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ज्ञान-विज्ञान विमुक्तये

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CONTENTS OF PART - I

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1. Stress Management and Role of Yoga, Pranamyam and Meditation during Pandemic

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Abstract

The COVID–19 pandemic has posed an immense challenge to health care system around the globe in terms of limited health care facilities and proven medical therapeutics to address the symptoms of the infection.

The current health care strategy has primarily focused on either the pathogen on the environmental factors. However, efforts towards strengthening the host immunity is important from public health perspective to stop the spread of the infection.

The potency of the agent, while a vaccine can induce specific immunity within the host, non – specific ways of improving overall host immunity are the necessity .This scenario has paved the way for the utilization of traditional Indian therapies like Ayurveda and yoga. this review aims at collecting available data on Ayurveda, yoga and COVID – 19 further, it draws inferences from recent studies on Yoga and Ayurveda on immunity respiratory health and psychological state respectively to approximate its probable role in prophylaxis and as an add – on management option for the present pandemic.

Keywords: Stress management, skill training, psychological well –being, academic vitality, Yoga, Pranayama, meditation, COVID-19.

Introduction

COVID –19 Pandemic was first detected in the Wuhan in late 2019, COVID-19 belongs to the family of SARS and MERS-CoV. The number of infected people and resulting deaths have increased drastically because of rapid viral infections across the globe. The elderly and people with underlying medical conditions are at higher risk of developing COVID-19. Recent reports reveal that coronaviruses, such as SARS and MERS, can modulate the host immune system (Vellingiri B, *et al.*, 2020) and creating underlying medical conditions and

weaken immune system making them more vulnerable to infections(Guan WJ, *et al.*, 2020) (Toniato E, *et al.*, 2020) pharmacological and non-pharmacological immune-modulatory interventions, empowered to combat such pathogens, are being discovered through intensified experiments and trials (Sanders JM, *et al.*, 2020)

Since the declaration of the COVID-19 outbreak as a pandemic by the world Health Organization (WHO), the uncertainty, stress is being circulated in social media, further exacerbating the situation causing fear, anxiety and stress in people and healthcare workers alike. In order to restrain the transmission of infection (and panic), several 'hotspot localities' are under lockdown. These conditions further escalated the conditions of stress among residents of the pandemic and containment regions (Zhang Y and MaZF, 2020) this further escalated work from home jobs and education online for students. Healthcare workers with a medical and para-clinical background also are at higher risk of developing psychological stress, strain, depression and post-traumatic stress disorder (Lai J, *et al.*, 2019) and requires rehabilitation therapy to deal with the crisis.

1. Yoga

Traditional Indian health practices such as Yoga, Siddha, Ayurveda and homeopathy have been known to prevent, treat and control several diseases. (Coudhary A, *et al.*, 2019)

These practices are 5000 years old and have been cited in ancient Indian literature. Yoga is one among the widely accepted and structured lifestyle practices which promotes the mixing of the mind, body and soul. These practices are known to have a strong influence on the psychology, control in thoughts (La Torre G, *et al*)

The Common Yoga Protocol was proposed by the Indian government for International Yoga Day. This Protocol includes all the aspects of Yoga practice, as an example postures (Asanas), breathing techniques (Pranayama) and meditation (Dhyana).(Ministry of AYUSH, I., Common Yoga Protocol. 2014.) Yoga has been shown to exert health promoting effects by influencing the neuro-psycho-immune ability through the improvement of psychological balance. Therefore, the Common Yoga Protocol can be universally adopted as a recourse to change the lifestyle of every age group and to supply mental and physical health benefits during the pandemic outbreak. Thus, we advocate the practice of the Common Yoga Protocol for risk reduction of COVID-19, because it could even be useful for the enhancement of immunity and to combat anxiety, hypertension and stress induced by the pandemic.

2. Meditation

Meditation is basic spiritual practice for relaxing the mind and getting into touch with our deeper Self, the spirit. Meditation provides a deeper appreciation of the interrelatedness of all things and thus the part everyone plays. The simple rules of this game are honesty with yourself about where you're in your life and learning and taking note. Meditation may be a way of listening more deeply, so you hear how it all is from a more profound place. Meditation enhances your insight to life, reveals your true nature, and brings you inner peace. A meditation practice is extremely useful in clearing your mind and letting you see how your mind keeps creating your universe. The ego will keep you occupied with its endless story line of thought forms. Just keep watching them until they dissolve. Most traditions require a regular practice to progress, to get ahead. Regularly practicing meditation, even once you don't desire it, will assist you see how your thoughts impose limits and colour your existence.

There are many various sorts of meditation from a number of spiritual traditions. They include Vipassana (or insight) meditation from the Southern Buddhist tradition, mantra from Hindu bhakti devotional practice (including the thanks to practice mantra with a mala, or rosary), and Guru Kripa (grace of the guru) meditation.

3. Pranayama

Yoga breathing exercises, also referred to as pranayama, are a crucial a part of a developing yoga practice. Pranayama is one among the Eight Limbs of Yoga referenced by The Yoga Sutras of Patanjali, which suggests that it had been considered an integral tread on the trail to enlightenment. Human breathing may be a synergistic process that's under autonomic nervous control continuously, and may even be controlled voluntarily at will, and thus reflects in various breathing patterns. Pranayama is a term that is associated with ashtanga yoga and deals with formal and traditional practice of control of breath and is intended for regulation of prana – the life-force. Pranayama is that the practice of controlling energy through the utilization breath. Implementing breath add yoga poses allows for more opening and presence. A pranayama practice revitalizes the body and stabilizes emotions.

4. Sub – Topics

4.1 Yoga

Stress relief - The practice of yoga is demonstrated to reduce the physical effects of stress. The body responds to stress through a fight-or-flight response, which is a combination of the sympathetic nervous system and hormonal pathways activating, releasing cortisol – the stress hormone – from the adrenal glands. Cortisol is often used to measure the stress response. Yoga practice has been demonstrated to reduce the levels. Most yoga classes end with savasana, a relaxation pose, which further reduces stress and relaxes the body.

Pain relief - Yoga can ease pain. Studies have shown that practicing yoga asanas (postures), meditation or both, reduces pain for people with conditions such as cancer, auto-immune diseases and hypertension as well as arthritis, back and neck pain and other chronic conditions.

Better breathing - Yoga includes breathing practices known as pranayama, which can be effective for reducing stress response, improving lung function and encouraging relaxation. Many pranayama's emphasize slowing down and deepening the breath, which activates the body's parasympathetic system, or relaxation response. By changing our pattern of breathing, we can significantly affect our body's experience of and response to stress. This may be one of the most beneficial lessons we can learn from our yoga practice.

Flexibility - Yoga improves flexibility, mobility and increase range of motion. Over the time, the ligaments, tendons and muscles lengthen, increasing elasticity of the body and making our body fit and healthy.

4.2 Pranayam

Breathing Benefit - Yoga involves paying attention to your breath, which can help you to relax. It may also call for specific breathing techniques. But yoga typically is not aerobic, like running or cycling, unless it is an intense type of yoga.

Ujjayi Breathing - Ujjayi breathing is usually practiced in Ashtanga yoga classes. Also known as Ocean Breath or Victorious Breath. Ujjayi creates heat in the body and it also brings stability. Using Ujjayi breath during asana practice can be a reminder and an indicator not to rush through any of the poses poses and not to sacrifice the breath for the sake of getting into an idealised shape of the pose. Spending time with deep Ujjayi breathing increases the awareness of our breath.

Nadi Shodhana - nadi = subtle energy channel; shodhan = cleaning, purification; pranayama = breathing technique

Nadi Shodhana or Alternate nostril breathing is the most important breathing technique to help keep the mind calm, happy and peaceful. In this type one needs to hold the breath for a longer time .This technique balances 2 of the most significant nadis or energy channels, Ida and Pingala, which criss-cross the central nadi, Sushumna and each of the chakras running up the spine.

It balances the breath through both nostrils – we usually have one which is more blocked and this will change through the day. Nadi Shodhana also balances the two hemispheres of the brain. It is an excellent relaxation technique, calming the mind and generally bringing balance to the whole system. It improves concentration and mental focus as it clears out blocked energy channels in the body.

Kapalabhati - Kapalabhati is also known as Skull Shining breath, Kapala means skull and Bhati means light. The emphasis is on the exhalation through strong, fast abdominal contractions and so has a cleansing effect on the breathing pathways. The inhale follows naturally after the strong exhale. It improves circulation especially to the brain which gives the skull shining effect; energizing the mind and waking up your system. Kapalabhati also creates heat and increases and stimulates the digestive fire (agni) by strengthening, massaging and toning the abdominal muscles and digestive organs.

Agni Sara / Fire Breath - In Agni Sara or Fire Breath, , the focus is on expelling the outbreath in the same way as Kapalbhati. It has many of the same benefits for the abdominal organs and muscles but is often taught using one nostril at a time and at a slower pace. The pace makes it more accessible to people starting out with Pranayama.

Pranayama techniques are sometimes taught differently depending on the teacher and style of yoga. For example, in the Kundalini Yoga tradition Agni Sara is taught in the same way as Kapalabhati. It is also sometimes taught by expelling the breath fully, applying Jalandhara Bandha (throat lock), then contracting and expanding the abdomen quickly while still retaining the exhalation comfortably. This variation also raises energy levels, stimulates the appetite and improves digestion.

Decreases Stress - According to scientists and doctors' pranayama calms the nervous system, which improves your stress response.

Increases Mindfulness - Research shows that pranayama helps remove carbon dioxide and raises oxygen levels, which fuels brain cells aiding in mindfulness (a practice focusing on the present moment rather than the past or future) thus improving focus and concentration.

Reduces Cigarette Cravings

A 2012 study found that just 10 minutes of yogic breathing showed a shortterm reduction in cigarette cravings. While there are tons of videos out there to learn this breathing technique and the fact that there are several different Pranayama methods in itself, we suggest you start off with the basics and develop a consistent practice to truly see a mind-body difference.

4.3 Meditation

Meditation promotes healing. The mind becomes fresh and beautiful. It cleanses and nourishes you from within and calms you, whenever you feel overwhelmed, unstable, or emotionally shut down. With regular practice of meditation:

- Anxiety decreases
- Emotional stability improves
- Creativity increases
- Happiness increases
- Intuition develops

Stress reduction is one of the most common reasons people try meditation. Normally, mental and physical stress cause increased levels of the stress hormone cortisol. This produces many of the harmful effects of stress, such as the release of inflammatory chemicals called cytokines. These effects can disrupt sleep, promote depression and anxiety. In an 8-week study, a meditation style called "mindfulness meditation" reduced the inflammation response caused by stress. Furthermore, research has shown that meditation may also improve symptoms of stress-related conditions, including, post-traumatic stress disorder.

Controls anxiety

Meditation can reduce stress levels, which translates to less anxiety. A meta analysis including nearly 1,300 adults found that meditation may decrease anxiety. Notably, this effect was strongest in those with the highest levels of anxiety Also, one study found that 8-10 weeks of mindfulness meditation helped reduce anxiety symptoms in people with generalized anxiety

disorder, along with increasing positive self-statements and improving stress reactivity and coping.

Improved memory: Better focus through regular meditation may increase memory and mental clarity. These benefits can help fight age-related memory loss and dementia.

Increased attention: Meditation makes one very much aware and attentive.

Enhanced will power: Meditation develops the mental discipline that is needed to avoid bad habits and make one focussed.

Better sleep: Meditation can shorten the time it takes to fall asleep and improves the sleep quality.

Less pain: Meditation can reduce pain and boost emotion regulation.

Lower blood pressure: Blood pressure decreases during meditation and over time in people who meditate regularly. This can reduce strain on the heart and blood vessels and help prevent heart disease.

Less anxiety: Regular meditation helps reduce anxiety and related mental health issues.

Less depression: Meditation can help reduce the occurrence of depression.

Conclusion

In this review article, we discussed the points of Yoga, Pranayama and Meditation and their long term benefits. Specially focusing on the practices and reduction of the future health problems. It has shown that meditation can usually decrease the risk of acquiring cold and flu by improving physiological function and quality of life. Yogic breathing techniques improve respiratory and cardiac function.

Refeences

1. Baden LR, Rubin EJ . Covid-19—the search for effective therapy. 2020, Mass Medical Soc.
2. Choudhary A , Pathak A , Manickam P , Purohit M , Rajasekhar TD , Dhoble P , Sharma A , Suliya J , Apsingekar D , Patil V , Jaiswal A . Effect of Yoga versus Light Exercise to Improve Well-Being and Promote Healthy Aging among Older Adults in Central India: A Study Protocol for a Randomized Controlled Trial. Geriatrics. 2019;4(4):64.
3. Falkenberg R , Eising C , Peters M . Yoga and immune system functioning: A systematic review of randomized controlled trials. Journal of Behavioral Medicine. 2018;41(4):467482.

4. Guan WJ , Liang WH , Zhao Y , Liang HR , Chen ZS , Li YM , Liu XQ , Chen RC , Tang CL , Wang T , Ou CQ . Comorbidity and its impact on patients with Covid-19 in China: A Nationwide Analysis. European Respiratory Journal. 2020;55(5)
5. Jayawardena R , Sooriyaarachchi P , Chourdakis M , Jeewandara C , Ranasinghe P . Enhancing immunity in viral infections, with special emphasis on COVID-19: A review. Diabetes v Metabolic Syndrome: Clinical Research & yReviews. 2020 Apr 16.
6. Lai J , Ma S , Wang Y , Cai Z , Hu J , Wei N , Wu J , Du H , Chen T , Li R , Tan H . Factors associated with mental health outcomes among health care workers exposed to coronavirus disease 2019. JAMA network open. 2020;3(3):e203976.
7. Ministry of AYUSH, I., Common Yoga Protocol. 2014. Sanders JM , Monogue ML , Jodlowski TZ , Cutrell JB . Pharmacologic treatments for coronavirus disease (COVID-19): A review. Jama. 2020;323(18):1824–36.
8. Toniato E , Ross R , Kritas S . How to reduce the likelihood of coronavirus-19 (CoV-19 or SARSCoV-2) infection and lung inflammation mediated by IL-1. 2020.
9. Vellingiri B , Jayaramayya K , Iyer M , Narayanasamy A , Govindasamy V , Giridharan B , Ganesan S , Venugopal A , Venkatesan D , Ganesan H , Rajagopalan K . COVID-19: A promising cure for the global panic. Science of the Total Environment. 2020:138277.
10. Zhang Y , Ma ZF . Impact of the COVID-19 pandemic on mental health and quality of life among local residents in Liaoning Province, China: A cross-sectional study. International journal of Environmental Research and Public Health. 2020;17.

2. Comparative Study of Hand Sanitizer

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Abstract

SARS-COV-2 has wreaked havoc on most countries of the world. At present, methodologies to manage COVID-19 i.e preventing the infection by using a mask, washing hands, using a sanitizer, and avoding people who have been explosed to the virus are only effective in decreasing transmission. One can reduce the microbial contamination in laboratories, hospital, toiletries and at home by washing hands with a soap. The strong religious belief of any religious is to wash your hand before any intake of food. Scientists have already proven that many food borne diseases such as diarrhea, etc are caused due to unwashed hands. Most of the hospital acquired infection are caused due to the unhygienic conditions of the hands of both the patient and the hospital staff. The common opportunities pathogenesis which caused hospital acquired infection are Staphylococcus aureus, E.coli and Pseudomonas Aurengies. The most common used to disinfect the hand is to wash it with clean water. However, the water used may not be safe all the time and therefore the used of soap and detergent have been introduced in a addition to the water. Still in recent times the hand sanitizer have been introduced in the market which claims to have great bactericidal activity and safe for use. The hand sanitizer available in the market are both alcohol based and non-alcohol based. The alcohol based hand sanitizers claims to kill 100% microorganisms including the most safe structure. The liquor free hand sanitizer viz. povidone- iodine, benzalkonium chloride or triclosan have persistent antimicrobial activity for a prolonged period and claim to be effective in killing microorganisms. In the presence study the effectiveness of hand sanitizer both alcohol/ non-alcohol based are tested against the standard Staphylococcus aureus and E.coli.

Keywords: *Staphylococcus aureus, Escherichia coli,* Hand sanitizer, Alcoholic, Non-alcoholic.

Introduction

The emergence of new pathogens, bacteria and viruses, has always posed serious challenges to public health around the globe. Severe Acute Respiratory Syndrome Coronavirus 2 SARS- Cov-2, more commonly known for causing Coronavirus disease 2019 or Covid-19 is currently one of the most perilous microorganisms. Because of the rapid transmission and mutation of this virus, WHO, the global health body had declared a global pandemic in early 2020. Since its discovery in December 2019 in Wuhan, there have been over three million confirmed cases world wide by April 2020. Because of the highly transmissive nature of the virus and the aftermath of the transmission, the coronavirus has caused significant trouble on all aspects of society despite aggressive isolation method to prevent its contamination. Currently, therapeutic strategies to deal with Covid-19 is only supportive, making prevention aimed at reducing transmission the best method at this time.

Washing hands often is one of the many ways to prevent the spread of this virus. In both healthcare and community setting, alcohol-based sanitizers have become a popular alternative to the traditional hand washing with soap and water. Alcohol based hand Sanitizer have been utilized as an effective alternative to hand washing to prevent the spread of bacterial and viral infections, making it one of the essential protocol in decreasing healthcare problem.

As of today, various types of hand sanitizes are available in the markets. The sanitizers are made up of combinations of ingredients that are known to neutralize the coronavirus. Given the prevalence of hand sanitizers during this pandemic, comprehend which kinds of hand sanitizers work best against this clever infection. The parts of human body that are mostly in contact with the outside world are hand. We use our hands for a variety of activities everyday. As our hands come in contact with various things and as pathogens are around us or on the surface of things we touch, our hands can carry different microbes. When contaminated hands come in contact with objects such door knobs, pen, pencils, seats and even people, the hands may transfer the microbes to the objects. Surprisingly finger nails harbour the most bacteria found on the human hands. Children contaminate their own food by not washing hands after playing outdoors, using toilets, etc. The genital area, nose, toilet doors, etc or sand house the deadly pathogen Staphylococcus aureus. When people touch these body parts or things, their hands may get contaminated with the pathogen.

A hand sanitizer is a great alternative to hand washing with soap and water. HS sometimes also referred to as rub, can be presented in the foam or as liquid solution. Further, the vehicle for HS may be either alcohol (alcoholic) or aqueous (non alcoholic). The antimicrobial activity of alcohol is based on its capacity to induce microbial protein denaturation. Studies and research have proven that alcohol is a great germicide i.e. alcohol is effective in neutralizing vegetative bacteria, fungi and many viruses.

Non- alcoholic hand sanitizer, on other hand, have nitrogenous cationic surface- acting agents such as benzalkonium chloride, chlorinated aromatic compound triclosan, povidone-iodine.

1. Sub topics

A. Hand sanitizer ingredients

There are two categories of hand sanitizer

1. Alcohol based hand sanitizer (ABHS)
2. Non- alcohol based hand sanitizer (NABHS)

The most common primary active ingredient of NABHS is Benzalkonium chloride, a quaternary ammonium is a commonly used disinfectant(Gold and Avva, 2018).Disinfectant with Benzalkonium chloride is generally less irritating than those with alcohol, though more recent evidence suggests that it may cause (Wentworth, Yiannias, Davis and Killian, 2016). ABHS are less friendly on skin than NABHS, ABHS predominate in health care setting given their low cost and efficacy of reducing infectious transmission(Flewr and Jones, 2017).

Hand sanitizer preparation containing alcohol, on the other hand it can include Ethanol, Isopropyl, N- propanol or a combination of these (Mcdonnell and Russell,1999). Solution containing alcohol between 60% and 95% in volume are most prevalent and effective. Humectants are included to prevent skin dehydration and excipients help stabilize the product(Bush, Benson and White, 1986).

B. Liquor instrument of activity against Bacteria

The compound, n-propanol, is the most ordinarily utilized liquor compound in biocides(Mcdonnell and Russell, 1999).It is not known with much confidence the exact mechanism of alcohol's antimicrobial activity, however it may be related film harm, and hindrance or uncoupling of mRNA and protein amalgamation through consequences for ribosomes and RNA polymerase (Haft, Keating and Schwaegler, 2014), or associated with protein (Mcdonnell and Russell , 1999). For activity against bacteria, it's optimal bactericidal

efficacy is achieved at concentration between 60% and 90%(Morton, et al., 1950). Note in any case, that alcohols display bactericidal movement against vegetative microbes those undergoing metabolism and binary fission but not against spores (Thomas, *et al* .,2012**).**

C. Alcohol mechanism of action against Viruses

The viral targets of alcohol based hand sanitizer are predominantly the viral envelope if present, which is derived from host lipid envelope, the protein capsid, which contains and protects the genetic material(Mcdonnell and Russell, 1999). While less is known with respect to the particular component of activity of alcohols specialists against infections contrast with microorganisms, it is understood that Ethanol have a broader and stronger virucidal activity than propanol. Indeed high centralization of ethanol has demonstrated to be profoundly viable against wrapped infections(Kampf and Kramer, 2004),and thus is effective against the majority of clinically relevant viruses(Kampf, et al ., 2018). It is also interesting to note that adding acid to ethanol solution can increase it's efficacy against viruses that are more resistant to ethanol alone(Kampf, et al .,2018) (14. Park, Barclay, MacInga, Charbonneau, Pettigrew and Vinje, 2010)

2. Efficacy of Hand Sanitizer

A. Bacteria and Fungi

Traditionally, bacteria on hands can be grouped into two categories – resistant and transient verdures. Common resident floras are Staphylococcus aureus, Staphylococcus epidermis and Enterococcus faecalis. The resident floras can colonize deep layers of the skin. They are resistant to mechanical removal (Jain, Karibasappa, Dodamani, Prashanth and Mali, 2016). Transient verdures for example S. aureus, Escherichia coli and Pseudomonas aeruginosa colonize the superficial layers of skin (Jain, Karibasappa, Dodamani, Prashant and Mali, 2016). Several bacterial strains can be transmitted to the host from other sources that can potentially develop into a variety of bacterial infection.

1. ABHS are extremely powerful for rapidly annihilating numerous microbes by the activity of the fluid liquor arrangement without the requirement for water or drying with towel. ABHS have astounding in vitro antimicrobial action, including multidrug-safe microorganisms, like methicillin – safe S.aureus, vancomycin- resistant Enterococcus, according to the Centres for Disease Control and Prevention (CDC) (Gerberding, David Fleming, and Snider, 2002). Specific in vitro studies show that hand sanitizer containing 60% - 80% ethanol created 4 to 6 log decrease in 15-30 seconds against a reach of bacterial and parasitic species(Flender, Ali,

Hammond, Lyons, Kelley, and Vowell, 2002). Various investigations have likewise archived in vivo antimicrobial action from defiled hands (Di Muzio, Cammilletti, Petrelli and Di Simone, 2015) (Ramasethu, *et al* ., 2017). While different alcohol-based hand sanitizer all demonstrated antimicrobial effects against various gram- positive and gram- negative bacteria using the Kirby-Bauer method, which uses anti-toxin impregnated circles to test the powerlessness of strains, propanol-based sanitizers were more viable contrasted with ethanol with the best zone of restraint. (Gold and Avva, 2018) (Jain, Karibasappa, Dodamani, Prashanth and Mali, 2016).

With increasing use of hand sanitizers as infectious control measure, it is also important to note any potential tolerance mechanism from bacteria. An in vitro alcohol tolerance assay using a lower concentrations of alcohol (Islam, Cicek, Sparling and Levin, 2009). Tolerance is not only limited to alcohol, but also exist for Benzalkonium chloride (Minarovičová, Véghová and Mikulášová, 2018) (Bore, Hébraud and Chafsey, 2007). The presence of any selective pressure in environments encourage microbes to adapt and evolve resistance to such pressures, and in the case of BC, researchers have observed resistant strains that were able to survive certain concentration of BC (0.1% - 0.4%) since the 1960s(Malizia, Gangarosa and Goley, 1960) (Adair Geftic and Gelzer, 1969).

B. Viruses

Although studying the behaviour of viruses in vivo is difficult compared to microscopic organisms, various examinations have endeavoured to approve the adequacy of hand sanitizers on diseases. The World Health Organization recommend alcohol- based hand sanitizer formulations against bovine viral diarrhoea virus, murine norovirus and Coronavirus as shown with effective inactivation in quantitative suspension tests (Siddharta Pfaender and Vielle, 2017) (Steinmann, Becker and Bischoff, 2010). Different details from Sterillium that contain isopropanol as the principle fixing likewise totally inactivated encompassed intestinal and respiratory infections, for example, H1N1 flu An infection, however neglected to inactivate nonenveloped infections, with the exception of rotavirus (Tuladhar, Hazeleger, Koopmans, Zwietering , Duizer and Beumer, 2015). Various in vivo studies have likewise been led where the infection is applied to fingertips and the efficacy of the hand sanitizers in reducing the number of viral particles recoverable from hands is determined (Ansari , Sattar , Springthorpe, Wells and Tostowaryk, 1989).

Many of these fingers pad tests show moderate efficacy against most nonenveloped viral strains, which are known to be more impervious to sanitizers than encompassed(Sattar, Abebe, Bueti, Jampani, Newman and Hua, 2000)(Kampf, Grotheer and Steinmann, 2005).

It is crucial to keep note of the type of viral strains as high concentration of ethanol has shown to be highly effective against enveloped viruses (Kampf and Kramer, 2004) and thus is effective against the majority of clinically relevant viruses (Kampf, et al ., 2018). That being said, despite the fact that nonenveloped infections like Hepatitis An and enteroviruses require 70%-80% liquor to be dependably inactivated, Sattar et al suggest that 60% ethanol was sufficient to reduce the titters of rotavirus, adenovirus and rhinovirus by > 3 log 10 within a 10 second contact period (Sattar, Abebe, Bueti, Jampani, Newman and Hua, 2000).Even with non enveloped viruses, satisfactory activity can be achieved with higher alcohol concentrations and extended contact times (Boyce and Pittet, 2002) (Kampf, Rudolf, Labadie and Barrett, 2002).

As the novel SARS-Cov-2 is changing rapidly, data from previous coronaviruses can be extrapolated in the context of the efficacy of hand disinfection given the structural similarity of different variants of the coronaviruses. A systematic review examining the 2002- 04 SARS outbreak indicated that 9 out 10 small case control studies pointed towards the idea that hand washing decreases the likelihood of nosocomial and community transmission, although only three showed statistical significance, partly explained due to the small sizes of the studies(Fung and Cairncross, 2006). A portion of the studies varied in the specific method of hand washing; some studies used hand sanitizers, while others did not specify whether it was achieved through soap and water or sanitizers. Albeit direct in vivo affirmation of infection inactivation after hand sanitizer use is infeasible to accomplish in standardized method, vitro studies using sputum cultures of SARS- CoV infected patients with four different alcohol-based hand sanitizer formulations were all able to inactivate the virus below the limit of detection(Rabenau, Kampf, Cinatl and Doerr, 2005).

3. Benzalkonium Chloride Mechanism of Action

Similar to alcohol- based mostly hand sanitizers, benzalkonium chloride (BC), the essential part of NABHS, is for the foremost half not viable against nonenveloped viruses (Tondreau and Markham, 1986) (Springthorpe, Grenier, Lloyd-Evans and Sattar, 1896), though a study demonstrating its effectualness nonenveloped viruses, recommend exception exist (Wood and Payne, 1998) . Despite this exception, it seems that the lipide envelope of either microorganism or viruses square measure essential structures for BC's effectiveness.

The ion "headgroup " of before Christ is dynamically adsorbable to the adversely charged phosphate heads of lipid within the lipide bilayer, and as a result, increase in concentration(Wessels and Ingmer, 2013).The consistent increase of before Christ concentration leads to reduced thinness of the membrane and therefore the creation of deliquescent gaps within the membrane(Wessels and Ingmer, 2013). Likewise, the chemical group chain " tail" a part of before Christ any annoys and disrupt the membrane bilayer by distributive the barrier and disrupting its physical and organic chemistry properties(Wessels and Ingmer, 2013). supermolecule operate is afterwards distributed and also the combination of the for mentioned effects leads to the solubilization of the bilayer constituents into BC/ lipid micelles(Wessels and Ingmer, 2013). before Christ additionally interrupt living thing targets and compromises the conformational behaviour of DNA (Zinchenko, Sergeyev, Yamabe, Murata and Yoshikawa, 2004).

4. Hand Sanitizer Versus Soap

Numerous hand sanitizers, consisting of various ingredients and strategies of application, are compared. Be that because it might, the authority suggests laundry hands with formulation and water at no matter purpose conceivable over hand sanitizers (Gerberding, David Fleming and Snider, 2002). the prevalence pf hand laundry stems from varied factors, like elimination of a wider of spectrum of pathogens and chemicals, and removal of bio burden on unclean hands. A 2016 systematic review support the historical agnosticism regarding the utilization of hand sanitizer in food preparation setting and recommend that hand laundry with soap and water is more practical than various hand medical aid technique for removal of soil and microorganisms from hands(Foddai, Grant and Dean, 2016).

Despite what's typically expected, logical investigations have shown that when hand laundry, as varied as eightieth of people retain some unhealthful microorganism on their hands(Tambekar, Shirsat, Suradkar, Rajankar and Banginwar, 2007). Moreover, hand laundry removes the body's own fatty acids from the skin that ultimately provides a possible entry portal for pathogen(Larson, Norton Hughes, Pyrek, Sparks, Cagatay and Bartkus, 1998). to beat the constraints of plain hand laundry, hand sanitizer were introduced claiming to be effective against those unhealthful microorganisms in addition as improve skin condition because of the addition of emollient. (Lauharanta, Ojajärvi, Sarna and Makela, 1991).

5. Foam Versus Gel

Three common modes of delivering the active ingredient in hand sanitizer, whether or not alcohol or alternative disinfectants, are foams, gels and sprays. there's restricted analysis on scrutiny the effectualness of assorted sanitizer delivery system on viricidal effectualness. One study with thirty human volunteers showed> three log ten reductions of H1N1 infectious agent depends on finger cushions with froth gel and wipes with none distinctions in adequacy among delivery types (Larson, Cohen and Baxter, 2012).Similar finding were seen by Grayson et al, scrutiny alcohol based mostly gel and liquid forms on H1N1(Grayson, Melvani and Druce, 2009). each of those studies recommend that there might be some variable variations in effectualness because of the tactic of mechanical friction that would contribute to physical removal of pathogens, however there has to be any analysis conducted to match the effectualness between the assorted hand sanitizer delivery framework.

References

1. Adair FW, Geftic SG, Gelzer J. Obstruction of pseudomonas to quaternary ammonium compounds. I. Development in benzalkonium chloride arrangement . Appl Microbiol. 1969;18:299–302.
2. Ansari SA, Sattar SA, Springthorpe VS, Wells GA, Tostowaryk W. In vivo convention for testing viability of hand-washing specialists against infections and microorganisms: explores different avenues regarding rotavirus and Escherichia coli. 1989;55:3113–3118.
3. Boyce JM, Pitted D, Healthcare Infection Control Practices Advisory Committee. Society for Healthcare Epidemiology of America. Relationship for Professionals in Infection Control. Irresistible Diseases Society of America. Hand hygiene Task Force Guideline for hand cleanliness in medical -care settings: proposals of the medical care contamination control rehearses warning advisory group and the HICPAC/SHEA/APIC/IDSA hand cleanliness team. Contaminate Control Hosp Epidemiol. 2002;23(12 Suppl):S3–40.
4. Bore E, Hébraud M, Chafsey I. Adjusted resistance to benzalkonium chloride in Escherichia coli K-12 concentrated by transcriptome and proteome investigations. Microbial science. 2007;153:935–946.
5. Blaney DD, Daly ER, Kirkland KB, Tongren JE, Kelso PT, Talbot EA. Utilization of liquor based hand sanitizers as a danger factor for norovirus episodes in long haul care offices in northern New England: December 2006 to March 2007 . Am J Infect Control. 2011;39:296–301.

6. Dastider D, Jyoti Sen D, Kumar Mandal S, Bose S, Ray S, Mahanti B. Hand sanitizers bid goodbye to microbes on surface space of hands. J Pharm Med Res. 2020;7:648–656. [Google Scholar]
7. Fung ICH, Cairncross S. Viability of handwashing in forestalling SARS: an audit. Trop Med Int Health. 2006;11:1749–1758.
8. Fleur P la, Jones S. Non-liquor based hand rubs: a survey of clinical adequacy and rules. [Internet]. CADTH Rapid Response Report. 2017. Available at: http://www.ncbi.nlm.nih.gov/pubmed/29266912. Accessed July 10, 2020
9. Fendler EJ, Ali Y, Hammond BS, Lyons MK, Kelley MB, Vowell NA. The effect of liquor hand sanitizer use on disease rates in a lengthy consideration office. Am J Infect Control. 2002;30:226–233.
10. Foddai ACG, Grant IR, Dean M .Viability of moment hand sanitizers against foodborne microorganisms contrasted and hand washing with cleanser and water in food arrangement settings: An orderly audit. J Food. J Food Prot. 2016;79:1040–1054. Worldwide Association for Food Protection.
11. Grayson ML, Melvani S, Druce J. Adequacy of cleanser and water and alcohol-based hand-rub arrangements against live H1N1 flu infection on the hands of human volunteers. Clin Infect Dis. 2009;48:285–291
12. Gold NA, Avva U. StatPearls Publishing; 2018. Alcohol Sanitizer. Available at: http://www.ncbi.nlm.nih.gov/pubmed/30020626. Accessed July 10,2020.
13. Gerberding JL, Director David Fleming MW, Snider DE, et al. Grimness and mortality week by week report rule for hand cleanliness in medical services settings proposals of the medical care contamination control rehearses warning committee and the HICPAC/SHEA/APIC/IDSA Hand Hygiene task force centers for disease control and prevention. MMWR 2002;51 (No. RR-16):2-29.
14. Haft RJF, Keating DH, Schwaegler T. Adjusting direct impacts of ethanol on interpretation and record hardware gives ethanol resistance in microscopic organisms. Proc Natl Acad Sci U S A. 2014;111:E2576.
15. Islam R, Cicek N, Sparling R, Levin D. Impact of introductory cellulose fixation on the carbon stream conveyance during bunch maturation by Clostridium thermocellum ATCC 27405 Appl Microbiol Biotechnol. 2009;82:141–148.
16. Jain VM, Karibasappa GN, Dodamani AS, Prashanth VK, Mali GV. Similar appraisal of antimicrobial viability of various hand sanitizers: an in vitro study . Dent Res J (Isfahan) 2016;13:424–431.

17. Kampf G. adequacy of ethanol against infection closed by sanitization . j hosp infect. 2018;98:331–338. W.b. Saunders ltd.
18. Kampf G, Grotheer D, Steinmann J. Adequacy of three ethanol-based hand rubs against cat calicivirus, a proxy infection for norovirus. J Hosp Infect. 2005;60:144–149.
19. Kampf G, Kramer A Epidemiologic foundation of hand cleanliness and assessment of the main specialists for scours and rubs. Clin Microbiol Rev. 2004;17:863–893. American Society for Microbiology (ASM)
20. Kampf G, Rudolf M, Labadie JC, Barrett SP. Range of antimicrobial movement and client adequacy of the hand sanitizer specialist Sterillium® Gel. J Hosp Infect. 2002;52:141–147.
21. Kampf G, Todt D, Pfaender S, Steinmann E. Tirelessness of Covids on lifeless surfaces and their inactivation with biocidal specialists. J Hosp Infect. 2020;104:246–251. W.B. Saunders Ltd.
22. Larson EL, Cohen B, Baxter KA. Investigation of liquor based hand sanitizer conveyance frameworks: adequacy of froth, gel, and wipes against flu A (H1N1) infection on hands. Am J Infect Control. 2012;40:806–809.
23. Lauharanta J, Ojajärvi J, Sarna S, Mäkelä P. Avoidance of dryness and skin inflammation of the hands of medical clinic staff by emulsion purging as opposed to washing with cleanser. J Hosp Infect. 1991;17:207–215
24. Larson EL, Norton Hughes CA, Pyrek JD, Sparks SM, Cagatay EU, Bartkus JM. Changes in bacterial vegetation related with skin harm on hands of medical services work force. Am J Infect Control. 1998;26:513–521.
25. McDonnell G, Russ Germ-killers and sanitizers: movement, activity, and opposition microbial Rev. 1999;12:147–179. American Society for Microbiology (ASM)
26. Morton HE. The relationship of focus and germicidal proficiency of ethyl liquor. Ann N Y Acad Sci. 1950;53:191–196.
27. Minarovičová J, Véghová A, Mikulášová M. Benzalkonium chloride resistance of Listeria monocytogenes strains secluded from a meat handling office is identified with presence of plasmid-borne bcrABC tape. Antonie van Leeuwenhoek, Int J Gen Mol Microbiol. 2018;111:1913–1923.
28. Park GW, Barclay L, MacInga D, Charbonneau D, Pettigrew CA, Vinjé J. Relative adequacy of seven hand sanitizers against murine norovirus, cat calicivirus, and GII.4 norovirus. J Food Prot. 2010;73:2232–2238.

29. Pidot SJ, Gao W, Buultjens AH. Expanding resistance of clinical Enterococcus faecium to handwash alcohols. Sci Transl Med. 2018;10:eaar6115.
30. Pillar Transllegranzi B, Boyce J. The World Health Organization rules available cleanliness in medical care and their agreement suggestions. Contaminate Control Hosp Epidemiol. 2009;30:611–622.
31. Peeri NC, Shrestha N, Rahman MS. The SARS, MERS and novel (COVID-19) scourges, the most current and greatest worldwide wellbeing dangers: what examples have we realized? Int J Epidemiol. 2020;49:717–726.
32. Rabenau HF, Kampf G, Cinatl J, Doerr, J Hosp Infect. Feasibility of various sanitizers against SARS Covid. J Hosp Infect. 2005;61:107–111. 2005;61:107–111. [PMC free article] [PubMed] [Google Scholar]
33. Resnick L, Veren K, Salahuddin SZ, Tondreau S, Markham PD. Security and inactivation of HTLV-III/LAV under clinical and research centre condition. JAMA J Am Med Assoc. 1986;255:1887–1891.
34. Ramasethu J. Counteraction and treatment of neonatal nosocomial diseases. Matern Heal Neonatol Perinatol. 2017;3:5.
35. Springthorpe VS, Grenier JL, Lloyd-Evans N, Sattar SA. Substance sanitization of human rotaviruses: adequacy of economically accessible items in suspension tests. J Hyg (Lond) 1986;97:139–161.
36. Siddharta A, Pfaender S, Vielle NJ. Virucidal action of World Health Organization-suggested definitions against wrapped infections, including Zika, Ebola, and arising Covids . Br Rep J Infect Dis. 2017;902:902–908.
37. Steinmann J, Becker B, Bischoff B. Virucidal action of 2 liquor based details proposed as hand rubs by the World Health Organization. Am J Infect Control. 2010;38:66–68.
38. Sattar SA, Abebe M, Bueti AJ, Jampani H, Newman J, Hua S. Movement of a liquor based hand gel against human adeno-, rhino-, and rotaviruses utilizing the fingerpad technique. Infect Control Hosp Epidemiol. 2000;21:516–519.
39. Steinmann J, Paulmann D, Becker B, Bischoff B, Steinmann E, Steinmann J. Correlation of virucidal movement of liquor based hand sanitizers versus antimicrobial hand cleansers in vitro and in vivo. J Hosp Infect. 2012;82:277–280 .
40. Thomas P. Long-term survival of bacillus spores in alcohol and identification of 90% ethanol as relatively more spori/bactericidal. Curr Microbiol. 2012;64:130–139.

41. Tuladhar E, Hazeleger WC, Koopmans M, Zwietering MH, Duizer E, Beumer RR. Lessening viral tainting from finger cushions: handwashing is more compelling than liquor based hand sanitizers. J Hosp Infect. 2015;90:226–234
42. Tambekar D.H., Shirsat SD, Suradkar S.B., Rajankar PN, Banginwar YS. Anticipation of transmission of irresistible sickness: examines available cleanliness in medical care among understudies. Cont J Biomed Sci. 2007;1:6–10.
43. Vogel L. Hand sanitizers might increase norovirus hazard . CMAJ 2011;183:E799.
44. Wentworth AB, Yiannias JA, Davis MDP, Killian JM. Benzalkonium chloride: a known aggravation and novel allergen. Dermatitis. 2016;27:14–20.
45. Wood A, Payne D. The action of three antiseptics/disinfectants against enveloped and non-enveloped viruses. J Hosp Infect. 1998;38:283–295.
46. Wessel S, Ingmer H. Methods of activity of three sanitizer dynamic substances: an audit. Regul Toxicol Pharmacol. 2013;67:456–467.
47. Zinchenko AA, Sergeyev VG, Yamabe K, Murata S, Yoshikawa K. DNA compaction by divalent cations: Structural specificity revealed by the potentiality of designed quaternary diammonium salts. Chem Bio Chem. 2004;5:360–368.

3. Scrutinize on Antibacterial and Antifungal Properties of Brahmi (Bacopa Monnieri (Linn) Pennell (A Review)

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Abstracts

Plants have been utilized as drugs for a gigantic number of a long time, in light of inclusion and society cures and keep on outline wide thought for their work within the treatment of delicate and perpetual sicknesses.

In these periods, concentration on plant ask has extended all through the world too, a tremendous gathering of confirmation has been collected to highlight the huge capability of therapeutic plants utilized in different framework of medication. In differing of restorative plants Bacopa monnieri is one of the foremost valuable plants seen in Ayurveda medicines. Bacopa monnieri may be a interminable, moving furtively herb root to wetlands of southern and eastern India, Australia, Europe, Asia and north and South America. Brahmi has its claim person unmistakable solid home grown taste and a severe after taste. Due to modification in lives and developing mindfulness for wellbeing there's a endless request of nourishment items that are sound as well as give a few valuable welfare.

Its phytochemical substances are alkaloids, flavonoids, glycosides, saponins and the critical constituents such as bacosides, bacopa sides and bacopa saponins, which all of these contribute to its accommodating properties. It is presently being broadly advanced to improve memory, learning and concentration additionally to treat uneasiness, sadness and systemic disarranges like cardiovascular, gastrointestinal, hepatic, neurological conjointly respiratory issues. This article basically joins on the outline of Bacopa monnieri collection, development, Ayurveda benefits.

Keywords: *Bacopa monnieri, Bacoside, Brahmi, Bacopa saponin C, Anti-Parkinson*

1. Introduction

Brahmi may be a typical herb originated all over India. It may be a plant which lives more than two a long time (lasting) of 10 cm tall. Brahmi leaf's, are sessile organized in inverse heading, which is little and plump. The blooms are of 1-2 cm and white in colour. It indeed develops in hot and dampness put. It is one among the medicinal plants in India (Gk S, MS Bharath M 2011). The word Brahmi comes from the word 'Brahman' which implies Awareness of God. Brahmi gives a state of calmness to the body and soul. It is primarily begin from Karnataka, Kerala, Odisha, Bihar, Punjab, Haryana, Bengal, Tamil Nadu, Himachal Pradesh and Uttarakhand. In subtropical and ineffectively water depleted ranges it develops well. It develops speedier at 30-40°C. Made on their part in treatment of slight and persevering wellbeing issues, plants have been utilized for a thousand a long time presently. As of late, home grown plants are in consideration due to their capacity to appear ideally results in various wellbeing troubles. It indeed develops in overwhelm and damp places of Nepal, Sri Lanka, China, Bangladesh and USA. Bacopa monieri Linn. (Herpestismoniera) equivalent word. Bacopa supremely is known as Brahmi, Jalnim in Hindi and Nirpirami, Piramiyapundu in Tamil which has a place to the family Scrophulariaceae (Ramawat KG 2004).

A. Plants Parts Used

Utilize by - Seeds, roots, leaves, rhizomes

Intrusive parasitic contaminations have expanded in recurrence and seriousness over the final two decades as a result of an expanding number of immunocompromised host (Tortorano AM, *et al.*, MA 2004). Broad utilize of antibacterial and antifungal treatments for corrective and prophylactic purposes has genuine downsides such as the improvement of parasitic resistance and poisonous side impacts. Since of the eukaryotic properties of parasites, numerous antifungal compounds display a strong cytotoxic impact on people which could be a critical confinement for the application of these compounds as a down to earth medicate (Singh HK, Dhawan BN 1997). In look of modern antifungal compounds with moo side impacts such as cytotoxicity, later endeavours have centred on normal assets to get a novel bioactive substance, particularly from plants. Due to the tall costs, debasements and conceivable side impacts of manufactured drugs the hunt for elective cheap therapeutic plants is of best need in creating and beneath created nations (Arora DS, Kaur GJ 2007). Therapeutic plants speak to a wealthy source of antimicrobial specialists and utilized broadly in Ayurvedic and other conventional therapeutic frameworks (Arora DS, Kaur GJ 2007), (Sampathkumar P, *et al.*, 2008), (Thomson WAR 1978), (Mahesh B, Satish S 2008).

A wide run of therapeutic plant parts utilized for extricate as crude drugs and they have changed therapeutic properties. The diverse parts utilized incorporate root, stem, blossom, natural product, twigs exudates and altered plant organs. Whereas a few of these crude drugs are collected in littler amounts by the nearby communities and people healers for nearby utilized, numerous other crude drugs are collected in bigger amounts and exchanged within the showcase as the crude fabric for numerous home grown businesses. In spite of the fact that hundreds of plant species have been tried for antimicrobial properties, the endless lion's share of have not been enough assessed (Balandrin M F, *et. al.*,1985). The common restorative plant Bacopa monnieri (Linn) Pennell, could be a well-known herb in Indian framework of pharmaceutical commonly called as Brahmi. The plant is commonly found in damp, moist and mucky regions. The dynamic fixings of the plants were utilized as brain tonic, which is compelling in keeping up the energy and judgment skills

(Ahmad I, *et al.*,1998), contcoid saponin called bacosides (Chaudhuri PK, *et al.*, 2004), (Ghosh T, *et al.*,2007).

The bacosides upgrade the efficiency of transmission of nerve motivation additionally utilized as a purgative and corrective for ulcers, aggravation, anaemia, scabies, leucoderma, epilepsy and asthma (Russo A, Borrelli F 2005), The plant is additionally detailed to appear narcotic (Kar A, Panda S, Bharti S 2002), hyperthyroidism, vasoconstrictor and anti-inflammatory property (Khan AV, *et al.* 2010).

2. Chemical Constituents

his plant within the innate framework of medication, efficient chemical reviews of the plant have been carried out by various bunches of researchers. A few of the chemical constituent that are display are alkaloids, flavonoids, glycosides, saponins and the critical constituents such as bacosides, bacopa sides and bacopa saponins, which all of these contribute to its supportive properties. It too contains bacopa side X, bacopa side II, bacoside A3 and bacopa saponin C

A. Ethnomedical uses

- Brahmi is utilized for oxidative harm conjointly act as a effective antioxidant agent.
- It soothes spinal pain, mental illness, epilepsy, aggravation within the bowel and joint pain (Onsa-ard A, *et al.*, 2012).
- Elephantiasis is treated by Brahmi root treatment (Mukherjee A, 2017).
- Gonorrhoea, the sexually transmitted infections is treated by utilizing powder leaf of Brahmi which is blended with milk (Caroline R, 2003).

- The leaf extricate of Brahmi is utilized to remedy jaundice and fever and its other applications is neurological tonic which too acts as neuroprotective properties; even it cures asthma and bronchitis (Elangovan V, *et al.* 199).
- It is additionally treated for diarrhoea in children (Elangovan V, *et al.*, 1995).
- To increment the blood and for upgrading the apprehensive framework, Brahmi leaf juice is managed (Tripathi YB, *et al.*, 1996).
- The takes off filter the blood and utilized to remedy mental sickness, cholera, domestic pharmaceutical for heaps and amenorrhea are moreover treated by utilizing Brahmi (Phrompittayarat W, *et al.* 2008).
- When Brahmi is blended as a composition with tulsi, neem, amla it advances the development of nails, hair and skin (Jain P, *et al.*,1994).

B. Pharmacological uses

Memory Enhancement - The Ayurvedic herb Brahmi too called Bacopa. It makes a difference in expanding the memory and learning ability of human and it too hone the brain (Chowdhuri DK, *et al.* 2002), (Rao SB, 2005). It's utilized to treat Alzheimer's malady, uneasiness, beside battling push and making strides memory (Kumar A, *et al.*,2009).

Antioxidant - The antioxidant potential is nice in Brahmi which secures from oxidative destructions (Yu Z, *et al.*, 1997). The cellular devastation is due to free radical and which too upgrade antioxidant movement in other organs that basically acts on brain related to the cognitive capacities (Chopra RN, Nayar SL 1956).

Anti-depressant - The dynamic fixings influence the hormonal adjust within the body and influence the push hormone in our body (Nadkarni KM, 1996). It increases the serotonin levels within the brain, which calms from uneasiness, apprehension and permits unwinding the intellect, when Brahmi leaf is managed (Nadkarni KM, 1996).

Anti-inflammatory - It is utilized for systemic redness within the brain and swelling within the body. When Brahmi leaf is connected within the influenced portion, it diminishes swelling and diminishes the irritation level interior the body. This too has important anti-inflammatory activity that will well be pertinent to its effectiveness within the healing of various incendiary circumstances in conventional pharmaceutical. It too intentionally repressed 5-lipoxygenase (5-LOX), 15-LOX and cyclooxygenase-2 (COX-2) exercises. This action may be due to event of the triterpenoids and bacosides in it. It can be utilized for individuals enduring from joint pain, gout and other swelling situations

References

1. Ahmad I, Mehmood Z, Mohammad F. Screening of some Indian medicinal plants for their antimicrobial properties. J Ethnopharmacol. 1998; 62(2):183-93
2. Arora DS, Kaur GJ. Antibacterial activity of some Indian medicinal plants. J Nat Med. 2007; 61(3):313-7.
3. Balandrin M F, Klocke, JA, Wurtele ES, Bollinger WH. Natural plant chemicals: sources of industrial and medicinal materials. Sci. 1985; 228:1154-9.
4. Caroline R, Richard B, Scoot (2003) Brain bioenergetics and cognitive ability. Dev Neurosci 25: 324-331.
5. Chatterjee TK, Chakraborty A, Pathak M, Sengupta GC (1992) Effects of plant extract Centella asiatica (Linn.) on cold restraint stress ulcer in rats. Indian J Exp Biol 30: 889-891.
6. Chaudhuri PK, Srivastava R, Kumar S, Kumar S. Phytotoxic and antimicrobial constituents of Bacopa monnieri and Holmskioldia sanguinea. Phytother Res. 2004; 18(2):114-7.
7. Cheng CL, Koo MW (2000) Effects of Centella asiatica on ethanol induced gastric mucosal lesions in rats. Life Sci 67: 2647-2653.
8. Chopra RN, Nayar SL (1956) Glossary of Indian medicinal plants. Council of Scientific and Industrial Research, New Delhi.
9. Chowdhuri DK, Parmar D, Kakkar P, Shukla R, Seth PK, et al. (2002) Anti-stress effects of bacosides of Bacopa monnieri: Modulation of Hsp70 expression, superoxide dismutase and cytochrome P450 activity in rat brain. Phytotherapy Research: An International Journal Devoted to Pharmacological and Toxicological Evaluation of Natural Product Derivatives 16: 639-645.
10. Elangovan V, Govindasamy S, Ramamoorthy N, Balasubramanian K (1995) In vitro studies on the anticancer activity of Bacopa monnieri. Fitoterapia 66: 211.
11. Ghosh T, Maity TK, Bose A, Dash G.K, Das M. Antimicrobial activity of various fractions of ethanol extract of Bacopa monnieri Linn. aerial parts. Indian J Phar Sci. 2007; 69(2): 312-4.
12. Gk S, MS Bharath M (2011) Exploring the role of "Brahmi" (Bacopa monnieri and Centella asiatica) in brain function and therapy. Recent Patents on Endocrine, Metabolic and Immune Drug Discovery 5: 33-49.
13. Gohil KJ, Patel JA. A review on Bacopa monniera: Current research and future prospects. Int J Gre Pha. 2010; 4(1): 1-9.

14. Huie CW. A review of modern sample-preparation techniques for the extraction and analysis of medicinal plants. Anal Bioanal Chem. 2002; 373:23-30.
15. Jain P, Khanna NK, Trehan N, Pendse VK, Godhwani JL (1994) Anti-inflammatory effects of an ayurvedic preparation, brahmi rasayan, in rodents. Indian J Exp Biol 32: 633-636.
16. Kar A, Panda S, Bharti S. Relative efficacy of three medicinal plant extracts in the alteration of thyroid hormone concentrations in male mice. J Ethnopharmacol. 2002; 81(2):281-5
17. Khan AV, Ahmed QU, Shukla I, Khan AA. Antibacterial efficacy of Bacopa monnieri leaf extracts against pathogenic bacteria. Asian Biomed. 2010; 4(4):651-5.
18. Khare CP, Chopra RN (2000) Indian herbal therapies. Vishv Books.
19. Krishnakumar, K. N., GSLHV Prasada Rao, and C. S. Gopakumar. "Rainfall trends in twentieth century over Kerala, India." Atmospheric environment43.11 (2009): 1940-1944.
20. Kumar A, Dogra S, Prakash A (2009) Neuroprotective effects of Centella asiatica against intracerebroventricular colchicine-induced cognitive impairment and oxidative stress. Int J Alzheimers Dis.
21. Mahesh B, Satish S. Antimicrobial activity of some important medicinal plant against plant and human pathogens. World journal of agricultural sciences. 2008; 4(5):839-43.
22. Mehrotra BN. Compendium of Indian medicinal plants Lucknow: Central Drug Research Institute, 1990; p: 226-7.
23. Mukherjee A, Gombar V, Shamsi Y, Gupta M, Sinha S (2017) Effectiveness of brahmi in various illnesses: Review paper. Herb Med 3: 10.
24. Nadkarni KM (1996) Indian materiamedica. Dr. KM Nadkarni's Indian materiamedica: with Ayurvedic, Unani-Tibbi, Siddha, allopathic, homeopathic, naturopathic and home remedies, appendices and indexes. 1. Popular Prakashan.
25. Onsa-ard A, Scholfield CN, Ingkaninan K, Srimachai S, Kamkaew N, *et al.* (2012) Oral Bacopa monnieri is antihypertensive in rats chronically treated with L-NAME. J Physiol 25: 23-26.
26. Phrompittayarat W, Wittaya-Areekul S, Jetiyanon K, Putalun W, Tanaka H, *et al.* (2008) Stability studies of saponins in Bacopa monnieri dried ethanolic extracts. Planta Medica 74: 1756-1763.

27. Rae C, Scott RB, Lee M, Simpson JM, Hines N, et al. (2003) Brain bioenergetics and cognitive ability. Dev Neurosci 25: 324-331.
28. Ramawat KG (2004) Biotechnology of medicinal plants: Vitalizer and therapeutic. Science Publishers, Inc.
29. Rao SB, Chetana M, Devi PU (2005) Centella asiatica treatment during postnatal period enhances learning and memory in mice. Physiol Behav 86: 449-457.
30. Robinson T. Metabolism and function of alkaloids in plants. Sci. 1974; 184:430-5.
31. Russo A, Borrelli F. Bacopa monniera, a reputed nootropic plant: an overview. Phytomedicine. 2005; 12(4):305-17.
32. Sampathkumar P, Dheeba B, Vidhyasagar ZV, Arulprakash T, Vinothkannan R. Potential antimicrobial activity of various extracts of Bacopa monnieri (Linn.). Int J Pharmacol. 2008; 4(3): 230-2.
33. Singh HK, Dhawan BN. Neuropsychopharmacological effects of the Ayurvedic nootropic Bacopa monniera Linn.(Brahmi). Indian J Pharmacol. 1997; 29(5):359-65.
34. Singh RH, Singh L (1980) Studies on the anti-anxiety effect of the medyharasayana drug Brahmi (Bacopa monniera Wettst.). Res Ayur Siddha 1: 133-148.
35. Thomson WAR. Medicines from the earth: a guide to healing plants. New York: McGraw-Hill, 1978; p 25-9.
36. Tortorano AM, Caspani L, Rigoni AL, Biraghi E, Sicignano A, and Viviani MA. Candidosis in the intensive care unit: a 20-year survey. J Hosp Infect. 2004; 5:8-13.
37. Tripathi YB, Chaurasia S, Tripathi E, Upadhyay A, Dubey GP (1996) Bacopa monniera Linn. as an antioxidant: Mechanism of action. Indian J Exp Biol 34: 523-526.
38. Uniyal SK, Singh KN, Jamwal P, Lal B. Traditional use of medicinal plants among the tribal communities of Chhota Bhangal, Western Himalaya. J Ethnobiol and Ethnomed. 2006; 2(1): 2-14.
39. Yu Z, Cheng G, Hu B (1997) Mechanism of colchicine impairment on learning and memory and protective effect of CGP36742 in mice. Brain Res 750: 53-58.

4. A Review: Indian Medicinal Plants and Covid-19

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Abstract

The COVID-19 cases area unit still increasing altogether over the globe. The infection of SARS-CoV-2 is quick as a result of presence of S-Proteins. The individuals died because of severe unwellness and acute metastasis distress syndrome that occurred by the general inflammatory reaction. In India, spreading of infection is additional however death rate is below one.50% that is mention in web site of statista.com. In our country, the population is high and health infrastructure is a smaller amount, however death rate is low. This could result to the routine use of the many immunomodulator medicative plants by the Indian individuals. This reviews explains the habitually used medicative plants and work against COVID-19. Special discussion on Indian medicative plants work as an antiviral, immunomodulatory and anti-allergic/anti-inflammatory activities that area unit reportable in earlier analysis report. Additionally mentioned still as furtherance of pre-clinical and clinical testing of the potential ancient medicines against COVID-19 and SARS-CoV-2.

Keywords: Tulsi, COVID-19, Medicinal plants.

1. Introduction

WHO, 2020a, reportable the COVID-19 has chop-chop accrued to a virulent disease scale and affected human population globally. In India, the primary case of COVID-19 was AN foreign case on January thirty, 2020 copied in Kerala (Sahasranaman and Kumar, 2020) and therefore the death rate of COVID-19 in India is one.45%, as of twelfth Gregorian calendar month, 2020 (Worldometers, 2020). Severe acute metastasis syndrome-related coronavirus (SARS-CoV-2) has become an endemic hazard to international public health worldwide. Indian individuals use the medicative plants in daily routine as a home remedies for treating unwellness and immunomodulators. Since earlier period, most of herbals name as

Ashwagandha, Giloy, Ginger, Turmeric, Cinnamon, Tulsi, Black pepper, Black cumin, Amala, Garlic, and Flax Seeds are historically used for multiple diseases. These herbs are utilised in food preparations and ancient medicines in many countries. In India, they're normally utilized in the room, but they're found in each house. The medicative plants and their supplements have their own economic, non-secular importance. The sooner reports are established potent scientifically for his or her immunomodulator, inhibitor, and anti-infective properties, but in India, death rate is a smaller amount per million of population because of COVID-19.

1.1 Magnoliid dicot genus verum J.Presl. (Cinnamon) or Cinnamomum zeylanicum Blume

Islam *et.al.*, 2017, studied on oil and powder of C. verum that has shown the inhibitor, antiviral activity and immunostimulant in chicken's unwellness caused by animal disease virus. The element of this flavourer has shown the enzyme activity, globulin, total inhibitor capability, modulation supermolecule and accrued vegetative cell activity against animal disease virus. Another study of Broch et al., 2017, reportable that combination of oil of C. zeylanicum and different oil has showed potential antiviral result against H1N1 and HSV1 viruses. Reduction in virus infectivity has been determined with ninety nine at 60-min contact time and over ninety nine.99% when sixty min for each H1N1 and HSV1 viruses. Vetal *et al.*, 2013, studied on procyanidine polyphenols that was extracted from the bark of C. zeylanicum showed anti-inflammatory drug potential in swelling elicited by gum.

1.2. Turmeric L. (Turmeric)

Antiviral activity of turmeric against H5N1. Water and ethanolic crude extract are showed upregulated TNF-α still still RNA expression, that showed the inhibition of replication of virus (Sornpet *et al.*, 2017). Shine et al., 2015 reportable on turmeric extract, has shown the attenuation of allergic reaction by maintaining balance of Th1/Th2. has been reportable. This extract insusceptible with simple protein and alum and has been found to be anti-allergic in mice. An extract has been found to cause reduction in Th2 and increase in Th1 cell-related cytokines. Further, The result of turmeric established on allergic diseases like respiratory disease and food allergies because of accrued levels of immune gamma globulin, IgG1 and mMCP-1 levels were additionally belittled (Shin et al., 2015). varied different studies additionally reportable anti-inflammatory drug effects of C. longa either alone or together (Lee *et al.*, 2020).

1.3. Nigella L. (Black Cumin)

Koshak *et al.*, 2018, has established that thymoquinone wealthy oil of nigella the improvement of PGE2 in adrenocarcinomic human alveolar basal animal tissue A549 cells and suppression of cytokines signalling molecule and PGE2 in T-lymphocytes. Alshatwi, 2014, studied on the alcoholic seed extract and has shown immunological disorder activity on a phytohemagglutinin and immunostimulating result on non-phytohemagglutinin (PHA) excited proliferation. Taurus and Noueddine, 2020 determined the bio compound of nigella L. and has studied the molecular tying up as potential inhibitors of COVID-19. They determined the Nigellidine gave energy complicated at situation (6LU7) with energy scores nearest to antimalarial and higher than anti-inflammatory and favipiravir whereas α-hederin gave energy complicated at the situation (2GTB) with energy scores higher than antimalarial, anti-inflammatory, and favipiravir.

1.4. Allium sativum L. (Garlic)

Arify et al., 2018, studied on binary compound garlic extract that showed potential antiviral effects on Newcastle disease virus in embryonated chicken eggs. varied analysis has been conducted in vivo to focus on the impact of A. sativum in immunomodulation exploitation garlic oil extract. A. sativum additionally showed antiviral impact against vertebrate grippe virus H9N2 on Vero cells (Rasool et al., 2017). Hsieh *et al.*, 2019, has shown the defensive impact on allergen-induced airway inflammation in placental model showed vital reduction in inflammatory cell count, white blood cell infiltration and humor immune serum globulin modulation of Th1, Th2, and Th3 cytokines, upregulation of Th-1, Th-3 and coinciding down-regulation of Th-2 expression. Jeong et al., 2016 has studied on contemporary raw garlic extract and located that medication effects because of decreasing production of autocoid E2 (PGE2), IL-6, IL-1β, gas (NO), and leukotrienes (LT D4 and E4) in lipopolysaccharide activated RAW264.7 cells.

1.5. Asterid dicot genus sanctum L. (Tulsi)

Soni *et al.*, 2015, has been discovered repressive activity of Tulsi. They studied on HL-60 cells and located that O. sanctum inhibits leukotriene-C4-synthase, leukotriene-A4-hydrolase and Cox-2 activities in civilised HL-60 cells and causes a major reduction in OVA-induced respiratory organ inflammation. Ghoke et al., 2018 has shown the repressive activity of hydro-alcoholic extract of asterid dicot genus sanctum on animate thing multiplication of virus. Bhalla *et al.*, 2017, has shown the immunomodulatory potential of alcoholic leaves

extracts at IC50 price of seventy three.3 µg/ml showed reduction in viscus parasite and, skewing of the humeral response toward Th1 kind.

1.6. Black pepper L. (Black Pepper)

Mair *et al.*, 2016, has isolated piperamides from P. nigrum fruits, carried inhibition assay and has shown the many inhibition of coxsackie virus kind B3 during a cytopathic impact. Majdalawieh and Carr, 2010 has studied binary compound extract of P. nigrum that acted as a potent modulator of the macrophages and considerably increased splenocyte proliferation during a dose-dependent manner. Pei *et al.*, 2020, has isolated organic compound from P. nigrum exhibited medication impact in RAW 264.7 cells stirred up by LPS and vital inhibition in iNOS-mediated NO and IL-1β, IL-6, and TNF-α. It additionally incontestable medication activity in swelling evoked by carrageenin.

1.7. Tinospora cordifolia (Willd.) Miers (Giloe)

Sharma V. *et al.*,2020 reported in vitro screening of T. cordifolia silver nanoparticles against chikungunya virus cell showed vital antiviral potential. Banerjee et al., 2018, studied on alcoholic leaves extract of T. cordifolia that considerably decreases animate thing reactive atomic number 8 species (ROS) in chikungunya patients with high levels of animate thing ROS in continuous polyarthralgia by ex vivo treatment. Nety *et al.*, 2017, studied on the hydro-alcoholic extract of T. cordifolia stem in potable caused improvement of cellular immunity likewise as body substance immunity in broiler chicks.

1.8. Stem Ginger Roscoe (Ginger)

Cheng *et al.*, 2013, studied on contemporary ginger binary compound extract and discovered antiviral activity against human metastasis syncytial virus in human tract cell lines (HEp-2 and A549) and remittent the plaque counts during a dose-dependent manner. It additionally stirred up the secretion of IFN-β that contributes to counteracting against infection. Rasool *et al.*, 2017, showed antiviral activity against vertebrate grippe virus H9N2 on Vero cells during a dose-dependent manner. Carrasco *et al.*, 2009, studied on volatile oil of ginger and reported immunomodulatory effects by up the body substance immunity in cyclophosphamide-immunosuppressed mice during a dose-dependent manner. Kahn *et al.*, 2015, has worked on the binary compound and alcoholic extracts of stalk remittent epithelial cell dysplasia, infiltration of inflammatory cells in airways with reduced total and differential counts of eosinophils and neutrophils in mouse model. Yamprasert *et al.*, 2020, reported on oral administration of alcoholic ginger extract to coryza patients showed vital reduction in total

nasal symptom scores (TNSS), with overall improvement in rhinoceros rubor quality of life form.

2. Conclusion

The impact of COVID-19 on human population is magnified death rate because of non-availability of approved vaccines or medication for its treatment. several herbs that are reported to figure as Associate in Nursing immunity booster against different microorganism infections, and to possess anti-allergic/anti-inflammatory activities, ought to be tested against COVID-19. There was a major use of medicative plants for each bar and treatment, that was related to many population characteristics and whether or not respondents had COVID-19.

The current study reported Associate in Nursing association between the utilization of eight medicative plants and therefore the treatment or bar of the metastasis symptoms associated with COVID-19. The potential use of medicative plants for metastasis conditions is acknowledged however a lot of analysis is critical to possess solid proof of their effectiveness and to isolate compounds with potential pharmacologic use.

References

1. Arify, T., Jaisree, S., Manimaran, K., Valavan, S., and Sundaresan, A. (2018). Antiviral effects of garlic (allium sativum) and nilavembu (andrographis paniculata) against velogenic strain of newcastle disease virus- an in ovo study. *Int. J. Livest.* Res. 8 (5), 157. doi:10.5455/ijlr.20170814051902
2. Banerjee, N., Saha, B., and Mukhopadhyay, S. (2018). Intracellular ROS generated in chikungunya patients with persisting polyarthralgia can be reduced by Tinospora cordifolia leaf extract. *Virus Dis.* 29 (3), 375–379. doi:10.1007/s13337-018-0465-1
3. Bhalla, G., Kaur, S., Kaur, J., Kaur, R., and Raina, P. (2017). Antileishmanial and immunomodulatory potential of Ocimum sanctum Linn. and Cocos nucifera Linn. in murine visceral leishmaniasis. *J. Parasit. Dis.* 41 (1), 76–85. doi:10.1007/s12639-016-0753-x
4. Brochot, A., Guilbot, A., Haddioui, L., and Roques, C. (2017). Antibacterial, antifungal, and antiviral effects of three essential oil blends. *Microbiologyopen* 6 (4), e00459. doi:10.1002/mbo3.459
5. Carrasco, F. R., Schmidt, G., Romero, A. L., Sartoretto, J. L., Caparroz-Assef, S. M., Bersani-Amado, C. A., et al. (2009). Immunomodulatory activity of zingiber officinale Roscoe, salvia officinalis L. And syzygium aromaticum L. Essential oils:

evidence for humor- and cell-mediated responses. *J. Pharm. Pharmacol.* 61 (7), 961–967. doi:10.1211/jpp/61.07.0017

6. Chang, J. S., Wang, K. C., Yeh, C. F., Shieh, D. E., and Chiang, L. C. (2013). Fresh ginger (Zingiber officinale) has anti-viral activity against human respiratory syncytial virus in human respiratory tract cell lines. *J. Ethnopharmacol.* 145 (1), 146–151. doi:10.1016/j.jep.2012.10.043
7. Ghoke, S. S., Sood, R., Kumar, N., Pateriya, A. K., Bhatia, S., Mishra, A., et al. (2018). Evaluation of antiviral activity of Ocimum sanctum and Acacia arabica leaves extracts against H9N2 virus using embryonated chicken egg model. BMC *Complementary Altern. Med.* 18 (1), 174. doi:10.1186/s12906-018-2238-1
8. Hsieh, C. C., Peng, W. H., Tseng, H. H., Liang, S. Y., Chen, L. J., and Tsai, J. C. (2019). The protective role of garlic on allergen-induced airway inflammation in mice. Am. J. Chin. Med. 47 (5), 1099–1112. doi:10.1142/S0192415X19500563
9. Jeong, Y. Y., Ryu, J. H., Shin, J. H., Kang, M. J., Kang, J. R., Han, J., *et al.* (2016). Comparison of anti-oxidant and anti-inflammatory effects between fresh and aged black garlic extracts. *Molecules 21* (4), 430. doi:10.3390/molecules21040430
10. Kaushik, D., Rani, R., Kaushik, P., Sacher, D., and Yadav, J. (2012). *In vivo and in vitro* antiasthmatic studies of plant Piper longum Linn. Int. J. Pharmacol. 8 (3), 192–197. doi:10.3923/ijp.2012.192.197
11. Khan, A. M., Shahzad, M., Raza Asim, M. B., Imran, M., and Shabbir, A. (2015). Zingiber officinale ameliorates allergic asthma via suppression of Th2-mediated immune response. *Pharm. Biol.* 53 (3), 359–367. doi:10.3109/13880209.2014.920396
12. Khan, A. U., and Gilani, A. H. (2012). Antidiarrhoeal and bronchodilatory potential of Valeriana wallichii. *Nat. Prod. Res.* 26 (11), 1045–1049. doi:10.1080/14786419.2010.551754
13. Khan, A. U., Rahim, A., Iqbal, Z., and Gilani, A. H. (2012). Insights into mechanisms underlying the gut and airways modulatory effects of Swertia chirata. *J. Nat. Med.* 66 (1), 140–148. doi:10.1007/s11418-011-0566-2
14. Koshak, A. E., Yousif, N. M., Fiebich, B. L., Koshak, E. A., and Heinrich, M. (2018). Comparative immunomodulatory activity of Nigella sativa L. preparations on proinflammatory mediators: a focus on asthma. *Front. Pharmacol.* 9, 1075. doi:10.3389/fphar.2018.01075

15. Lee, S. Y., Cho, S. S., Li, Y. C., Bae, C. S., Park, K. M., and Park, D. H. (2020). Anti-inflammatory effect of curcuma longa and allium hookeri Co-treatment via NF-κB and COX-2 pathways. *Sci. Rep.* 10 (1), 5718. doi:10.1038/s41598-020-62749-7
16. Majdalawieh, A. F., and Carr, R. I. (2010). In vitro investigation of the potential immunomodulatory and anti-cancer activities of black pepper (Piper nigrum) and cardamom (Elettaria cardamomum). *J. Med. Food* 13 (2), 371–381. doi:10.1089/jmf.2009.1131
17. Pei, H., Xue, L., Tang, M., Tang, H., Kuang, S., Wang, L., et al. (2020). Alkaloids from black pepper (piper nigrum L.) exhibit anti-inflammatory activity in murine macrophages by inhibiting activation of NF-κB pathway. *J. Agric. Food Chem.* 68 (8), 2406–2417. doi:10.1021/acs.jafc.9b07754
18. Rasool, A., Khan, M. U. R., Ali, M. A., Anjum, A. A., Ahmed, I., Aslam, A., et al. (2017). Anti-Avian influenza virus H9N2 activity of aqueous extracts of Zingiber officinalis (Ginger) and Allium sativum (Garlic) in chick embryos. *Pak. J. Pharm.* Sci. 30 (4), 1341–1344.
19. Salim, B., and Noureddine, M. (2020). Identification of compounds from nigella sativa as new potential inhibitors of 2019 novel coronasvirus (Covid-19): molecular docking study. chemRxiv:10.26434/chemrxiv.12055716.v1.
20. Sharma, V., Kaushik, S., Pandit, P., Dhull, D., Yadav, J. P., and Kaushik, S. (2019). Green synthesis of silver nanoparticles from medicinal plants and evaluation of their antiviral potential against chikungunya virus. Appl. *Microbiol. Biotechnol.* 103 (2), 881–891. doi:10.1007/s00253-018-9488-1
21. Shin, H. S., See, H. J., Jung, S. Y., Choi, D. W., Kwon, D. A., Bae, M. J., et al. (2015). Turmeric (Curcuma longa) attenuates food allergy symptoms by regulating type 1/type 2 helper T cells (Th1/Th2) balance in a mouse model of food allergy. *J. Ethnopharmacol.* 175, 21–29. doi:10.1016/j.jep.2015.08.038
22. Soni, K., Lawal, T., Wicks, S., Patel, U., and Mahady, G. (2015). Boswellia serrata and Ocimum sanctum extracts reduce inflammation in an ova-induced asthma model of BALB/c mice. *Planta Med.* 81 (11), B4. doi:10.1055/s-0035-1556201
23. Sornpet, B., Potha, T., Tragoolpua, Y., and Pringproa, K. (2017). Antiviral activity of five Asian medicinal pant crude extracts against highly pathogenic H5N1 avian

influenza virus. *Asian Pac. J. Trop. Med.* 10 (9), 871–876. doi:10.1016/j.apjtm. 2017.08.010

24. WHO (2020a). Coronavirus disease (COVID-19) outbreak. Emergencies Dis. Available at: https://www.who.int/emergencies/diseases/novel-coronavirus-2019 (Accessed December 19, 2020).
25. Worldometers (2020). COVID-19 coronavirus pandemic. Available at: https://www. worldometers.info/coronavirus/ (Accessed December 19, 2020).
26. Yamprasert, R., Chanvimalueng, W., Mukkasombut, N., and Itharat, A. (2020). Ginger extract versus Loratadine in the treatment of allergic rhinitis: a randomized controlled trial. *BMC Complementary Med.* Ther. 20 (1), 119. doi:10.1186/s12906-020-2875-z

5. An Exploratory Review of Literature: Surface Treatment before and after Sanitization during Pandemic

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Abstract

The indirect transmission of SARS CoV2 is a major problem responsible for the propagation of the COVID-19 pandemic. surface sanitization via different methods is the solution and hence its types, mechanism efficiency and users are discussed in this review. This review aims to explain the importance of surface treatments and the study regarding the most common methods observed during this pandemic.

Keywords: SARS CoV2, surface treatment, sanitisation, disinfection, covid19 pandemic, transmission.

1. Introduction

World Health Organization officially recognized the disease of virus coronaviridae of the nidovirales family as the COVID-19 on 11th February 2020. The patients showed symptoms such as fever, coughing, shortness of breath, sore throat, runny nose, loss of taste, etc. Due to the unavailability of the vaccine of this newly found coronavirus, the world population was quarantined to prevent the transmission of this respiratory disease, prevention of propagation remained the only line of defence against the pandemic. It was established that constant sanitisation will be necessary everywhere to prevent any further contamination due to inevitable lack of complete quarantine. Practices of sanitization during this pandemic are dependent on the primary routes of transmission of SARS COV2 which are firstly direct contact with the host which is dealt with by individual sanitation, indirect contact through objects contaminated by the host that require surface treatment and lastly like most respiratory

diseases airborne transmission which needs ambience treatment of the environment. (Kutter, J. S.*et al.*, 2018)

The focus of this review being surface treatment, indirect contact transmission and sanitisation treatments are highlighted as it plays a very significant role in the spread of the disease hence also in the increased requirement of surface treatments during the pandemic.

a. Importance of surface sanitisation

Indirect contact involves transmission via formites; which are contaminated intermediate objects or surfaces due to mostly physical contact but also because of airborne particles that settle on them.

Formites are responsible for virus transmission in a wide range of environments which is why various surface treatments are practised so rigorously. (Boone, S. A, *et al.*, 2007) (Stephens, B., et al., 2019.) Studies regarding adsorption and transfer rates between skin and formites, virus persistence on different surfaces under various environmental factors are carried out and discussed to make a better decision with regards to disinfection protocols. Factors such as surface porosity, virus envelope characteristics and environmental factors affect the viability of the virus on the surface. (Vasickova, P., *et al.*, 2010).

Surfaces that have adsorbed virus particles have higher infection potential due to increased rates of survival. Identifying potential formites and surfaces with a high risk of contamination by their position, material, environmental conditions and frequency of physical contact can help design the disinfection strategies and curb further infection. To intercept the formite transmission route, the inactivation of SARS CoV2 is important. the successful mechanisms will be discussed

b. Types of surface treatments

For better understanding of the content, surface treatment sanitization is classified based on the method and mechanism.

The mechanism involved in sanitization uses either one or both of these steps: (i) mechanical or thermal treatment: UV/ led irradiation, heat treatment, plasma disinfection, self-disinfecting materials and/or (ii) use of virucidal/anti-microbial agents to decontaminate the body part, object or surfaces: wet mops and washes, jet sprays, wipes and chemical disinfectants.

i. Mechanical or Thermal Treatment

1. UV led irradiation: Inactivation of SARS CoV2 is done by typically 254nm wavelength of UV. It works by damaging nucleic acid bases in viral genetic material and proteins in viral capsids via dimerization in RNA. The effect of this is a 4.5 log 10 TCID50/ml reduction in the virus tier within six minutes. Virus inactivation is plateaued and viral activity is not detected at all after 15 minutes. Other UV wavelengths, though utilised aren't sufficient. (Darnell, M. E., *et al.*, 2004) Time required is longer than chemical disinfectants (Kampf, G, et al., 2020) and effectiveness is hindered in shadowed and underexposed regions of the surface. This also has significant health risks to the user (Dixon, A. J. *et al.*, 2004) while it also reduces object life of some materials making this method not very ideal. UV is used best for sterilizing N95 and other medical masks. Currently it is available easily in lab and clinical settings for instruments, clothes, utensils, tools other inanimate objects. (Mackenzie 2020) (Tseng and Li (2007)

2. Heat treatment: At temperatures beyond approximately 80C, viral capsid protein denatures and RNA is damaged leading to the inactivation of SARS CoV2 within 5 minutes at 70C. Here, the reduction is of 6.8log10 TCID50/ml to undetectable levels is observed. (Zhang, Y, *et al.*, 2019,) Moderately high temperatures (19C – 37C) do less to cause any damage. the minor damaged cause is insufficient. Instruments like autoclave are perfect choices to sterilize medical equipment and healthcare and laboratory requirements but heat treatment is easily accessible at home for sterilisation of daily objects and can also be the most efficient of food produce.

3. Plasma disinfection: A very less discussed new method that involves ionised gas of charged and uncharged particles and reactive species of UV photon. (Hoffmann, C.; *et al.*, 2013) (Filipić, A.; *et al.*, 2019) There are thermal and non-thermal applications observed in the dental and oncology fields. This too like other mechanical methods damage genetic materials and proteins leading to the inactivation of the virus. The working and effectiveness of this process are still under investigation yet to be officially determined.

4. Self-disinfecting materials: Looking into virus-specific self-disinfection studies, copper and silver alloys show viricidal properties. Their mechanisms being direct interaction between microbial proteins and metal ions or indirect interaction of radicals that damage the DNA and lipid membranes. (Gordon, O.; *et al.*, 2010,) (Macomber, L, et al., 2009,)This photocatalytic action is further researched and developed but despite the potential of such

materials in hospitals, lack of clinical trials, associated costs and undetermined effectiveness over repeated cycles in the environment or setbacks to this method.

ii. Use of Viricidal/Anti-Microbial Agents

1. Wet mops and washes: Mopping or washes of water, soap and or USEA identified chemical disinfectants creates a disinfecting fluid layer film. This film is larger than the size of 1 virus particle enveloping them and sanitizing their respective surface. Mopping is much efficient due to vast distribution of the fluid layer, thus the water envelope around the virus is reduced and evaporation is also accelerated. As the film is thinner, disinfectant does have has more effect on the virus. Wet and moist mobs perform mechanical removal of the virus along with disinfection, however, untreated mops and fluids become formites themselves. (Andersen *et al.* (2009)) This easily covers larger areas like floors of and closed setting and even furniture surfaces.

2. Jet sprays: Jet sprays are usually not suggested for surface disinfection, unlike air fumigation, due to factors such as aerosol physics, virus heterogeneity, faster evaporation, etc. reducing the desired effect but it is convenient. It can be used to spray difficult to sanitize areas where mops or hands can't reach and reduce formite formation due to contamination via aerosols. After removal of dust particles beforehand and use of registered disinfectant like 1.4% improved hydrogen peroxide (Cadnum *et al.* (2015) the effect is more enhanced. (Schneiderman and Cartee (2020). This method does prove to be useful for outdoor areas and large objects of irregular shapes. It is seen to be used in public transport vehicles and places of crowd due its convenience.

3. Wipes and chemical disinfectants: The mechanism being contrary to the jet sprays a cloth or a towel with chemical products for disinfection, preservation, fragrance, etc. the wipe aiding mechanical removal of organic matter and proper application of disinfectant that decontaminates the surface. (Sattar, S. A.; Maillard, J.-Y., 2013). The chemical disinfectant performs inhibition of microbial growth and lethal action in the form of any type of biocide with active ingredients like chlorine, alcohol, peroxygen, quaternary ammonium compounds and aldehydes. (Abreu AC, et al., 2013). Ethanol and detergents lead to disruption of the envelop lipid layer. Chlorine causes modification of important sites of protein on the capsid and reaction leading to degrading of nucleic acid basis in the genetic materials. (Wigginton, K. R, et al., 2012,) (Wigginton, K. R., *et al.*, 2012). Over wiping and on a larger area than recommended deteriorates the effectiveness of wipe. repeated use can also lead to the transfer

of the microorganism to other surfaces. (Williams, G. J., 2009). Factors that affect the efficiency of this method are the interaction of the wipe and disinfectant, application method, nature and concentration of ingredients, the liquor ratio, storage manners and time, contact time, etc. Though multiple questionable obstacles in achieving 100% safe sanitised surface this is the easiest, most convenient while also most reliable and effective method due to its lack of complexity and lower failure risk of decontamination. This can be used in any form and by anyone to manually treat surfaces immediately.

2. Future perspective

The application of every method is only limited by the lack of research and clinical trials. COVID-19 pandemic makes us realize the significance of sanitation in public health, especially in the prevention of propagation of diseases, thus concluding how important sanitation practices are and the need for advancement in the technology combating growth and spread of pathogens harmful to the human society. The Research and study of this field are equally important as other medical life sciences and must be paid attention to and given opportunities to grow.

References

1. Abreu AC, Tavares RR, Borges A, Mergulhao F, Simoes M. Current and emergent strategies for disinfection of hospital environments. J Antimicrob Chemother. 2013;68:2718–32.
2. Boone, S. A.; Gerba, C. P. Significance of fomites in the spread of respiratory and enteric viral disease. Appl. Environ. Microbiol. 2007, 73, 1687-1696.
3. Chin, A. W. H.; Chu, J. T. S.; Perera, M. R. A.; Hui, K. P. Y.; Yen, H.-L.; Chan, M. C. W.; Peiris, M.; Poon, L. L. M. Stability of SARS-CoV-2 in different environmental conditions
4. Darnell, M. E. R.; Subbarao, K.; Feinstone, S. M.; Taylor, D. R. Inactivation of the coronavirus that induces severe acute respiratory syndrome, SARS-CoV. J. Virol. Methods 2004, 121, 85-91
5. Dixon, A. J.; Dixon, B. F. Ultraviolet radiation from welding and possible risk of skin and ocular malignancy. Med. J. Aust. 2004, 181, 155-157.
6. Filipić, A.; Primc, G.; Zaplotnik, R.; Mehle, N.; Gutierrez-Aguirre, I.; Ravnikar, M.; Mozetič, M.; Žel, J.; Dobnik, D. Cold atmospheric plasma as a novel method for

inactivation of potato virus Y in water samples. Food Environ Virol 2019, 11, 220-228.

7. Gordon, O.; Vig Slenters, T.; Brunetto, P. S.; Villaruz, A. E.; Sturdevant, D. E.; Otto, M.; Landmann, R.; Fromm, K. M. Silver coordination polymers for prevention of implant infection: thiol interaction, impact on respiratory chain enzymes, and hydroxyl radical induction. Antimicrob. Agents Chemother. 2010, 54, 4208-4218.
8. Hoffmann, C.; Berganza, C.; Zhang, J. Cold Atmospheric Plasma: methods of production and application in dentistry and oncology. Med. Gas Res. 2013, 3, 21.
9. Kampf, G.; Todt, D.; Pfaender, S.; Steinmann, E. Persistence of coronaviruses on inanimate surfaces and their inactivation with biocidal agents. J. Hosp. Infect. 2020, 104, 246-251
10. Khan, M.H., Yadav, H. Sanitization During and After COVID-19 Pandemic: A Short Review. Trans Indian Natl. Acad. Eng. 5, 617–627 (2020). https://doi.org/10.1007/s41403-020-00177-9
11. Macomber, L.; Imlay, J. A. The iron-sulfur clusters of dehydratases are primary intracellular targets of copper toxicity. Proc. Natl. Acad. Sci. USA 2009, 106, 8344 8349.
12. Nicolas Castaño, Seth Cordts*, Myra Kurosu Jalil*, Kevin Zhang*, Saisneha Koppaka, Alison Bick, Rajorshi Paul, and Sindy KY Tang*, Fomite transmission and disinfection strategies for SARS-CoV-2 and related viruses. Department of Mechanical Engineering, Stanford University.
13. Pfaender, S.; Brinkmann, J., Todt, D.; Riebesehl, N. Steinmann, J.; Steinmann, J.;Pietschmann, T.; Steinmann, E. Mechanisms of methods for hepatitis C virus inactivation. Appl. Environ. Microbiol. 2015, 81, 1616-1621
14. Sattar, S. A.; Maillard, J.-Y. The crucial role of wiping in decontamination of high-touch environmental surfaces: review of current status and directions for the future. Am. J. Infect. Control 2013, 41, S97-104
15. Stephens, B.; Azimi, P.; Thoemmes, M. S.; Heidarinejad, M.; Allen, J. G., Gilbert, J. A. Microbial exchange via fomites and implications for human health. Curr. Pollution Rep. 2019.
16. Vasickova, P.; Pavlik, I.; Verani, M.; Carducci, A. Issues Concerning Survival of Viruses on Surfaces. Food Environ Virol 2010, 2, 24-34.][Vega, E.; Garland, J.;

Pillai, S. D. Electrostatic forces control nonspecific virus attachment to lettuce. J Food Prot 08, 71, 522-529

17. Wigginton, K. R.; Pecson, B. M.; Sigstam, T.; Bosshard, F.; Kohn, T. Virus inactivation mechanisms: impact of disinfectants on virus function and structural integrity. Environ. Sci. Technol. 2012, 46, 12069-12078
18. Williams, G. J., Denyer, S. P., Hosein, I. K., Hill, D. W., Maillard, J.-Y. Limitations of the efficacy of surface disinfection in the healthcare setting. Infect. Control Hosp. Epidemiol. 2009, 30, 570-573.
19. Zhang, Y.; Qu, S.; Xu, L. Progress in the study of virus detection methods: The possibility of alternative methods to validate virus inactivation. Biotechnol. Bioeng. 2019, 116, 2095-2102.

6. Review: Mask, Types and Role

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Abstract

Cardiovascular damage and other severe medical conditions are the respiratory symptoms that occurred during COVID-19. In the public sector, masks and different types are effective utilization of personal equipment (PPE) during COVID 19 situations. Masks are at the top of the list of PPE. The mechanism of the mask and exact function of the mask to prevent the virus transmission have not been understood. Although extensive studies in mask functions have been carried out ever since the COVID-19 outbreaks, most of the investigations appear to have focused on exhalation isolation of individuals who may have been infected with the disease.

This review focuses on the role of the masks, types and their uses. Also provides the information on how to prevent the transmission mode of COVID-19 virus in terms of droplets and aerosols, the aspects such as exhalation isolation and inhalation protection are discussed according to the connection between virus transmission modes and the effectiveness of different types of mask in different environmental situations.

Keywords: COVID-19, prevention, mask, transmission, aerosol and exhalation

1. Introduction

Since the outbreak of the coronavirus disease in 31 December 2019 (COVID-19), the planet has seen waves of coronavirus that have devastated and destroyed many regions and countries. However, there are still many unknown things and aspects to be yet discovered about the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) that cause COVID-19. One year later since the first COVID-19 case, the evolution of the outbreak has

remained in the escalation and growth phase in the United States according to the latest(CDC, 2020; China's Response to the Pneumonia Outbreak in Wuhan Has Been Far Better Than Its Reaction to SARS,; Coronavirus COVID-19 (2019-nCoV); Fortune, 2020; Time, 2020). The reported numbers of individuals who are infected by COVID-19 aren't to be entirely predictable because the outbreak is during a dynamic mode, making the assessment of the pandemic extremely difficult. Nonetheless, current life science research has revealed some basic characteristics and features of the coronavirus supported on which precautionary measures are established.

COVID-19 is caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) which is transmitted through respiratory virus carrying droplets, that can be originated from cough and sneez of an infected person. This virus-droplets available in the air for a prolong period of time which can can stand on any surfaces of humans and objects where the infectious disease is further spread contagiously and rapidly (Service R, 2020). An infected person can carry and spread COVID 19 to people those are coming in close contact, in public sectors such as trains and aeroplane (Science Alert, 2020), this is a very dangerous situation.

The CDC and The Environmental Protection Agency via standard disinfectants in the first quarter of 2020 recommended the major methods to prevent the transmission of virus (CDC, 2020; US EPA, 2020). The hand sanitizer, alcohol and a diluted solution of sodium hypochlorite, or household bleach are the disinfectant used for prevention.

How to stop transmission of Coronavirus Without the specific therapeutics and vaccines? This is a main question arise in our minds. However, the key to stop the spreading of COVID-19 has to be dependent on preventative precautions by all means possible among which social distancing and quarantine have not only been recommended but also mandated by various state and federal regulations especially for those who have been infected by this lethal virus (CDC, 2019, 2020; Parmet & Sinha, 2020). The weakening of mask is the one common and widely method to protect from virus spreading way.

According to literature survey, we studied and analyzed on effectiveness of the mask, their types and function based on spreading way of COVID 19. The perspectives of mask analyzed by their aspects such as exhalation isolation and inhalation protection. The purpose of this review to provide effectiveness of mask according to scientific research outcomes.

It is also very important to take certain precautions till the vaccines are administered and subjected to common people.

2. Transmission mode of Coronavirus

The major transmission mode of Coronavirus is droplets which are coming from speaking, coughing or sneezing (Burke et al., 2020; Chan *et al.*, 2020; WHO, 2020).

Bahl *et al.* (2020) summarized recent studies on COVID-19 transmission and concluded that the droplets spreading distance is depend on droplet size. In air, the droplets size is found smaller than 100 μm and 4 -8 μm (Morawska *et al.*, 2009). Wang & Du, 2020, had studied the droplet size and distance, the sizes of droplets from 1 to 5 mm can spread in a distance over 1–2 m from the source of infection. The research of Bourouiba *et al.* (2014) showed that droplets of 30 μm can have a horizontal range up to 2.5 m away from the cougher due to cloud dynamics, while the smaller droplets may even reach 4–6 m. According to dropltet movement studies, a major factor in virus transmission is the different ranges of droplets size. Hence the setti *et al.*, 2020, showed the use of mask is the effective and proper protection and maintain a social distancing of 1.8 m (or 6 feet).

3. Varieties of mask

Masks area unit classified into 3 varieties like surgical masks, air filtering respirators and artefact masks. artefact mask has no normal testing.

a. Surgical masks: These area unit made from made from with a multi-layered structure consisting of a leak proof layer, a high density filter layer, and an immediate contact skin layer (Henneberry, 2020). Surgical masks match loosely to the face with a versatile metal nose clip.

b. Air filtering respirators: These are made from several layers of artificial artificial material, usually composed of plastic (Henneberry). Their geometric dimensions area unit usually fastened however with another pre-filtration layer than the other surgical masks. This mask is discomfort for individuals, thanks to facial stresses, build respiration tougher and not dioxide retention. N95 masks area unit the foremost common example of air filtering respirators that area unit presently in high demand throughout the COVID-19 pandemic. N95 is largely a check normal of the U.S. National Institute for activity Safety and Health (NIOSH) air filtration rating, that provides United States of America the classification of filtering respirators as per their basic tips (CDC, 2020). in step with the expressed standards and tips of NIOSH, filtering respirators area unit usually classified as a result of the N95, N99 and N100

masks, which can severally block a minimum of ninety fifth, 99% and 99.97% of particles with median radius of concerning zero.15 fifteen from entering(CDC, 2020) .

c. Artefact masks: These area unit those while not testing normal that embrace cotton masks, made from many various materials, self-made artefact masks and alternative substitutes. The standard of those masks varies reckoning on the materials, structures and strategies of constructing that makes them onerous to reason.

4. Role of Mask

The perspective of analysis on the effectiveness of masks is primarily divided in 2 classes as expressed below:

a. The supply management and

b. The protection of the user (Chan & Yuen, 2020).

a. Supply Management (Exhalation Isolation)

The main role of mask to cut back the metastasis infectious droplets type transmission (Hui *et al.*, 2012). supported study and researches, transmission mechanism is extremely probably because of the propagating driblets within the air as delineate on top of specially those of smaller sizes together with metastasis droplet nuclei and aerosols that area unit capable of travel over the social distancing vary of over one.8 meters. The individuals to prevent the transmission of infectious particles by carrying a mask, though the aspect discharge is feasible. Some studies indicated and convey that carrying a mask will scale back the generation of infectious aerosol created throughout cough (Loeb et al., 2009).

Among all sorts, N95 masks area unit far more effective than traditional surgical masks in preventing air discharge throughout cough production, however, neither would entirely stop the aspect leakage (Hui *et al.*, 2012). Surgical masks area unit kind of like N95 masks in reducing the unfold of metastasis diseases, however with a higher comfort level as compared to N95 (Jefferson et al., 2008).

Davies *et al.*, (2013) recruited and worked on over concerning twenty one healthy volunteers and picked up air samples of every volunteer in 3 totally different conditions:

1. Carrying a mask made from made from,
2. Carrying a basic surgical mask, and
3. One with carrying no mask.

Though important and major variations in filtration efficiencies were found and discovered between the T-shirt and therefore the surgical masks, the previous showed

extensive reduction of metastasis driblet transmission, indicating its significance in an exceedingly pandemic state of affairs. Ho et al., (2020) disbursed precisely similar experiments on varied adult volunteers carrying medical masks or self-designed triple-layer cotton masks in 2 totally different close environments: a daily sleeping room and a automobile with air con on (doors closed). They found that each varieties of masks were capable of suppressing and avoiding metastasis droplets to a precise degrees of level.

b. Inhalation Protection: Protection of the user

Presently, study has simply discovered that carrying masks is totally essential in the least times, notably once in direct contact with cases confirmed (Sung *et al.*, 2018). A face - to - face interview exploration was conducted with many medical employees on the effectiveness of carrying masks in an exceedingly clinical setting. The corollary of the exploration indicated a additional defensive impact by the medical masks over those home - created cotton bones on tract infection (Yang et al., 2011). Defilements, bacterium and alternative matters area unit filtered by air filtering respirators like as N95 masks from reaching nose and mouth. A study predicated on MS2 Virus indicated that N95 masks have a way improved effectuality on virus penetration inhibition than surgical masks (Balazy *et al.*, 2006) additionally, contagious disease is usually transmitted through little aerosol nubbins with a diameter of one – ten ten. It's attainable that one virus nub is transmitted from person to person (Wiwanitkit, 2006). each surgical masks and N95 respirators will provide like protection for the attention staff throughout non - aerosol generation care, however N95 is suggested for the high - peril environments (Bartoszko et al., 2020).

Several Studies on the Characteristics of Material Masks

Some of the self - created masks were tested and located comparatively and relatively effective though to an inferior degree compared to the surgical and N95 masks (Mahase, 2020). Analysis has conjointly been freshly disbursed on the common materials for creating masks. Konda *et al.* (2020) also examined several common fabrics for the same purpose including cotton, silk, chiffon, flannel, various simulations and their combinations. They determined the aerosol filtration edge of different masks with cotton comforter or the cotton/ chiffon cross sample, and begin their filtration efficiencies even advanced than those of N95 respirators or surgical masks for the atoms inferior than 300 nm (Konda *et al.,* 2020). Wang *et al.* even compared different surgical masks with those made of 17 different kind of materials including

some cloth and other kind of fabrics (Wang *et al.*, 2020). Davies *et al.*, (2013) experimented on the filtration edge and pressure drop of several common fabrics and surgical masks, and concluded that cotton T - shirts can be the most suitable home materials for an ad-libbed face mask. Zhao *et al.* (2020) found that the cloth masks may have akin filtration efficiencies to medical masks.

Reuse of the disposable filtering respirators may be needed during times of shortage to ensure continued availability, though there has been no any approved specific method for decontamination. CDC has provided guidelines and basic regulations about several potential methods to decontaminate disposable filtering respirators, such as ultraviolet germicidal irradiation, vaporous hydrogen peroxide and moist heat (Center for Disease Control & Prevention, 2020).

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Reference

1. References Bahl, P., Doolan, C. , de Silva, C. , Chughtai, A. A. , Bourouiba, L. , & MacIntyre, C. R. (2020). Airborne or droplet precautions for health workers treating coronavirus disease 2019? *Journal of Infectious Diseases*, 208, 2025–2035.
2. Bai, Y. , Yao, L. , Wei, T. , Tian, F. , Jin, D.-Y. , Chen, L. , & Wang, M. (2020). Presumed asymptomatic carrier transmission of COVID-19. *JAMA*, 323, 1406–1407.
3. Bałazy, A. , Toivola, M. , Adhikari, A. , Sivasubramani, S. K. , Reponen, T. , & Grinshpun, S. A. (2006). Do N95 respirators provide 95% protection level against airborne viruses, and how adequate are surgical masks? *American Journal of Infection Control*, 34, 51–57.
4. Bartoszko, J. J. , Farooqi, M. A. M. , Alhazzani, W. , & Loeb, M. (2020). Medical masks vs N95 respirators for preventing COVID-19 in healthcare workers: A systematic review and meta-analysis of randomized trials. *Influenza Other Respi Viruses*, 14, 365–373
5. Bergman, M. S. , Viscusi, D. J. , Heimbuch, B. K. , Wander, J. D. , Sambol, A. R. , & Shaffer, R. E. (2010). Evaluation of multiple (3-Cycle) decontamination processing

for filtering facepiece respirators. *Journal of Engineered Fibers and Fabrics*, 5, 155892501000500.

6. CDC . (2019). Guidance on Management of Coronavirus Disease 2019 (COVID-19) in Correctional and Detention Facilities | CDC. Retrieved from https://www.cdc.gov/coronavirus/2019-ncov/community/correction-detention/guidance-correctional-detention.html
7. CDC . (2020). Symptoms of Coronavirus. https://www.cdc.gov/coronavirus/2019-ncov/symptomstesting/symptoms.html?CDC_AA_refVal=https%3A%2F%2Fwww.cdc.gov%2Fcoronavirus%2F2019-ncov%2Fabout%2Fsymptoms.html
8. CDC . (2020). Air | Appendix | Environmental Guidelines | Guidelines Library | Infection Control | CDC. Retrieved from https://www.cdc.gov/infectioncontrol/guidelines/environmental/appendix/air.html .
9. CDC . (2020). The national institute for occupational safety and health (NIOSH). Retrieved from https://www.cdc.gov/niosh/index.htm
10. CDC . (2020). Social Distancing, Quarantine, and Isolation. Retrieved from https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/social-distancing.html
11. CDC . (2020). Returning from International Travel | CDC. Retrieved from https://www.cdc.gov/coronavirus/2019-ncov/travelers/after-travel-precautions.html
12. Center for Disease Control and Prevention . (2020). Decontamination and Reuse of Filtering Facepiece Respirators: COVID-19. Centers for Disease Control and Prevention. Centers for Disease Control (2020). Strategies for optimizing the supply of face masks.
13. Chan, J. F. W. , Yuan, S. , Kok, K. H. , To, K.-W. , Chu, H. , Yang, J. , Xing, F. , Liu, J. , Yip, C.-Y. , Poon, R.-S. , Tsoi, H.-W. , Lo, S.-F. , Chan, K.-H. , Poon, V.-M. , Chan, W.-M. , Ip, J. D. , Cai, J.-P. , Cheng, V.-C. , Chen, H. , … Yuen, K.-Y. (2020). A familial cluster of pneumonia associated with the 2019 novel coronavirus indicating person-to-person transmission: a study of a family cluster. *Lancet*, 395, 514–523
14. Chan, K. H. , & Yuen, K.-Y. (2020). COVID-19 epidemic: disentangling the re-emerging controversy about medical facemasks from an epidemiological

perspective. *International Journal of Epidemiology*, 49(4), 1063–1066. 10.1093/ije/dyaa044

15. Coronavirus COVID-19 (2019-nCoV) . https://gisanddata.maps.arcgis.com/apps/opsdashboard/index.html#/bda7594740fd40299423467b48e9ecf6
16. Davies, A. , Thompson, K. A. , Giri, K. , Kafatos, G. , Walker, J. , & Bennett, A. (2013). Testing the efficacy of homemade masks: Would they protect in an influenza pandemic? *Disaster Medicine and Public Health Preparedness*, 7(4), 413–418. 10.1017/dmp.2013.43.
17. Fortune . (2020). Wuhan coronavirus? 2019 nCoV? Naming a new disease. https://fortune.com/2020/02/08/wuhan-coronavirus-disease-names/.
18. Henneberry, B. (2020). How to Make N95 Masks - A Manufacturing Guide. Retrieved fromhttps://www.thomasnet.com/articles/plant-facility-equipment/how-to-make-n95-masks/.
19. Henneberry, B. (2020). How Surgical Masks are Made, Tested and Used. Retrieved from https://www.thomasnet.com/articles/other/how-surgical-masks-are-made/#_Types_of_Masks.
20. Ho, K. F. , Lin, L. Y. , Weng, S. P. , & Chuang, K. J. (2020). Medical mask versus cotton mask for preventing respiratory droplet transmission in micro environments. *Science of the Total Environment*, 735, 139510.
21. Jefferson, T. , Foxlee, R. , Del Mar, C. , Dooley, L. , Ferroni, E. , Hewak, B. , Prabhala, A. , Nair, S. , & Rivetti, A. (2018). Physical interventions to interrupt or reduce the spread of respiratory viruses: Systematic review. *BMJ*, 336, 77–80.
22. Konda, A. , Prakash, A. , Moss, G. A. , Schmoldt, M. , Grant, G. D. , & Guha, S. (2020). Aerosol filtration efficiency of common fabrics used in respiratory cloth masks. *ACS Nano*, 14, 6339–6347.
23. Morawska, L. , Johnson, G. R. , Ristovski, Z. D. , Hargreaves, M. , Mengersen, K. , Corbett, S. , Chao, C. Y. H. , Li, Y. , & Katoshevski, D. (2009). Size distribution and sites of origin of droplets expelled from the human respiratory tract during expiratory activities. *Journal of Aerosol Science*, 40(3), 256–269. 10.1016/j.jaerosci.2008.11.002

24. National Academies of Sciences . (2006). Reuse of disposable medical masks during flu pandemic not recommended - reusing respirators is complicated. Retrieved from https://www.nationalacademies.org/news/2006/04/reuse-of-disposable-medical-masks-during-flu-pandemic-not-recommended-reusing-respirators-is-complicated
25. Rengasamy, S. , Eimer, B. , & Shaffer, R. E. (2010). Simple respiratory protection—evaluation of the filtration performance of cloth masks and common fabric materials against 20–1000 nm size particles. *Annals of Occupational Hygiene*, 54, 789–798.
26. Sciencealert . (2020). A Person Can Carry And Transmit COVID-19 Without Showing Symptoms, Scientists Confirm. https://www.sciencealert.com/researchers-confirmed-patients-can-transmit-the-coronavirus-without-showing-symptoms (accessed Aug 26, 2020).
27. Service R (2020). Does disinfecting surfaces really prevent the spread of coronavirus? Science (80-); published online March 12. 10.1126/science.abb7058
28. Setti, L. , Passarini, F. , De Gennaro, G. , Barbieri, P. , Perrone, M. G. , Borelli, M. , Palmisani, J. , Di Gilio, A. , Piscitelli, P. , & Miani, A. (2020). Airborne Transmission Route of COVID-19: Why 2 Meters/6 Feet of Inter-Personal Distance Could Not Be Enough. *International Journal of Environmental Research and Public Health*, 17(8), 2932 10.3390/ijerph17082932
29. Time . (2020). Wuhan Outbreak Highlights Danger of China's Opaque System. Retrieved from https://time.com/5768230/wuhan-pneumonia-flu-crisis-china-government/.
30. Wang, D. , You, Y. , Zhou, X. , Zong, Z. , Huang, H. , Zhang, H. , Yong, X. , Cheng, Y. , Yang, L. , Guo, Q. , Long, Y. , Liu, Y. , Huang, J. , & Du, L. (2020). Selection of homemade mask materials for preventing transmission of COVID-19: a laboratory study. In medRxiv. 10.1101/2020.05.06.20093021
31. WHO . (2020) Modes of transmission of virus causing COVID-19: implications for IPC precaution recommendations. Retrieved from https://www.who.int/news-room/commentaries/detail/modes-of-transmission-of-virus-causing-covid-19-implications-for-ipc-precaution-recommendations.

32. World Health Organization . (2020). Modes of transmission of virus causing COVID-19 : implications for IPC precaution recommendations. scientific brief. 10.1056/NEJMoa2001316.5

33. Yang, P. , Seale, H. , Raina MacIntyre, C. R. , Zhang, H. , Zhang, Z. , Zhang, Y. I. , Wang, X. , Li, X. , Pang, X. , & Wang, Q. (2011). Mask-wearing and respiratory infection in healthcare workers in Beijing, China. *The Brazilian Journal of Infectious Diseases*, 15, 102–108.

34. Zhao, M. , Liao, L. , Xiao, W. , Yu, X. , Wang, H. , Wang, Q. , Lin, Y. L. , Kilinc-Balci, F. S. , Price, A. , Chu, L. , Chu, M. C. , Chu, S. , & Cui, Y. I. (2020). Household materials selection for homemade cloth face coverings and their filtration efficiency enhancement with triboelectric charging. *Nano Letters*, 20(7), 5544–5552. 10.1021/acs.nanolett.0c0221

7. A Review: Indian Natural Health Supplements and Covid-19

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Abstract

Since two years worldwide popul ation face the malady COVID-19 that is caused by coronavirus. The COVID-19 may be a severe acute metabolism syndrome, thence search selection} choice of healthful plant based-therapeutics. Currently, vaccination drive started all told over world to extend the immunity against COVID-19. however in pandemic scenario the center and low financial gain cluster stricken by the economic impact of forced lockdowns, thence inflated the interest in different medical specialty of medical plant supplements. supported earliest review, during this articles we tend to summarised solely 3 healthful plant supplements with according antiviral, medicine, and immunomodulatory effects that may be attention-grabbing for any investigation.

Keywords: Chyawanprash, Triphala, Rooh Afza, Supplements, COVID-19,

Introduction

Medicinal plants area unit used as associate degree immunity booster, equally some ancient supplements that area unit ready by victimization Indian Formulation name as Chyawanprash, Triphala, and Rooh Afza etc. There are unit principally used as a daily food biological process supplements in Indian Territory. These plants and formulations area unit quite common and a minimum of one among of them is being employed daily by every Indian, no matter religion/community/financial standing. associate degree immunomodulatory, inhibitor, and anti-infective properties area unit shown by these on top of mentioned formulation, thence could be one among the explanations behind lower death rate of Indians per million of population thanks to COVID-19 even with minimum health infrastructure.

1. Chyawanprash

Chyawanprash is ready by concentrated extracts of various nutrient-rich herbs and minerals. it's associate degree Ayurvedic health supplement. Chyawanprash may be a flavoring jam that include Amla fruit as a base, that have a correct consistency and contemplate because the Rasayanato improve the strength, stamina, vitality and immunity. in keeping with earliest analysis work, according Chyawnprash has health benefita against numerous ill health. Bhattacharya *et al.*, 2002, has been according as a atom scavenging, Anil and Suresh, 2011, has according as associate degree inhibitor. Gupta *et al.*, 2017, has been evidenced that the Chyawanprash shows the medicinal drug, antiviral, medicine, anti-allergic and antithrombotic effects. Sharma R., *et al.*, 2019, worked on consumption and has been according as as adjuncts to antitubercular medication.

2. Triphala

Triphala is ready by two fruits *Phyllanthus emblica* L., Terminalia bellerica (Gaertn.) Roxb. and *Terminalia chebula* Retz in equal proportion. It's a really common polyherbal Ayuvedic drugs. it's out there within the market within the type of powder and used for biological process and refreshing action. Tambekar and Dahikar *et al.*, 2017, has according the medicinal drug activity of alcoholic extract of Triphala. Peterson *at al.*, 2017, has according the therapeutic potential of Triphala as associate degree antioxidants, anti-inflammatory, antineoplastic, antimicrobial, medicament, etc. they'd shown the broad-spectrum antimicrobial activity against antibiotic-resistant bacterium isolated from humans.

Kaiaiselvan and Rasool, 2016 studied on LPS-stimulated macrophages, mentioned the restrictive activity of Triphala and strangled the assembly of inflammatory mediators, living thing free radicals. Phetkate *et al.*, 2012, worked on clinical trials of Triphala that showed immunostimulatory properties on T cells and NK cells, but failed to modification the protein levels in healthy volunteers. Aher and Wahi, 2011, has been studied on individual constituents of Triphala and have showed immunomodulatory activity. The according analysis work and information on Triphala create that it's a strong polyherbal formulation with innumerous therapeutic uses for maintaining physiological condition yet because the cure and management of assorted malady.

3. Sharbat Rooh Afza

Rooh Afza may be a well-known refreshing formulation that is ready as syrup syrup with distillates of diverse healthful plants as well as seeds of Khurfa (*Portulaca oleracea L.*), Kasni (*Cichorium intybus L.*), Angoor (*Vitis Vitis vinifera L.*), Nilofar (*Nymphaea alba L.*), Neel Kamal (*Nymphaea nouchali Burm. f.*), Kamal (*Nelumbo nucifera Gaertn.*), Gaozaban (*Borago officinalis L.*), Badiyan (*Coriandrum sativum L.*), fruits/juices of Santara (Citrus × sinensis (L.) Osbeck), Ananas (*Ananas comosus (L.) Merr.*), *Staphylococcal enterotoxin* (*Malus domestica (Suckow) Borkh.*), berries (*Rubus fruticosus L.*), Vegetables like palak (*Spinacia oleracea L.*), gazar (*Daucus carota L.*), and pudina (*Mentha arvensis L.*).

Rooh Afza boosts the energy system of the body by naturally refreshing. The on top of list of healthful plants have their own vital importance. RS *et al.*, 2013 has been according a study on *N. alba* flower against inflammatory activity in Swiss anomaly mice victimization acute inflammatory models in an exceedingly dose-dependent manners. Arora *et al.*, 2016, studies on V. Vitis vinifera fruits that showed anti-asthamatic activity by inhibiting cellular response and resulting production of inflammatory cytokines. Rooh Afza may be a natural refreshment associate degreed has an inhibitor, anti-inflammatory/antiviral activities and immunomodulatory. Thus, it is perceived that Rooh Afza not solely provides natural refreshness to the body however additionally has inhibitor, immunomodulatory, and anti-inflammatory/antiviral activities.

4. Tea

It's unremarkably used sweetening and a part of healthy human diet. it's immune boosting properties. A recent study conducted at Swansea University counsel the role of tea in fighting COVID-19. in keeping with study of J Selvaraj, et al, 2021, they found gallocatechin compound in tea which can be useful in fighting COVID-19.

Conclusion

The on top of studies encourage any investigations of ancient healthful plants supplements for his or her preventive use against coronavirus infection. The flavoring supplements might be used on an individual basis or mix at applicable concentrations for developing immunity against COVID-19

References

1. Bhattacharya, S. K., Bhattacharya, D., Sairam, K., and Ghosal, S. (2002). Effect of bioactive tannoid principles of Emblica officinalis on ischemia-reperfusion-induced oxidative stress in rat heart. *Phytomed.* 9 (2), 171–174. doi:10.1078/0944-7113-00090

2. Gupta, A., and Chaphalkar, S. R. (2016). Immunopharmacological screening of aqueous root extract of Santalum album. *J. HerbMed Pharmacol.* 5 (1), 7–11.
3. Gupta, A., Kumar, S., Dole, S., Deshpande, S., Deshpande, V., Singh, S., et al. (2017). Evaluation of Cyavanaprāśa on health and immunity related parameters in healthy children: a two arm, randomized, open labeled, prospective, multicenter, clinical study. *Ancient Sci. Life* 36 (3), 141–150. doi:10.4103/asl.asl_8_17
4. Kalaiselvan, S., and Rasool, M. K. (2016). Triphala herbal extract suppresses inflammatory responses in LPS-stimulated RAW 264.7 macrophages and adjuvant-induced arthritic rats via inhibition of NF-κB pathway. *J. Immunotoxical.* 13 (4), 509–525. doi:10.3109/1547691X.2015.1136010.
5. Peterson, C. T., Denniston, K., and Chopra, D. (2017). Therapeutic uses of triphala in ayurvedic medicine. J. Altern. Complementary Med. 23 (8), 607–614. doi:10.1089/acm.2017.008CrossRef Full Text | Google Scholar
6. Phetkate, P., Kummalue, T., U-Pratya, Y., and Kietinun, S. (2012). Significant increase in cytotoxic T lymphocytes and natural killer cells by triphala: a clinical phase I study. Evidence Based Complementary Altern. Med. 2012, 1–6. doi:10.1155/2012/239856
7. Sharma N., N., Mishra, K. P., Chanda, S., Bhardwaj, V., Tanwar, H., Ganju, L., et al. (2019). Evaluation of anti-dengue activity of Carica papaya aqueous leaf extract and its role in platelet augmentation. Arch. Virol. 164 (4), 1095–1110. doi:10.1007/s00705-019-04179-z
8. Sharma, R., Martins, N., Kuca, K., Chaudhary, A., Kabra, A., Rao, M. M., et al. (2019). Chyawanprash: a traditional indian bioactive health supplement. Biomolecules 9 (5), 161. doi:10.3390/biom9050161
9. Tambekar, D. H., and Dahikar, S. B. (2011). Antibacterial activity of some Indian ayurvedic preparations against enteric bacterial pathogens. *J. Adv. Pharm. Technol. Res.* 2 (1), 24–29. doi:10.4103/2231-4040.79801

8. Potential Role of Ayurveda and Yoga on Respiratory System

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Abstract

An immune challenges created throughout the COVID-19 pandemic state of affairs to health care system. Medical and health care facilities square measure restricted however the infection of coronavirus in folks of Asian nation is recover and death rate conjointly low. These all attainable by Ayurveda and Yoga. The pathogens square measure accessible in surroundings, therefore health care systems targeted on the pathogens. They conjointly gave the importance on the Immunity and system of individuals to stop the unfold of infection and down regulate the efficiency of the agent.. This review aims to debate accessible proof on Ayurveda, Yoga and COVID-19. Further, it shows recent studies on Yoga and Ayurveda on immunity, metabolism health.

Keywords: Ayurveda, Yoga, COVID-19, system

1. Introduction

The health care system has moon-faced the main international challenge the COVID-19. Conti et al, instructed that reduction of inflammatory responses could be a relevant strategy to scale back the severity of the COVID-19 , that may probably cut back the quantity of cases requiring important care. The pathogens square measure accessible in surroundings, therefore health care systems targeted on the pathogens. They conjointly gave the importance on the Immunity and system of individuals to stop the unfold of infection and down regulate the efficiency of the agent. Thus, ancient Indian systems of medication like Ayurveda and Yoga

ought to be explored for his or her potential role in rising host immunity and reducing severity of the infection.

This review aim to know the role of Ayurveda and Yoga to extend the immunity of host.

2. Potential Role of Ayurveda and Yoga in COVID-19 Infection: Current proof Base

To understand the role, we've got mentioned the system in our literature.

2.1 Ayurveda and metabolism Health

The COVID-19 malady inflicting coronavirus enters the host by air and also the 1st target of virus is that the tract, animal tissue cells, tube epithelium cells and alveolar macrophages. These totally different cells square measure an initio targeted by virus and created infection thanks to replication method. IN line with Ayurveda, the first website of the malady is Prāṇavaha srotas, which incorporates each higher and lower metabolism tracts. Āyurveda mentions many medications could might improve the innate immunologic responses of metabolism animal tissue and so may forestall the virus transmission to lungs. The upkeep of metabolism track by the daily Ayurvedic measures like like (drinking water maintained in copper vessel), gargling, nasal installation and overwhelming hot food and water that square measure useful in host unconscious process against infectious agent infections (Fan *et al.,* 2019, agnivesha *et al*., 1990, Balasubraman, *et al*., 2011). Medicated predicament (Saḍaṅga pānīya) might facilitate in rising digestion and reconciliation of vāta and kapha dosha that play a serious in manifestation of metabolism conditions like rubor, cough and dyspnea (Chaudasanak *et al.*, 2015) the house remedies holy basil, cinnamon, ginger and black pepper beside jaggery/raisins and juice employed in maintain the metabolism health that is suggested by AYUSH ,a Government of Asian nation. Madhavmohan et al., 1992, instructed that each one the ingredients in AYUSH kvātha spacify kapha and vāta, possess Kāsahara, Svāsahara, Dēpana, Pāchana, Jvaragna and Kṛimigna properties. Recent studies on Aśwagandha have discovered important increase in immunoglobulins viz. IgA, immunoglobulin and Ig (Santaaella *et al.*, 2011. additional Sodana (bio-cleansing) in sort of sort of (seasonal bio-cleasing) and Rasāyana (immune modulators) for the upkeep of metabolism health. in line with in-vitro studies on animal and human have have incontestable the immunomodulatory effects of the Rasāyana medication like Aśwagandha (Withania somnifera), Gudūci (Tinospora cordifoloia) and Āmalaki (Emblica officinale) (Singh *et al*., 1990). Gudūci has been found to exert a spread of immunomodulatory effects like stimulation of vegetative cell functions,

phagocyte and mitogenic activity, protein responses, synthesis of interleukins, and body substance and cell-mediated immunity, each in-vitro and in-vivo severally.

2.2. Yoga and metabolism health

Yang *et al.,* 2016 has according, respiratory organ functions and capability by strengthening the breath and breath muscles thanks to regular apply of yogistic respiratory techniques (Prānayāma) improves. Sixty seven has declared in their work, the apply of Bhastrika (Bellow's breath) Prānayāma considerably increased the most breath and breath pressures compared to the stretching exercises within the old participants. Weitzeb *at al.*, 2002, studied on result of Bhramaripranayam, according improvement in sinus ventilation and 15-fold increase in nasal gas (NO) levels (involved in host defence functions)

Soni *et al.*, 2002 has studied on time of yoga and response and declared as a randomized, double-blind, placebo-controlled, crossover trial incontestable improvement in mean forced breath volume in 1-second (FEV1), peak breath flow, symptom score, and inhalator use (over the past three days) in eighteen patients with delicate respiratory disease when the apply of slow deep yogistic respiratory. The respiratory was practiced for quarter-hour, doubly each day, for two consecutive weeks.

Gupat *et al.*, 2011 assessed the study of blood chemical element saturation before, throughout and when two yoga respiratory techniques; high frequency yoga respiratory (Kapālabhāti) and breath awareness in twenty nine healthy young male volunteers. a major increase in chemical element saturation was noted when high frequency yoga respiratory for 33-minutes

Conclusion

Currently the researchers, health care, medical department all square measure engaged on the study on each role of Yoga and Ayurveda on COVID-19. In line with survey of literature, the strengthening the system by use of Ayurveda and consistent apply of Yoga. This means associate degree pressing want for conducting systematic clinical trials to analyze the add-on efficaciousness of Yoga and Ayurveda manner interventions with current typical treatment approaches.

References

1. Wagh K, Nagendra A, Vairagade A. Study on antibacterial activity of various water storing vessels.

2. V.K.L. Shanbhag, **Oil pulling for maintaining oral hygiene – A review** J Tradit Complement Med, 7 (1) (2016 Jun 6), pp. 106-109
3. Fan W, Zeng J, Xu Y. A theoretical discussion of the possibility and possible mechanisms of using sesame oil for prevention of 2019-nCoV (COVID-19 coronavirus) from the perspective of colloid and interface science. 2020.
4. Agnivesha, Charaka samhita of Acharya Charaka, Dridhabala krit, edited by Vaidya Jadavaji Trikamji Aacharya. Viamna Sthana. Ch.3, Verse 145, 2nd edition, Varanasi: Chaukhamba Sanskrit Sansthan; 1990.
5. Bhavamishra, Bhavaprakasha Samhita, Poorva khanda, Bulusu Sitaram. 2018th ed. Vol. 1. Varanasi: Chaukamaba Orientalia;.
6. S.P. Balasubramani, P. Venkatasubramanian, S.K. Kukkupuni, B. Patwardhan **Plant-based Rasayana drugs from Ayurveda** Chinese journal of integrative medicine, 17 (2) (2011), pp. 88-94
7. K. Chudasama, G. Singh **Efficacy of Ashvagandha (Withania Somnifera) On Immunity Of Krisha (Underweight)** Journal of Ayurveda Physcians and Surgeons, 2 (3) (2015), pp. 61-65
8. U.M. Thattet, S.A. Dahanukar **Immunotherapeutic modification of experimental infections by Indian medicinal plants** Phytotherapy Research [Internet], 3 (2) (1989), pp. 43-49
9. J. Rajani, B.K. Ashok, Galib, B.J. Patgiri, P.K. Prajapati, B. Ravishankar **Immunomodulatory activity of Āmalaki Rasāyana: An experimental evaluation**
10. Madanmohan null, D.P. Thombre, B. Balakumar, T.K. Nambinarayanan, S. Thakur, N. Krishnamurthy, et al. **Effect of yoga training on reaction time, respiratory endurance and muscle strength** Indian J Physiol Pharmacol, 36 (4) (1992 Oct), pp. 229-233
11. D.F. Santaella, C.R.S. Devesa, M.R. Rojo, M.B.P. Amato, L.F. Drager, K.R. Casali, e t al. **Yoga respiratory training improves respiratory function and cardiac sympathovagal balance in elderly subjects: a randomised controlled trial** BMJ Open [Internet], 1 (1) (2011 Jan 1), p. e000085
12. V. Singh, A. Wisniewski, J. Britton, A. Tattersfield **Effect of yoga breathing exercises (pranayama) on airway reactivity in subjects with asthma** The Lancet [Internet], 335 (8702) (1990 Jun 9), pp. 1381-1383

13. H. Cramer, H. Haller, P. Klose, L. Ward, V.C. Chung, R. Lauche **The risks and benefits of yoga for patients with chronic obstructive pulmonary disease: a systematic review and meta-analysis**Clinical rehabilitation, 33 (12) (2019), pp. 1847-1862
14. Z.-Y. Yang, H.-B. Zhong, C. Mao, J.-Q. Yuan, Y.-F. Huang, X.-Y. Wu, et al. **Yoga for asthma** Cochrane Database of Systematic Reviews, 4 (2016)
15. R. Soni, K. Munish, K. Singh, S. Singh **Study of the effect of yoga training on diffusion capacity in chronic obstructive pulmonary disease patients: A controlled trial** Int J Yoga [Internet], 5 (2) (2012), pp. 123-127
16. R.K. Gupta, S. Telles, A. Balkrishna **Effect of Two Yogic Breathing Techniques on Oxygen Saturation** Indian journal of physiology and pharmacology, 55 (5) (2011)
17. E. Weitzberg, J.O. Lundberg **Humming greatly increases nasal nitric oxiden** American journal of respiratory and critical care medicine, 166 (2) (2002), pp. 144-145

9. A Review on Licoric Root as a Medicinal Plant and Covid-19

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Abstract

The operation of the worldwide epidemic irruption thanks to the coronavirus criticism (COVID19) has been difficult with no precise devoted treatment nor established vaccines at the morning of the epidemic. Even so, things appears to be higher controlled with the recent COVID-19 vaccines roll- eschewal encyclopaedically as active protection to assist COVID-19. The expansive operation and trials drained recent irruption in China has shown the effectiveness of ancient Chinese Medicines (TCM) in perfecting the great of COVID-19 cases. Thus, COVID-19 hindrance and Treatment tips has listed variety of suggested creations meant for COVID-19 cases. Licoric, additional typically referred to as Gancao in Chinese Pinyin, is thought collectively of the foremost perpetually used constituents in TCM conventions for treatment of epidemic conditions. apparently, it's supposed as food part additionally, wherever it's usually employed in Western cookeries' goodies and sweets. The shocking undeniable fact that Licoric appeared within the prime ten main constituents employed in TCM conventions in COVID-19 has drawn nice attention from experimenters in revealing its natural event in prostrating this criticism. To date, there aren't any available comprehensive review on Licoric and its basic edges once employed in COVID-19. Therefore, during this current review, the attainable edges, medium of conduct, safety and limitations of Licoric were explored in expedient to allow a fast reference companion for its presymptomatic and clinical experimental set-up during this veritably essential moment of epidemic

Keywords: medicative plants; antiviral activity; hindrance, Licoric, COVID-19, SARS-CoV-2,

1. Introduction

In accordance to the Chinese formulary, Licoric is during a position to refill "Qi" (a very important energy that flows through the body to require care of one's well=being), notify spleen, take away heat, stop toxicity, take away phlegm, relieve cough, spasm and pain that finally ends up in harmonizing different medicines' effects.(The drugs Science and Technology of China Press, 2015) the data and information obtained through experimental and clinical studies had shown that Licoric or Glycyrrhizae (GR) possesses antiviral, antimicrobial, medication, medicinal drug, immunomodulatory, and expectorator activities (Hosseinzadeh, H. *et al.*, 2015). additionally, gastro protecting, hepatoprotective, antiepileptic, anti-tumor, inhibitor, medicinal drug, anti-asthma, anti-allergic, medicinal drug, blood cholesterin lowering impact, increment in digestive juice secretion, and different medicine effects area unit usually evoked by licorice and its constituents.(Ming principle, *et al.*, 2018)

Novel acute metabolic process sickness disease} named coronavirus disease (COVID-19) patients area unit usually classified according to the following categories; well or preclinical, mild, moderate, severe or essential health problem. (COVID-19 Treatment guideline Panel. Coronavirus malady 2019 (COVID - 19) Treatment tips., Health, Editor, 2020, National Institute of Health. SARS-CoV-2 virus spreads chiefly via metabolic process droplets once infected person. Previously, the preventive measures to cut back the speed of transmission were solely via physical distancing, sporting mask and hand hygiene as there aren't any approved treatment or vaccines to fight this pandemic. Recently, COVID-19 vaccination drive has began worldwide once receiving emergency use authorisation from numerous countries' restrictive bodies. all the same, vaccines area unit solely to prevent the malady rather than treating COVID-19. Thus, for infected patients, some of the off-label pharmacotherapies utilised in management of COVID-19 patients embrace Oradexon, remdesivir, lopinavir-ritonavir, azithromycin, convalescent plasma, interleukin-1 inhibitors, interleukin-6 inhibitors besides life support action and ventilation if necessary. Ali, I, Alharbi, OML, 2020.

1.1 Potential Mechanisms of Actions.

Implicit targets of COVID-19 curatives may be considerably distributed in a pair of corridor;1) mortal ingrain vulnerable system and 2) targeting the coronavirus by block infective agent polymer conflation, infective agent replication, tone- assembly and list to mortal cell receptors. provided that exploration on Severe Acute metabolic process

Coronavirus a pair of (SARS-CoV-2) is proscribed and on- going, results from exploration on SARS-CoV-1 will act as reference thanks to similarity of eighty ordering sequence identity between mortal SARS-CoV-1 and SARS-CoV-2. Virtual stimulations area unit choice to dissect and prognosticate bioactivity of Licoric.

1.2 Inhibitor, Medication and Expectorator Activities.

The idea of implicit places of intervention of inhibitor travail during this criticism, embrace aiding in reduction of positive feedback- circle in inflammation and aerophilous stress processes that result in a enduring inflammation things in cases. Historically, Licoric has been employed in redness respiratory disease, inflammatory disease, and asthma attack. Meanwhile, COVID-19 cases area unit renowned to manifest metabolic process symptoms, as well as cough and briefness of breath. Therefore, the medication, bronco-relaxant and expectorator travail could appropriate to palliate these symptoms operating of COVID-19. Aerophilous stress appropriate to induce multiple signal pathways, resulting in a rise in inflammation. The expansive high position of seditious halves could engender conformation of aerophilous injury in cells, resulting in the event of multi-system conditions. Plant product excerpt of polysaccharides deduced from herb was seen to ply their inhibitor acquisition via proliferation of blood SOD, CAT, GSH-Px and TAOC acquisition in mice. Besides, scavenging travail galvanized by biphenyl picrylhydrazyl, superoxide and radical revolutionaries were considerably plant in water answerable polysaccharides insulated from Glycyrrhiza uralensis victimisation DEAE-52 and Sephadex G-100 chromatography and ethanolic excerpt of G. (Pharmacogn Phytochem. 2019) Likewise, dry excerpt of base Glycyrrhizae showed forceful reduction of carbachol- convinced compression in rat trachea playacting in relaxation of the bronchial tube conceivably by blocking voltage-gated atomic number 20 channels.27

Ingredients of Licoric similar as liquiritin apioside, liquiritin and liquiritigenin showed necessary medication and expectorator travail. At 50mg/ kilo, these composites considerably scale back range of cough by 30-78, conceivably via modulation of supplemental ATP-sensitive metallic element particle channel and central activation of 5-HT receptor mechanisms however not via opioid receptors. On the opposite hand, composites similar as liquiritin apioside and liquiritin exaggerated expectorator acquisition up to2.5- crowds.

1.3 Safety and Adverse Effects.

Licoric is categorised as moderately hepatotoxic supported its LD50 price and its toxicity risk is lowest once administered orally (Nazari, S, *et al.*, 2017) in aspect effects

recorded for Licoric, embrace cardiovascular disease, fluid retention and hypokalaemia-induced secondary disorders. The mineralocorticoid-like activity is thanks to inhibition of protein protein sort two enzymes by active metabolites of licorice, glycyrrhizic acid glycyrrhetic acid. This result in rise in corticoid levels and activity as conversion of corticoid to Cortone Acetate is blocked. Besides, glycyrrhetic acid additionally inhibits 5-β enzyme activity that supresses viscus metabolism of mineralocorticoid myocardiopathy, pneumonic lump, symptom, myopathy, cramping, seizures and rhabdomyolysis are related to patients following chronic, excessive licorice bodily process. Thus, it's counseled to avoid excessive intake of licorice for individuals aged forty years and higher than, United Nations agency those who has history of cardiovascular disease or anyone who square measure a lot of susceptible to internal organ arrhythmias. Patients taking ACE inhibitors medication, loop diuretics or thiazides diuretics, ought to minimize or abstain intense Licoric thanks to additive metal lowering effects from these medications and Licoric, which can result in hypokalaemia. Patients taking Coumadin or digitalis glycoside ought to avoid Licoric product utterly to avoid toxicity. The utilization of Licoric in maternity and neonates ought to be cautioned as some clinical studies showed a decrease in fertilization age, preterm delivery, and changes in functions of hypothalamic–pituitary–adrenocortical axis and psychological feature in delivered youngsters once used throughout maternity. (Lu, L *et al.,* 2020). Licoric additionally able to inhibit or induce some CYP enzymes, UDP glucuronosyltransferases, Pglycoproteinmediated transport, 5α-reductase which can act with alternative medicine once given at the same time. (Nazari, S. *et al.*, 2017) pharmacological medicine effects of herb (Licoric)) but, once TCM consisting licorice was given to COVID-19 patients, there's no serious adverse events square measure being rumored up to now. Currently, licorice is usually recommended to lean as associate integrative treatment with antiviral medicine in COVID-19 patients. even supposing the results appear to be promising and helpful, the rumoured studies solely concerned little range of participants and displayed a high risk of bias in term of research. additional clinical trials square measure needed and in progress to additional explore the opportunities TCM and GR have in treatment of COVID-19. (Luo, E, *et al.,* 2020)

1.4 Antiviral Activity

In order to focus on SARS-CoV-2, a lively part is anticipated to be appropriate to ply impact on Angiotensin- changing protein two (ACE2) presumptively via shaft (S) proteins to assist microorganism entry and/ or 3C-suchlike proteolytic enzyme to dam replication and

microorganism assembly in host cells. A webbing by Zhang and associates has incontestable that Licoric consists of three orally bioavailable, antiviral natural factors against SARS-CoV-2 via inhibition of 3C-suchlike proteolytic enzyme, papain-suchlike proteolytic enzyme, Mpro and S proteins In atmosphere of S proteins, 3C-suchlike proteolytic enzyme and papain-suchlike proteolytic enzyme square measure required for host cell entry, recap and replication of SARS-CoV-2. Network material medical analysis prognosticated one in vivo pathway associated with infection and half-dozen in vivo pathways associated with vulnerable/ inflammation. (Med. 2020.) The attainable medium for 3C-suchlike proteolytic enzyme inhibition can be via targeting PIK3CG and E2F1 through PI3K-Akt signal pathway. (Zhang, DH, *et al.*, 2015). In another insilico approach study, derivations of flavones and coumarin additionally showed sturdy inhibition to 3C like proteolytic enzyme.(Khan, SA, *et al.*, 2020) Among the highest 3, rutin has been shown to bind explosively with main proteolytic enzyme of SARS-CoV-2 via commerce with Leu141, Ser144, His163 and Asp187 amino acids remainders. nineteen A molecular tying up has connected that kaempferol has stronger affinity with S macromolecule of SARS-CoV-2 and ACE2 compared to a several familiar modern medicine in inhibiting infection beside the 3C-suchlike proteolytic enzyme inhibition The pathways concerned in these inhibitions embrace JAK-STAT and PI3KAkt signal pathways. (Zhang, DH, *et al.*, 2020) Licoric has been familiar for its microorganism replication inhibition for colourful contagions as well as viral hepatitis, viral hepatitis, Influenza, H1N1 and HIV as bandied by Zhong et al. Med. 2020. This data might provide hints for experimenters to explore and work its impact additional in SARS-CoV contagion. Positive findings of Licoric displaying antiviral labour through its glycyrrhizin emulsion via inhibition of replication, sorption and penetration of the

SARS-CoV contagion were plant. (Lancet. 2003). A considerably potent inhibition of replication was observed; still, the precise careful medium remains unclear. It's being hypothecated that glycyrrhizin was liable for the determined product by poignant cellular signal pathways and adding expression of inhalation general anaesthetic synthase. (Lancet. 2003) A a lot of careful study in revealing the implicit impact of little motes on coronavirus, had showcased that glycyrrhizin derivations displayed learning against SARS-CoV contagion at IC50< a hundred μM rather of preliminarily rumoured as IC50> five hundred μM.23 Another in-vitro study has showed that seven glycyrrhizin derivations blocked SARS-CoV replication at lower attention compared to glycyrrhizin whereas revision of the chemical

structure of glycyrrhizin ends up in increasedanti-SARS-CoV labour from 10- times to 70-times.(Chen, F, *et al.* In vitro status of ten clinical isolates of SARS). withal, the emulsion baicalin was most well-liked than glycyrrhizin for respiratory disease antiviral prevention or treatment because it was prognosticated that glycyrrhizin might not have clinically vital in vivo learning thanks to its low body fluid attention.

2. Conclusion

Although most tending practitioners might feel sceptical toward TCM use, TCM shouldn't be discharged, particularly in current context of non-existence of effective treatment for COVID-19. TCM, specifically Licoric, has incontestable potential to act as antiviral, anti-inflammatory, immunomodulation and alternative effects for COVID-19 patients once administered as a part of concoction. Excessive use of Licoric could also be related to a couple of familiar aspect effects like cardiovascular disease, fluid retention and hypokalaemia but, there's no serious adverse event that has been rumoured up to now. With the background, benefits, attainable mechanism of actions and safety data of Licoric reviewed here, these information is additional used as a guide in fashioning additional studies to totally assess the effectiveness and safety of Licoric in COVID-19 patients.

3. References

1. Ali, I, Alharbi, OML. COVID-19: disease, management, treatment, and social impact.
2. Chen, F, Chan, KH, Jiang, Y, et al. In vitro susceptibility of 10 clinical isolates of SARS coronavirus to selected antiviral compounds. J Clin Virol. 2004;31(1):69–75.
3. Chenghao, Y, Gao, M, Lin, W, Yu, K, Li, P, Chen, G. Theoretical study of the anti-NCP molecular mechanism of Traditional Chinese Medicine Lianhua-Qingwen Formula (LQF). ChemRxiv 19. Preprint. 2020.
4. Cinatl, J, Morgenstern, B, Bauer, G, Chandra, P, Rabenau, H, Doerr, HW. Glycyrrhizin, an active component of liquorice roots, and replication of SARS-associated coronavirus. Lancet. 2003;361(9374):2045–2046.
5. Committee of Pharmacopoeia of China . Pharmacopoeia of People's Republic of China 2015 edition. The Medicine Science and Technology of China Press; 2015.
6. COVID-19 Treatment guideline Panel. Coronavirus Disease 2019 (COVID - 19)Treatment Guidelines. N.I.o Health, Editor, 2020, National Institute of Health.

7. Guo, A, He, D, Xu, HB, Geng, CA, Zhao, J. Promotion of regulatory T cell induction by immunomodulatory herbal medicine licorice and its two constituents. Sci Rep. 2015;5(1):14046.
8. Harish, R, Chauhan, JB. Antioxidant, antimicrobial and cytoprotective action of ethanolic extract of *Glycyrrhiza glabra* root against ccl4 induced damage on *Saccharomyces cerevisiae*. J Pharmacogn Phytochem. 2019;8(3):247–253.
9. Hoever, G, Baltina, L, Michaelis, M, et al. Antiviral activity of glycyrrhizic acid derivatives against SARS−Coronavirus. J Med Chem. 2005;48(4):1256–1259.
10. Hong, YK, Wu, HT, Ma, T, Liu, WJ, He, XJ. Effects of *Glycyrrhiza glabra* polysaccharides on immune and antioxidant activities in high-fat mice. Int J Biol Macromol. 2009;45(1):61–6
11. Hosseinzadeh, H, Nassiri-Asl, M. Pharmacological effects of Glycyrrhiza spp. and its bioactive constituents: update and review. Phytother Res. 2015;29(12):1868–1886.
12. Huang, YF, Bai, C, He, F, Xie, Y, Zhou, H. Review on the potential action mechanisms of Chinese medicines in treating Coronavirus Disease 2019 (COVID-19). Pharmacol Res. 2020;158:104939.
13. Khan, SA, Zia, K, Ashraf, S, Uddin, R, Ul-Haq, Z. Identification of chymotrypsin-like protease inhibitors of SARS-CoV-2 via integrated computational approach. J Biomol Struct Dyn. 2020:1– 18.
14. Kuang, Y, Li, B, Fan, J, Qiao, X, Ye, M. Antitussive and expectorant activities of licorice and its major compounds. Bioorg Med Chem. 2018;26(1):278–284.
15. Lu, L, Li, F, Wen, H, et al. An evidence mapping and analysis of registered COVID-19 clinical trials in China. BMC Med. 2020;18(1):167.
16. Luo, E, Zhang, D, Luo, H, et al. Treatment efficacy analysis of traditional Chinese medicine for novel coronavirus pneumonia (COVID-19): an empirical study from Wuhan, Hubei Province, China. Chin Med. 2020;15(1):34.
17. Ma, C, Ma, Z, Liao, XL, Liu, J, Fu, Q, Ma, S. Immunoregulatory effects of glycyrrhizic acid exerts anti-asthmatic effects via modulation of Th1/Th2 cytokines and enhancement of CD4(+)CD25(+)Foxp3+ regulatory T cells in ovalbumin-sensitized mice. J Ethnopharmacol. 2013;148(3):755–762.
18. Ming Yang, YJ, Li-Ping, Y. A systematic summary of natural compounds in radix Glycyrrhizae. Tradit Med Res. 2018;3(2):82–94.

19. Nazari, S, Rameshrad, M, Hosseinzadeh, H. Toxicological effects of *Glycyrrhiza glabra* (Licorice): a review. Phytother Res. 2017;31(11):1635–1650.
20. Wu, CY, Jan, JT, Ma, SH, et al. Small molecules targeting severe acute respiratory syndrome human coronavirus. Proc Natl Acad Sci U S A. 2004;101(27):10012–10017.
21. Yang L, YT, Miao, J, et al. Network pharmacology studies on the effect of Chai-Ling decoction in coronavirus disease 2019. Tradit Med Res. 2020;5(3):145–159.
22. Yang, EJ, Song, IS, Song, KS. Ethanol extract of Glycyrrhizae Radix modulates the responses of antigen-specific splenocytes in experimental autoimmune encephalomyelitis. 20 Phytomedicine. 2019;54:56–65.
23. Yang, R, Liu, H, Bai, C, et al. Chemical composition and pharmacological mechanism of Qingfei Paidu decoction and ma Xing Shi Gan decoction against coronavirus disease 2019 (COVID-19): in silico and experimental study. Pharmacol Res. 2020;157:104820.
24. Yue, GG, Chan, BC, Kwok, HF, et al. Screening for anti-inflammatory and bronchorelaxant activities of 12 commonly used Chinese herbal medicines. Phytother Res. 2012;26(6):915–925.
25. Zhang, CH, Yu, Y, Liang, YZ, Chen, XQ. Purification, partial characterization and antioxidant activity of polysaccharides from *Glycyrrhiza uralensis*. Int J Biol Macromol. 2015;79:681–686.
26. Zhang, DH, Wu, KL, Zhang, X, Deng, SQ, Peng, B. In silico screening of Chinese herbal medicines with the potential to directly inhibit 2019 novel coronavirus. J Integr
27. Zhong, LLD, Lam, WC, Yang, W, et al. Potential targets for treatment of coronavirus disease 2019 (COVID-19): a review of Qing-Fei-Pai-Du-Tang and its major herbs. Am J Chin Med. 2020;48(5):1051–1071.

10. Review on Tinospora Cordifolia (Giloy): Medicinal Uses

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Abstract

Tinospora cordifolia is an important and standard seasoner plant of Indian system of drugs (ISM) that is employed in many ancient medicines to cure varied diseases. The common names square measure Amrita and Guduchi and belong to the family of Menispermaceae. The plant reported containing substance as well as Alkaloids, Terpenoids, Lignans, Steroids et al. that establish the phytochemistry and pharmacologic activity of *Tinospora cordifolia*. it's been employed in the treatment of fever, urinary downside, dysentery, skin diseases Hansen's disease, diabetes, and lots of a lot of diseases. The current review highlights the pharmacologic importance like antimicrobial activity, medication activity, antifungal activity and inhibitor activity,

Keywords: *Tinospora cordifolia*, Terpenoid, antimicrobial, antifungal, medication

1. Introduction

Herbal formulations square measure medicative preparation of 1 or a lot of herbs gift in fixed quantities to administer the advantages meant for cosmetic, diagnose and to mitigate diseases of people at large or animals (Olabi and Nkemehule, 2013). it's conjointly referred to as herbal therapy or phytomedicine. *T. cordifolia* is additionally referred to as Guduchi/Amrita and its names in Latin: *Tinospora cordifolia* (Wild) Hook. f. & Thomson, English: Tinospora Gulancha/Indian Tinospora, Hindi: Giloya. It belongs to the family of Menispermaceae and is found in Myanmar, Sri Lanka, and China (Saha and Ghosh, 2012)

The plant is has many therapeutic properties (Meena, Singh and Rao, 2010)such as jaundice, rheumatism, urinary disorder, skin diseases, diabetes, anaemia, inflammation, allergic condition, anti-periodic, radio protecting properties, etc. (Sinha, Goel and Bala, 2004). the foundation of Giloya (T. cordifolia) is employed as potent remedy and for gut obstruction. The

starch of this plant serves a useful unit remedy for chronic fever, relieves burning sensation, will increase energy and appetency.

Giloya is employed in treatment of organic process ailments like acidity, colitis, worm infestations, loss of appetency, abdominal pain, excessive thirst, and innate reflex, and even liver disorders like liver disease (Chotalia and Salakar,2017).This plant contains chemical constituents like diterpenoid lactones, glycosides, steroids, sesquiterpenoid, phenolic, open-chain compounds, essential oils, a combination of fatty acids, and polysaccharides and is gift in an exceedingly totally different a part of the plant body, as well as root, stem, and whole half shows their role in material medical

Botanical Classification

Mehra *et al.*, ready the formulation and evaluated its inhibitor activity by DPPH (1-diphenyl2-picrylhydrazyl) radical scavenging methodology. They calculable the whole flavonol and total synthetic resin content. exploitation the results of the formulation showed potent inhibitor activity and repressing concentration (IC50) at five µg/ml as compared to straightforward drug vitamin C (Arora and Madan, 2013). Saint George et al., according the methanolic, ethanolic, and water extracts of T. cordifolia for his or her inhibitor activity, during which the stemic grain alcohol extract inflated the erythrocytes membrane lipide peroxide, enzyme activity and reduce the SOD, antioxidant in alloxan-induced diabetic rats. The leaves extract of alcohol, divided in water with ester and butyl alcohol at 250 mg/ml, and showed their inhibitor activity, extracts of alcohol phosphomolybdenum and metal chelating activity were high followed by ester, butanol, and water extract (George, et al., 2016). It conjointly decrease level of radical species of diabetic rat and up-regulate the anti-oxidant accelerator , scavenging activity for gratis radical of alcohol extract was high compared with phenol extract (Upadhyay and Sharma, 2014). This plant modifies the various protein system that controls the assembly of those reactive species and maintains the aerophilous load by control the lipide peroxidation method and glutathione level Premnath et al., dried the leave of T. cordifolia and pulverized and extracted with chloroform, methanol, grain alcohol alkane series, and water. inhibitor assay by totally different in-vitro models, lipide peroxidation repressing activity, DPPH radical scavenged, and superoxide radical scavenging activity. different solvent extracts showed weak inhibitor activity, whereas grain alcohol extract had high inhibitor activity. The results instructed that the inhibitor compound area unit higher in grain alcohol extract, and there's an instantaneous correlation between the whole polyphenols extracted and its inhibitor activity (Lakshmidevi and Premanath, 2010).

3. Outbreaks throughout Pandemic Situation

3.1 occurrence By Vibha Varshney (16 might 2021)

Soon once the occurrence of the SARS-CoV-2 virus within the country, the Union Ministry of AYUSH had discharged a consolatory, National Clinical Management Protocol supported writing and Yoga for management of COVID-19, that prescribes giloy joined of the prophylactic care measures against COVID-19.

People who area unit at high risk of the infection or area unit often exposed to the virus ought to take five hundred mg extract or 1-3 g powder doubly a day with heat water for fifteen days or one month, it says whereas undergoing standard treatment for the unwellness or ill from it, the ministry advises taking giloy together with amla (Indian gooseberry, Emblica officinalis) and gokshura (Tribulus terrestris) in prescribed doses to manage symptoms like fever, inflammatory disease, headache and fatigue.

The plant includes a long tradition of use for its therapeutic properties. writing refers thereto as guduchi, which implies "protector from diseases", or as amrita or nectar that has the property to form the user immortal. many writing texts mention giloy as a patra shaka (leafy vegetable), suggesting that the plant was used as a vegetable.

Studies have established that giloy leaves area unit made in water-soluble vitamin and minerals, whereas the starch from the stem (called guduchi satva) is filled with metallic element and iron. The stem extract helps management polygenic disorder and inflammatory disease, strengthens immunologic response and aids in digestion.

In recent years, studies try to explore its antiviral properties. The herb is effective in dominant hepatitis A virus, in step with a study revealed within the International Journal of research in Biological Sciences in June 2018. Ethanolic extract of the entire plant was found effective against the virus in an exceedingly dose-dependent manner in laboratory studies, with effectivity being most at fifty μg/ml concentration, says the study.

Another paper, revealed within the Indian Journal of medicine in 2008, says sixty % of HIV patients World Health Organization received treatment with extract of giloy according a decrease within the incidence of symptoms related to this disease. Compared to the current, twenty per cent individuals on placebo according improvement in symptoms of HIV.

Based on the findings, the researchers from the govt. Medical school and also the Government Ayurvedic school and Hospital, each in Nagpur, Maharashtra, counsel T cordifolia may well be used as AN adjunct (additional treatment to extend the effectivity of primary treatment) in hiv/aids management.

As a lot of and a lot of individuals decide to adopt a healthier style following the pandemic, there's AN inflated demand for the helpful stem of giloy from across the country. Since most giloy out there within the market is collected from the wild, state governments have conjointly inflated the minimum support worth (MSP) for it to market assortment.

Chhattisgarh, for instance, inflated the MSP to Rs forty per weight unit in might 2020 from Rs twenty one. In Maharashtra's Thane district, three hundred individuals of the Katkari community — one among India's seventy five significantly vulnerable social group teams — have move to create the Adivasi Eakatmik Samajik Sanstha to gather and sell giloy from forests.

Since its formation, the help cluster has attained Rs eighteen.5 large integer from merchandising giloy powder and dry giloy stems, in step with a government promulgation dated Apr eight, 2021. The Union Ministry of Affairs has conjointly originated a central process facility within the district wherever the dried stems brought in by the group area unit pulverized, packaged and oversubscribed to Ayurvedic corporations like Dabur, Baidyanath and Himalaya.

Giloy is alleged to own originated within the Indian landmass and is found across India, Myanmar, state and China. India is home to 3 of its forty species — *T cordifolia, T sinensis and T crispa* — they will be simply fully grown as a rain-fed crop.

The National healthful Plants Board, Delhi, has recently brought out tips for its cultivation, that say the tracheophyte grows best as AN inter-crop with native trees like neem tree (Azadirachta indica). it's aforementioned that once fully grown with neem tree, giloy takes up its healthful properties. recent twigs also are aforementioned to be a lot of economical than dried stems. Since it will grow extravagantly in pots, all one has to do is plant a little piece of the stem.

RECIPE / Giloy tea

Ingredients

Giloy stem: 5
cm Ginger: 2 cm

Turmeric (fresh): 1 cm

Cinnamon bark: 2 cm

Peppercorn: 1/2 tsp

Honey: 1 tsp

Method

Crush the ingredients and boil in 300 ml water using a pan with a thick base. Boil till the water reduces to 200 ml. Strain the concoction in a cup and add honey. It is said to be more effective when consumed on an empty stomach.

4. Conclusions

T. cordifolia is a medicinal plant having various type of compounds. The different bioactive compounds, including alkaloids, steroids, glycosides, sesquiterpenoid, etc have been discussed. Present review spotlights the artistic antifungal activity, antioxidant activity, antimicrobial activity, antibacterial activity. It has been used successfully in Ayurvedic medicine from the ancient era, and its products are used for their better economic and therapeutic utilization. In this regard, further studies need to be carried out to explore *T. cordifolia* for its potential in preventing and treating diseases.

References

1. A.S. Olabi, F.E. Nkemehule, O.A. Odukoya, S.Ogbonnia , T . A. Samuel , Inhibition of glycosylation as an index of activity in plants with antidiabetic potentials Biochem. Pharmacol., 2 (2013), p. 181
2. A.K. Meena, A. Singh, M.M .Rao , P. Panda, S. Mishra, Tinospora cordifolia: its bioactivities & evaluation of physicochemical properties IJPPR, 2 (2010), pp. 50-55 View Record in Scopus Google Scholar.
3. A.K Sinha , C. Goel, M. Bala , J. Prasad, S. Singh, P.K.Agrawal , R.K. Sagar, R. Dogra Radio protective potential of an herbal extract of Tinospora cordifolia J. Radiat. Res., 45 (2004), pp. 6168.
4. A. Rath, B. Fernandes , P.H.Ramamurthy , P. Sidhu , S.Agrawal Assessment of antimicrobial activity of different concentrations of Tinospora cordifolia against Streptococcus mutans: an invitro study Dent. Res. J., 16 (2019), pp. 24-28 View Record in Scopus Google Scholar.
5. A.K. Mishra, B. Sabata , J. B. Hanuman , A natural phenolic lignan from Tinospora cordifolia Miers J. Chem. Soc. (1986), pp. 1181-1185
6. A.R. Kidwai, K.C. Salooja, S. Siddiqui , V.N. Sharma , Chemical examination of Tinospora cordifolia J. Sci. Indian Res., 8 (1949), pp. 115-118 View Record in Scopus Google Scholar 7) A. Khaleque, K.A. Basar, M.A. Rouf, M.A. Khan, M.Q. Khuda , N. Roy Studies on Tinospora cordifolia II: isolation of tinosporine, tinosporic acid and tinosporol from the fresh creeper Sci. Res., 3 (1966), pp. 9-12

7. A. Tyagi , R. Maurya, R.S. Kapil , V. Wazir, Clerodane diterpene from Tinospora cordifolia Phytochemistry, 38 (1995), pp. 659-
8. A. Khaleque, M.Q.I Khuda , N. Ray Tinospora cordifolia constituents of plants fresh from the field Sci. Res., 1 (1964), pp. 177-183
9. A.S. Narayanan, A . Maripandi , K. Ponumurugan , K. Natarajaseenivasan, Q.A. Mandeel , S.C. Kandekar , S. S . Raja , Antibacterial activity of selected medicinal plants against multiple antibiotic resistant uropathogens Benef. Microbes, 2 (2011), pp. 235-243
10. A.Almatroudi , A. Khan , K.S. Allemailem, M.A. Alsahli, M.A. Khan Tinospora cordifolia aqueous extract alleviates cyclophosphamide-induced immune suppression, toxicity and systemic candidiasis in immunosuppressed mice: in vivo study in comparison to antifungal drug fluconazole Curr. Pharmaceutics. Biotechnol., 20 (2019), pp. 1-5
11. A.Chauhan ,B . Prasad .Anti-Oxidant and antimicrobial studies of Tinospora cordifolia (Guduchi/Giloy) stems and roots under in-vitro condition Int. J. Adv. Microbial. Health. Res., 3 (2019), pp. 1-10
12. C. Chotalia, K .Salkar , R. Salvi. Tinospora cordifolia: an antimicrobial and immunity enhancer plant Int. J. Sci. Res., 6 (2017), pp. 1603-1607
13. C . Sasikala , M. P . Sridhar , R. Jayaprakash, V. Ramesh, Antioxidant activity of ethanolic extract of Tinospora cordifolia on N-nitrosodiethylamine (diethyl nitrosamine) induced liver cancer in male wister albino rats J. Pharm. Bio Allied Sci., 7 (S1) (2015), pp. 40-45
14. G. Singh , L.R. Manhas, P. Gupta, P.K. Mishra, P.P. Yadav R . Maurya , Amritosides A, B, C and D: clerodane furono diterpene glucosides from Tinospora cordifolia Phytochemistry, 5 (2004), pp. 2051-2055
15. J.P. Yadav , K. Singh, M. Panghal, S. Kadyan, U. Chaudhary, Antibacterial activity of synthesized silver nanoparticles from Tinospora cordifolia against multi-drug resistant strains of pseudomonas aeruginosa isolated from burn patients J. Nanomed. Nanotechnol., 5 (2014), pp. 1-6
16. K. Balakrishna, N.A. Aaharbi , S. Ignacimuthu , V. Duraipandiyan , Antimicrobial activity of Tinospora cordifolia: an ethno medicinal plant Asean J. Trad. Knowledge, 7 (2012), pp. 59-65

17. L. Josepha, M. Mathew , M . George , A research on screening of learning and memory enhancing the activity of whole plant extract of Tinospora cordifolia (Wild) Pharma Innovation, 5 (2016), pp. 104-107
18. M. Arora, S. Madan , R . Mehra , T. Naved , Standardization and evaluation of formulation parameters of Tinospora cordifolia tablet J. Adv. Pharm. Educ. Res., 3 (2013), pp. 440-449 Saha, S. Ghosh, Tinospora cordifolia: one plant, many roles Ancient Sci. Life, 31 (2012), pp. 151159
19. M.B. Siddiqui, N. Chaudhry , S. Khatoon, Pharmacognostical evaluation of Tinospora cordifolia (Will) Meirs and identification of biomarkers J. Res. Indian Med., 13 (2014), pp. 543550
20. M.B. Siddiqui, N . Chaudhary , S. Azmat, S. Khatoon Tinospora cordifolia: ethnobotany, phytopharmacology and phytochemistry aspects IJPSR, 4 (2013), p. 891
21. M.A. Khan ,Tinospora cordifolia aqueous extract ameliorates the systemic infection of *Aspergillus fumigatus* in balb/c mice Asian. J. Pharm. Clin. Res., 12 (2019), pp. 525-528
22. N. Upadhyay, S.A. Ganie, R.K. Agnihotri, R. Sharma Free radical scavenging activity of
23. Tinospora cordifolia (Wild.) Mier J. Pharmacogn. Phytochem., 3 (2014), pp. 63-69
24. N. Lakshmidevi , R .Premanath ,Studies on the anti-oxidant activity of Tinospora cordifolia (Miers.) leaves using in-vitro models J. Am. Sci., 6 (2010), pp. 736-743
25. R. Nelson , V. Shanathi , Antibacterial activity of Tinospora cordifolia (Will) Hook. F. Thoms on urinary tract pathogens Int. J. Curr. Microbial. App. Sci., 2 (2013), pp. 190-194
26. S.S.Handa, R.Maurya ,Tinocordifolin, a sesquiterpene from Tinospora cordifolia Phytochemistry, 44 (1998), pp. 1343-1345
27. S.N. Dixit, R.L. Khosa Chemical investigations on Tinospora cordifolia (wild.) miers Indian. J. Appl. Chem., 34 (1971), pp. 46-47 Vw
28. S.P. Anand , R . Jeyachandran , T.F .Xavier , Antibacterial activity of stem extracts of Tinospora cordifolia (willd) hook Anc. Sci. Life. Res., 25 (2003), pp. 40-43

11. To Evaluate Antimicrobial Activity of the Plant of Tinospora Cordifolia

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Abstract

Tinospora cordifolia could be a medicative plants for the presence of bioactive compound. During this work, we have a tendency to studied the antimicrobial activity of small-grained type of T. cordifolia leaves and stem against a check being enteric bacteria Klebsiella pneumoniae 535 and Staph aerues 96 by agar well technique. The degree of the character of the plant extract was inferred by the comparative studies of the zone of inhibition (in metric linear unit diameter). The results ascertained prove that the natural medicative property of the leaves and stem shows an therapeutically economically vital with fewer facet effects to the shoppers and straightforward handiness.

Keywords: Tinospora cordifolia, antimicrobial activity, leaf extract, enteric bacteria pneumoniae, Agar well technique

Introduction

Nature must offer U.S.A. the plants of nutrient and therapeutic properties. Medicative plants area unit those plants that exhibit medicative and therapeutic properties within the type of biologically active compounds within the type of secondary metabolites and these metabolites area unit found either incorporated within the plant elements like leaves or flowers, seed or bark or typically found within the kind of exopolysaccharides, resins and gums. The recent discovery has pointed that the rhizosphere close the plant roots have therapeutic properties which will be used and exploited by the human beings for his betterment. (Eisner T. Thomas War ,1978 -1989) The scientific bodies have invariably been inquisitive and stunned by the medicative plants for his or her on the far side scientific rationalization behavior and have invariably tried to duplicate their effects within the laboratory conditions. India has invariably been famous for her wealthy cultural and religious

practices and also the extent of the impact that the medicative plants wear the culture, history and within the lives of the individuals domicile in India is clearly visible. that the well–known and in– depth data of each the medicative plants and their interactions with the advanced technology and the way these in native and in combined kind react with the biological system and convey concerning the required medicative and therapeutic properties.

Tinospora cordifolia could be a medicative plant whose standing within the field of natural medication and piece of writing is of the very best order. T. cordifolia is Associate in Nursing prestigious medicative plant whose uses and application with relevancy human edges are praised to unspeakable heights in varied ayurvedic and religious text scriptures and also the practices. The medicative plant of interest during this paper, Tinospora cordifolia, a climber plant of nice medicative property that is wide and popularly utilized in the ayurvedic and native styles of medication is studied within the phytochemical and totally different elements that exhibit the properties that are celebrated and upheld within the age recent traditions and medicative practices. botanic classification The plant is popularly called Guduchi, is Associate in Nursing nonwoody vascular plant happiness to the Menispermaceae and is found ordinarily deciduous and dry forests. Recently there has been a great deal of attention targeted on manufacturing medicines and merchandise that area unit natural. Many fruits and fruit extracts, yet as arrowroot tea extract and caffein, are found to exhibit antimicrobial activity against pathogens. This means that plants that manifest comparatively high levels of antimicrobial action could also be sources of compounds which will be accustomed inhibit the expansion of foodborne pathogens. Microorganism cells might be killed by the rupture of cell walls and membranes and by the irregular disruption of the intracellular matrix once treated with plant extracts.

Phytochemical composition of plant: The elaborate scientific studies have yielded the discovery of the various categories of compounds that area unit found during this plant area unit classed in teams like alkaloids, steroids, terpenoids, polysaccharides, glycosides and totally different aromatic and open-chain compounds that area unit gift in their phytoactive kind that area unit accountable for the wide vary of medicative and therapeutic properties. The presence of those compounds is found in varied plant elements however extremely targeted within the stem, leaves and root a part of the plant. (Mishra NP, island Sinha , Singh J *et al.*, 2016) the most compound of this plant is berberine and furanolactone and what is more compounds like tinosporone, tinosporic acid, cordifolisides A to E, giloin, gilenin, crude

giloininand, arabinogalactan polyose, picrotene, bergenin, gilosterol, tinosporol, tinosporidine, sitosterol, cordifol, heptacosanol, octacosonal, tinosporide, columbin, chasmanthin, palmarin, palmatosides C and F, amritosides, cordioside, tinosponone, ecdysterone, makisterone A, hydroxyecdysone, magnoflorine, tembetarine, syringine, glucan polyose, syringine apiosylglycoside, isocolumbin, palmatine, tetrahydropalmaitine, jatrorrhizine area unit few of the compounds that are iolated from the plant. The presence of 3 compounds like cycloeuphordenol, Cyclohexyl–11–heneicosanone and 2–Hydroxy–4–methoxy– benzaldehyde has been isolated from the plant and has been seen to be gift in varied different plants. The presence of proteins and miscellaneous compounds has been attributed to the medicative properties of the plant.

Medicinal and therapeutic properties

The plant has been titled to several properties that are used from yesteryear and few of them embody curative properties against Jaundice, fever, gout, urinary and higher metastasis infections and preventive measures against skin infections, chronic diarrhea, haemorrhage piles, dysentery, itchiness and Saint Anthony's fire. The plant is understood for its potent aphrodisiac nature and its rejuvenating nature. (Gaur LB, *et al.*, 2014) The plant extract influences the secretion of gall liquids and is understood to complement the blood constituents. The impact that the plant extract has in each adult and youngsters systems is analogous and this can be an honest consider the administration of the plant drug irrelevant to the host age that isn't the case in artificial medicine that base the age of the client to be a significant consider drug administration. (Reader `s Digest Magic and medication of plants 1986) . The plants show anti–diabetic properties thanks to the presence of tannins, alkaloids, flavonoids, glycosides, saponins and steroids. The plant has seen to possess impact on each the sexual arousal and also the sexual performance of the biological systems and these medicine have stimulatory impact on the sexual practice behavior and thereby entitled to aphrodisiac activity.

Materials and methods

1. Preparation of Plant Extract

The Tinospora cordifolia elements were collected from written material medical from Borivali east in Mumbai, Maharashtra.

The extract from leaves and stem bark of plant were ready by maceration adding forty g of powder plant to ethanol:water 1:1, 7:3 and 9:1 at temperature and to two hundred cubic centimeter of distilled deionized water and heated to concerning 10°C for 10 min underneath

reflux. The mixtures were created in sterile 125 mL flask wrapped in foil to avoid evaporation and exposure to lightweight for three days at temperature. The flasks were placed on a platform shaker at 70 rpm. when three days of soaking in solvent, the mixtures were transferred to 50 mL tubes and centrifuged for 10 min at 4000 rpm at 25°C. The supernatant was collected and keep at 4°C till use. The solvent was removed underneath vacuum at 40°C and therefore the binary compound and ethanol:water extracts were freeze-dried. The extracts were assayed against gram-positive and gram negative microorganism by agar dilution technique.

2. Phytochemical Analysis represented by Sofowora (1993).

2.1. Test for Saponins - Extract was placed in an exceedingly tubing and agitated smartly. The formation of stable foam was taken as a sign for the presence of saponins.

2.2. Check for Phenols and Tannins - Extract was mixed with 2 mL of twenty-two resolution of FeCl3. A blue-green or black coloration indicated the presence of phenols and tannins.

2.3. Check for Terpenoids (Salkowski's Test) - Extract was mixed with 2 mL of chloroform. Then 2 mL of focused vitriol was more rigorously and agitated gently. A sepia coloration of the interphase was fashioned to indicate positive results for the presence of terpenoids.

2.4. Check for Flavonoids (Shinoda Test) - Extract was mixed with Mg ribbon fragments, and focused acid was more drop wise. Orange, red, pink, or purple coloration indicates the presence of flavonoids.

2.5. Check for organic compound - Extract was mixed with two mL of glacial carboxylic acid containing two drops of twenty-two FeCl3 The mixture was poured into another tube containing 2 mL of focused vitriol. A brown ring at the interphase indicates the presence of glycosides.

3. Medicinal drug Activity

Antimicrobial condition testing was done exploitation the well-diffusion technique consistent with the quality of the National Committee for Clinical Laboratory Standards. The plant extracts were tested on Mueller Hinton agar plates to discover the presence of medicinal drug activity. before streaking the plates with microorganism, 5 mm diameter wells were punched into the medium employing a sterile borer. All plates were inoculated with the check

bacteria The plates area unit allowed three to 5 min to dry the surplus wetness. Fifty uL aliquots every check extract was distributed into each well when the vaccination of the plates with microorganism. The plates area unit sealed with parafilm, labeled, associate degreed placed in an setup set to 37°C. When twenty four hours of incubation, every plate was examined for inhibition zones. A ruler was accustomed live the inhibition zones in millimeters

Result and discussion

The medicinal drug activity of various a part of plant's extract were indicated in Table 1. The leaf powder has shown the very best medicinal drug activity against Enterobacteria Klebsiella pneumoniae 535 and Staphylococci aerues 96.

Table 2 showed that the phytochemicals were gift in each leaf and stem of Giloya. Each leaf and stem contain all the tested phytochemicals.

It is presence of biologically active phytocompounds like berberine, associate degree alkoloidic compound and the bitter compounds like tinosporin, tinosporic acid, tinosporal, a fancy mixture of fatty acids and essential oils that area unit to blame for the expression of the medicinal drug or the overall antimicrobial activity of the plant extract (Veeramuthu D,). The ascertained results will be ascertained because of the presence of assorted categories of phytochemical compounds like alkaloids, terpenoids, glycosides, flavonoids, essential oils and more organic chemistry substances that impact on the host or effect the target organism. The phytochemical screening of the extracts of check medicative plant have shown the presence of phytocompounds like tannins, phylobatannins, alkaloids, phenoplast compounds, flavonoids, steroids, sugars, resins, aromatic compounds, minerals and varied primary (Ugoh and Nneji (2013) and Offo (2015)) and changed compounds that contribute to the expression of properties like anti–microbial, anti–inflammatory, Anticancerous, protection against cardiovascular disease, infections, bodily discomforts and harmful radiations and chemicals and varied alternative properties that haven't nevertheless properly understood and discovered.

Table 1: Antibacterial activity of extract of leaf and stem

Sr. No.	Name of Pathogens	Leaf Extract	Stem Extract
		Zone of Inhibition (mm)	
1.	Klebsiella pneumoniae	22	21.5
2	Staphylococcus aerues	17.5	19.5

Table 2: Phytochemical constituents of leaves and stem

Sr. No.	Phytochemical Constituents	Leaf	Stem
1	Alkanoid	+	+
2	Saponin	+	+
3	Phenol	+	+
4	Flavonoid	+	+
5	Tannin	+	+
6	Steroid	-	+
7	Terpenoid	+	+
8	Glucosides	+	+

Conclusion

The medicative uses of those plants area unit supported by the presence of phytochemical constituents gift in them and therefore the antimicrobial activities they exhibit. The results obtained from this study showed that the plant contains bioactive chemical compounds and conjointly possesses medicinal drug activities against Klebsiella pneumoniae and Staphylococci aerues. Plant-based antimicrobials have monumental therapeutic and discriminatory potential; they'll serve the specified purpose with lesser facet effects that area unit usually related to artificial antimicrobials used presently supported these findings, the applying of the boiling of leaf and stem of the plant in ethno medication is even and leaves and stem of Psidium guajava possesses the capabilities of being an honest candidate. Hence, the necessity to use the potentials of those plants particularly in areas of ancient medication and pharmaceutical industries arises

References

1. Abdul RK, Jamal A, Mohamad, et al. Phytochemical, antioxidant and antiproliferative studies of some medicinal plants from indian sub– continent. Britisj Journal of Pharmaceutical Research. 2016;11(6):1–11.
2. Bala M, Kumar N, Sharma U et al. Immunomodulatory active compounds from Tinospora cordifolia. J Ethanopharmacol. 2012;141(3):318–926.
3. Bisset NG. Wichl M. Herbal drugs and phytopharmaceuticals. USA: CRC press; 2000. 708 p. 10.
4. Eisner T. Prospecting for nature's chemical riches. Issues Sci Technol. 1989;6 (2):31–34. 5.
5. Gaur LB, Gaur SC Singh SP , et al. A Basic Information, Cultivation and Medicinal Use of Tinospora cordifolia. Pop Kheti. 2014;2(3):188–192.

6. Ghosh S , Saha S, Tinospora cordifolia: One plant, many roles. Ancient Science of Life. 2012;31(4):151–157.
7. Jitendra Amala B , Madan MS, Tinospora cordifolia: a multipurpose medicinal plant– A review. Journal of Medicinal Plants Studies. 2014;2(2):32–47.
8. Kavya B, Kavya N, Ramarao V, et al. Tinospora cordifolia (Willd) Miers: Nutritional, Ethanomedia and therapeutic Utility. Int J Res Ayurvedic Pharm. 2015;6(2):195–198. 14.
9. Kedike B, Savarinuthu I , Veeramuthu D . Antimicrobial activity of Tinospora cordifolia: an ethnomedicinal plant. Asian Journal of Traditional medicines. 2012;7(2):59–65.
10. Kirti Sinha, Mishra NP, Singh J, et al. Tinospora cordifolia (Guduchi), a reservoir plant for therapeutic applications: A review. Indian Journal of Traditional Knowledge. 2004;3(3):257–270.
11. L.M, Nneji , S .C ,Ugoh, S. C. (2013). Evaluation of phytochemical composition and antimicrobial activities of methanolic and aqueous leaf extract of Psidium guajava (l.). Report and Opinion 5(9), 14-20.
12. Reader's Digest. Magic and medicine of plants. Reader's Digest Assoc. 1986. p. 42–44.
13. Reader's Digest. Magic and medicine of plants. Reader's Digest Assoc. 1986. p. 51–73. 12.
14. Sofowora , A. (1996). Research on Medicinal Plants and Traditional Medicine in Africa. Journal of Alternative and Complementary Medicine 2(3), 365 – 372.
15. Thomas WAR. Medicines from the Earth. Maidenhead, United Kingdom, UK: McGram–Hill Book Co; 1978.

12. Changes in Biodiversity Conservation Amid Covid-19 Pandemic: Case Study

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Abstract

Covid-19 pandemic has globally expanded exponentially for the past 2 years, It was declared a Global pandemic by WHO (World Health Organisation) on March 11 2020. Since its first outbreak it has had a major impact not merely on Human health but also has an influence on socio- economic factors, study and conservation of Ecosystem. The effects of the Pandemic are inescapable for a long run, the consequences of which can't be denied. Biodiversity is all about the multifariousness of life. It includes animal life, plant life, bacteria where we find these different organisms and the kind of habitats they flourish in. We mostly rely on biodiversity for maintaining healthy, robust, high functioning ecosystems. The current pandemic has strongly affected the preservation of biodiversity and understanding the consequences of wildlife trade, it has also highlighted the influence of bush meat and illegal trade on proliferation of zoonotic diseases. Covid-19 had limited travel of humans and concentrated in elimination of illegal markets and dealings, the terrestrial as well as marine life can be seen existing facilely, reducing environmental pollution which is accompanied by a balance in the ecosystem. However, the pandemic had brought a halt in economic activities, this decline in income compels people to be more dependent on natural resources which increased pressure on sensitive areas. Patrol officers were made to retrieve as a result of being subjected to the pandemic which affected conservation negatively, these areas were more susceptible to local poachers as a sole source of protein. Education and research was overshadowed and humanity is facing a severe crisis on mental and physical health. Several government funded and private organisations have come forward acknowledging the

difficulties and have made an initiative to redeem biodiversity. It is also the responsibility of common people to realise the importance of coexisting and increasing awareness rather than blaming a specific species.

Keywords: Biodiversity, Covid-19, Coexisting, Zoonosis, Wildlife trade, Ecology

1. Introduction

Biodiversity is a manifold of life on earth that reinforces the ecosystem. Around 8.7million botanical and zoological species are speculated to exist out of which only 1.2million species are reported and recognised hitherto. Covid-19 Pandemic has considerably affected the global economy and productivity. It is indispensable to know the effects of pandemic on biodiversity to acknowledge the repercussions of human utilization on different habitats and changes in the ecology due to the absence of humans. Comprehending these effects could help to reduce the outcome of zoonotic diseases by advancement of literature on different species. Trading and exploitation of biodiversity had increased the risk of epidemics and pandemics. About 40% of the world economy and 80% of the needs of local groups is centralized on biological resources therefore, it is important for all species to collaborate on maintaining and surviving in the ecosystem. Majority of earth's biodiversity is vulnerable due to excessive human consumption that destroys biota. Pollution, global warming and population growth are some human activities that are menace to biodiversity. Deforestation for human residence and agricultural land augment climate change allowing disease carriers to enlarge the area of contamination and afflict other human settlements. Diverse species are less susceptible to threats compared to a specific number of dominating species. Protection and Conservation of natural and wildlife resources is essential for perseverance of current biodiversity for future generations.

2. Impact on wildlife

Millions of people are affected by covid-19 Pandemic which is caused by the virus-SARS-CoV-2, on further research by medical experts it was proved that it has 96% resemblance to coronavirus in bats, which further increased the speculation of zoonotic origin (Zhou et al. 09 Feb 2020). Hence, much study was concentrated on wildlife markets as a probable source of infection. The virus that affected humans are believed to be spread by an undefined median from Hunan Seafood market in Wuhan, on further investigation it was found that most of the animals found in this market were sold live with onsite butchering which negatively affects the hygiene standards, 30% of found refrained mammals suffered gunshot

wounds and were trapped which suggested illegal untamed harvesting. Some vendors were also bluntly promoting selling of endangered species and many had no certified proof of origin or quarantine Certificate, making it illegal (Xiao et al. June 07, 2021). Examples are (a) King rat snake (Elaphe carinata), (b) Chinese bamboo rat (Rhizomys sinensis), (c) Amur hedgehog (Erinaceus amurensis) (the finger points to a tick), (d) Raccoon dog (Nyctereutes procyonoides), (e) Marmot (Marmota himalayana) (beneath the marmots is a cage containing hedgehogs), and (f) Hog badger (Arctonyx albogularis). (Xiao, X., et al., June 07, 2021)

Due to the coronavirus outbreak some wet markets were shut down which increased the pressure on the demand of Rhino horns, it is allegedly recommended as a 'cure' for covid-19 by some Chinese health officials. This brings a major threat of poaching of rare Black Rhinos and White Rhinos (Somerville April 11, 2020). Most conservative operations were ceased in Africa due to increasing covid cases and non-essential staff were withdrawn from their duties as to follow pandemic rules causing a disruption in quotidian operations in sensitive areas (Waithaka, June 2020). Covid cases increased among people thus increasing sickness and deaths of patrol officials. In Nepal out of 20 protected areas 13 records were disclosed of wildlife injuries without instantaneous death wheres, out of 20 areas 14 wildlife deaths were recorded. In conclusion, the biodiversity in Nepal has evidently experienced a damaging effect during pandemic due to significant increase in crime rate against wildlife (Koju et al., June 22, 2021).

The Giant Anteaters are an endangered species, native to central and south America. Throughout the course of the pandemic Anteaters were found to cross the most busiest highways of Brazil more than usual, this jeopardises the protection of these species when the automotive population rises again (Desbiez et al., & Anteaters & Highways supporter Naples Zoo at Caribbean Gardens, USA).

Moreover, there are some positive effects of pandemic on biodiversity as well. Lorises are Native to Southeast Asia and Tropical Forests of India and Sri Lanka, they are highly subjected to illegal trading, taken away from their natural habitat and sold as pets. Due to covid wildlife trade is highlighted, subjecting strict investigation which would liberate slow loris from illegal markets (People's Trust For Endangered Species 2021). During the pandemic, protected areas in Africa were still guarded by Anti poaching Patrol thus ensuring the wellbeing of wildlife and sensitive species. Covid guidelines prohibited Vehicles for non-

essentials, making it difficult for poachers to travel long distances for hunting. hence, reducing pressure on wildlife. (Akinsorotan Oluseun A *et al.*, April 23, 2021).

In India, prior to the pandemic there had been several reports that lockdown has been beneficial for wildlife as the reduction in human manoeuvre and habitat disturbance occur during the anthropause. Furthermore, a large scale in hunting has immensely overtaken which has now emerged as a conservation concern. A team of researchers in India conducted a study from march – may 2020 to inspect the real impact of COVID – 19 lockdown on wildlife hunting across india. Later on when the researchers were interviewed (online), they identified the main purpose for hunting during the pandemic is for household consumption, sport and recreation as well as trading in local or outside markets. Some were also reported to be an enlargement in medicinal use. According to the researchers the total number of hunters were doubled during the pandemic then compared to pre - pandemic times. The researchers also claimed that the hunting of mammals, fish as well as crustaceans and birds were enormous whereas the hunting of reptiles and amphibians were infrequent. Later the rise in people hunting turns out to be because of disruption in food supply chains such as shutting down meat shops. The lockdown also affected people from purchasing food due to loss of jobs especially for those who were employed in an unorganized sector during the pandemic. In addition researchers correspond the lockdown outcomes with that of war and civil strife, where the availability of food rations, essential services as well as enforcement agencies such as patrolling officers is hampered. Under such a state of affairs, wildlife conservation is threatened. Hence it is better to conserve practitioners and prepare them better for the future pandemics and other such socio economic shocks (Dr. Ramya Dwivedi, et al.,. May 20, 2021)

As we had to pause our lives because of the outbreak of coronavirus, which has set off a ripple effect across the nation, it has not only affected humans but also the wildlife of our country. Chief conservator of forest (CCF) Punjab, Basanta Rajkumar stated in his webinar about the 'impact on wildlife due to pandemic'. This webinar was arranged by Pushpa Gujral Science City (PGSC), Kapurthala wherein Basanta Rajkumar was the keynote speaker. He stated that, as people have started to imprison themselves as an effort to control the spread of the virus, the animals have started to venture into the cities. In an unanticipated way wildlife has been affected due to quarantine. In India animals like monkeys and various other wildlife species are mostly adapted to urban environments as they are dependent on human generated waste food to survive. Dr. Neelima Jerath who is a director general from science city also

stated in her speech that several human actions such as deforestation, encroachment on wildlife habitats, intensified agriculture as well as acceleration of climate change has pushed nature beyond its limit. She also added that around 1 million species of flora and fauna have been extinct due to deforestation. Also 50,000 species are being lost annually and this is generating imbalance in our ecosystem. If this continues to be the same then the wildlife loss will have extremely severe implications on humanity (The Tribune, et al.,October 05, 2020).

In the initial months of the lockdown (april 2020) a video was shared of dolphins near the shores of mumbai city. It went viral on social media and was viewed by 118,000 people, who were celebrating the appearance of dolphins, with some people terming it as a "rare" occurrence while some as " coming back". But people studying city ecology say that dolphins visiting shores in Mumbai is nothing new as they visit Mumbai's non residential area regularly. Dolphins have also been documented at the shores of Mumbai from the past 15-20 years. As Dolphins many such videos got viral on social media of animals invading human society for instance, An old video of elephant strolling through dehradun and a spotted deer on Ooty and Coimbatore road in Tamil Nadu were descried, Whales were also sighted at the shores of Bombay, photographs of peacocks and several other birds were also seen (Aditi Tandon, et al., May 03, 2020).

These years of pandemic have the birds and animals responding weirdly. The slowdown in human activity which is termed as "anthropause" by scientists is a mixed bag for animals. It was said that nature was adapting even in the dark times like these, whereas these reports were presented as a bit puzzling for scientists. The invasions of large unusual numbers of monkeys in the city, deers roaming on the roadside leading to night accidents, and flamingos in waterways. These changes in animal behaviour were significantly obnoxious to an extent (Suranjita Roy, et al.,. July 29, 2020).

3. Environmental Changes

Human beings have exploited natural resources as they deem fit for our own benefit, it is evident that humans have a great influence on environmental factors. During Covid- 19 pandemic major cities and villages from countries like India, China, Italy, U.S.A, France, U.K, Australia to name a few went under partial lockdown. This implication of restrictions for mobility ensured sudden shutdown of globalization, urbanisation and commercial activities. Thus, resulting in dropped air pollution and emission of greenhouse gasses responsible for Global Warming. (Chakraborty and Maity April 22, 2020). Emission of Nitrogen is

predominant for declining air quality especially in urban areas. The Nitrogen levels in china declined while the country was in lockdown, although a prominent decrease in 〖NO〗_2 is usually observed during Lunar New Year, it increases once the holiday is over. The NO 〖_2〗 levels remained downturned after the festival this mentioned by NASA and European Space Agency (ESA), 2020.

Exposure to traffic increases air and sound pollution, the risk of subjection to health related issues due to vehicular emissions is a hindrance especially in urban and commercial areas where private vehicles are used more frequently. Traffic related Ultrafine particles (PNC) and Black carbon (BC) were measured on major and minor Highways and interstate capital in Sommerville's (MA, USA) residential and commercial area with a mobile monitoring platform. Median PNC and BC was observed to be 60- 68% and 22- 46% lower as compared to pre pandemic conditions (Neelakshi Hudda et al. November 10, 2020). As, Transportation decreased the demand for crude oil reduced, this curtailed the harmful effects of oil on the environment such as oil spills. Drinking water in the UK, USA and India and China comes from corresponding rivers, lakes and Groundwater. An oil spill contaminates drinking water sources. It is difficult and expensive to clean and takes a long time to recover. An Oil spill negatively impacts photosynthesis in plants and is harmful for animals and insects, disrupting the food chain.

Although, The Pandemic had demonstrated a better understanding on positive effects of the lockdown, the waste management is declining. Local recycling centres have repudiated their duties in fear of the dissemination of the virus in public waste, as manufacturing and selling of masks, gloves, and protective equipment increased during covid-19. 2 million tonnes of plastic waste is generated which is roughly equivalent to the statue of liberty ends up eliminated in landfills and the environment. Due to decrease in cargo, transportation exports of several commodities have declined resulting in agricultural and fishery production wastage in large quantities (Earth 5R Sustainable Development Goals September 19, 2020).

India's environment is contemplated to be the world's most biodiverse ecorealm, such as the Deccan Traps, Gangetic plains and the Himalayas are some of the major geographical features. India being a developing country has witnessed a tremendous industrial growth in the past two years, which has certainly improved the standard quality of living of its people and additionally the rising of transport fleets on roads, however the worldwide spread of COVID-

19 has brought a forceful decrease in industrial activities, road traffic and tourism. There have been several positive impacts of COVID-19 on the environment. Delhi being one of the most polluted cities in the world showed improvement by 15% (as per 2019-20) (IQ Air, et al., 2020). Due to depletion in intense smog Delhi has experienced a clear blue sky, It was also observed that the energy footprint of Delhi was high however the lockdown has improved the quality of air at large scale. Besides Delhi, several other metro cities' pollution levels have dropped as well as the animals and birds are seen moving around on their own accord.

Ghaziabad, one of the largest cities in India situated in the state of Uttar Pradesh is considered as the 2nd most polluted city in the world after hotan of Xinjiang in China (as per 2020) has also experienced improvement in the quality of the air during the lockdown. According to the 2011 census information Ghaziabad has urban agglomeration with the population of 46.82 lacs with the expansion of 3971 individuals/ 〖km〗 ^2. The city faces adverse pollution due to traffic congestion and dust. Since Ghaziabad is the most polluted city in the country it was selected as the study area during the lockdown. The air quality of the city was compared to the concentration data of the previous year by the central pollution control board and the results are summarised by Lokhandwala, & Gautam, et al., September 2020).

Banglore is the capital of India's advanced technological industry located in the state of Karnataka. The city's air quality is extremely poor due to the emissions released by vehicles and dust from the ongoing development buildout and construction of buildings, as well as the emission of smoke from the industries are some of the significant reasons for the pollution in the city. The vehicles in the city cause 44% of the air pollution. However the outcome of the lockdown enhanced the visible improvement in ambient air quality with reduction of the sources of pollution. The city is evaluated by using CAAQM (Continuous Ambient Air Quality Measurement) ; data from the 10 monitoring stations across the city was obtained from the CPCB (Central Pollution Control Board) and KSPCB (Karnataka State Pollution Control Board) . The relative changes were analysed in the ambient concentration of six major air pollutants that is NO, NO2, NOX, PM2.5, O3, and SO2 has been administered for the two periods: March-May 2020 and the corresponding period when there was no lockdown. The analysis unveiled a noteworthy depletion in the concentration of ambient air contaminants at both daily and monthly intervals. This can be attributed to the reduction in sources of emission of vehicular traffic, industrial, and some other activities. The average reduction in the

concentration of O3, PM2.5, NO, NO2 and NOX between 1 March 2020 and 12 may 2020 was found to be 23%, 18%, 63%, 48%, and 48% respectively in comparison to an equivalent period in 2019 . Likewise, the comparative analysis of pollutant concentrations between pre-lockdown and lockdown periods has shown an enormous reduction within the ambient concentration of air pollutants, 47.3% NO, 49% NO2, 49% NOX,10%SO2, 37% PM2.5 and 15.6% O3, leading to the improvement of the air quality over bangalore during the COVID-19 lockdown period. (K C Gouda et al., June 8, 2021)

During the lockdown SAFAR (System of Air Quality Weather Forecasting and Research) monitored pollution level in six cities namely Mumbai, DELHI, ahmedabad, Chennai, Pune and Kolkata. The study found that there was a 54% decline in PM2.5, while 76% decrease in the NO2 as opposed to the same period in 2019. Delhi's PM2.5 was reduced by 39%, Kolkata and Ahmedabad's PM2.5 by 30%, Pune by 25% and Chennai by 11%. Whereas PM2.5 concentration in Mumbai was the highest at 33 micrograms per cubic metre and the least in Chennai at 6 micrograms per cubic meter (Vinamrata Borwankar, et.al,. May 13, 2020).

Biodiversity by the Bay' aims to exhibit the power in Mumbai's youth to rescue the city's natural habitats.

The Aarey controversy in 2019 unveiled a fortuity to create a significant climate movement in Mumbai, spurred by the city's youth. The act was carried out because the New Jersey-based Climate Central predicted that two major Indian coastal cities-Mumbai and Kolkata will drown by 2050. (S2wadmin, 2020) as a result of climate change- linked sea level rise. Green spaces and the natural beauty interlaced into the city's magic is under intimidating remark. Nonetheless, the government states that the reforestation and protected zones are being composed in the regions. Also it was determined by the Bombay High court that the ruination of mangroves "offends the fundamental rights of citizens."

The mangroves that envelope the massive coastline operate both as carbon sinks (an important component in the natural carbon cycling) and buffers against flooding. Mangroves are quadruple times as effectual as the forests in trapping atmospheric carbon, making them more valuable than before in Mumbai's resilience to climate change. Instead of nurturing mangroves, they are being annihilated to make way for more waste disposal facilities, construction, and reclaimed land (IUCN, et al., August 07, 2019). Hence mumbaikars, the

citizens of Mumbai took a stand against the climate changing decisions which saved the Aarey forest for now.

4. Marine conservation and Oceanic Pollution

The ongoing pandemic is not only affecting terrestrial but also marine biodiversity. The most crucial and holy river of India has undergone some beneficial changes. River Ganges is one of India's most polluted rivers because of industrial, sewage, agricultural and tourism waste. However, within four weeks of 1.3 billion humans confined in their residence, reports emerged about how clean the waters of the Ganges had become all the way from the foothills of the Himalayas, through to the Ganges by the City of Kolkata. For the first time in a vicennial, the water in some places has become potable again.

On the shores of New Jersey and Delaware in the Eastern United states, has the world's largest freshwater port system and has endless plains of bird watching . Every year around April and May (during the full moon cycle), an incredible spawning of an emphatically large number of Horseshoe Crabs – an artefact of the Jurassic era – occur on the coast of the Delaware Bay . This occurs simultaneously with the incredible emergence of the Red knot birds after a 9000 mile migration from Brazil to the Arctic who feast on the eggs of the spawning Horseshoe Crabs. For years, human activities and overfishing which is vital for the pharmaceutical industry (Alexis C. Madrigal, et al., February 26, 2014) has led to Horseshoe crabs plummeting in numbers (Adam Wernick, et al., July 09, 2016) and bringing the populations of Red Knots down too.

This year, due to lockdown and physical distance measures the populations of Horseshoe Crabs and Red Knots have stabilized during this crucial spawning season with the slowdown in Horseshoe Crab fishing. This is a precarious interlude however, care must be taken to corroborate that there shouldn't be a consequential rebound in fishing of Horseshoe Crabs to meet the growing pharmaceutical need for a secure coronavirus vaccine with synthetic alternatives also available. (Degnarain, 2020) All bays and estuaries around the world are having temporary improvement which are generally associated with contaminated rivers that are improving as an impact of lower agriculture and industrial output around the world.

Besides, inshore life is reconciled to various lakes; the endangered otter has decreased in Malaysia over recent years. However, during the movement control order (covid 19 lockdown), otters were spotted in the usually crowded Putrajaya Lake and many other lakes inland within Malaysia (IDA LIM, et al., February 02, 2020). This was also possible because

of more pellucid air and other environmental improvements seen in Malaysia during the MCO (Movement Control Order). Otters are actively hunted or encaged as a pet although, under the Malaysian law otters are a protected species they are still considered to be endangered due to human activities prior to the COVID-19 (Forbes & Nishan Degnarain, et al., May 16, 2020).

Furthermore, in East Africa the world's largest tropical lake, Lake Victoria may have rebounded too much, 40 million people depend on the waters of Lake Victoria (Jonathan Kamoga, et al., May 02, 2020) With imported food from China being impacted by slackening Global trade, local fishermen initially benefited with strong local demand for fish. However, simultaneously after years of pollution, invasive species, overfishing and fluctuating water levels, the East African lake has also been experiencing significant flooding, impacting coastal countries like Uganda and Kenya (Reuters, et al., October 09, 2021). Countries downstreams along the White Nile such as Egypt, South Sudan and Sudan are sure to benefit from the extra water caused by the flooding upstream.

With agricultural fertilizer output significantly down, this could also provide an interval allowing lakes around the world to temporarily recover from agricultural and industrial pollution. Moreover, in a recent press release by the Charles Darwin Foundation (CDF, 2020), flightless cormorant (Phalacrocorax harrisi) and Galapagos penguins (Spheniscus mendiculus) which have been tracked for the last 30 years, are showing increment in the number of individuals by 2,290 and 1,940 respectively, which is an accompaniment for these species. Marine animals navigate across the ocean by use of sound or natural sonar. The plausible reason is the sound of silence – decreased marine vessel traffic by humans. Sailing of larger ships and tourism have been decelerated due to embankment of covid-19. Cetaceans i.e. whales, Poises, dolphins (all marine mammals) find mates and family by using echolocation. Less underwater pandemonium due to fewer ships means that cetaceans are getting a hiatus from a normally obstreperous underwater soundscape due to which, Many humpback whales have appeared in Alaska.

Minimization of shipping traffic will decrease the sector's Greenhouse effect; about 2.5 percent of greenhouse gas emissions is represented by international shipping. This greenhouse as depletion will advantage the ocean by a downturn of acidification, warming and minimization of shipping traffic will decrease the sector's Greenhouse effect; about 2.5 percent of greenhouse gas emissions is represented by international shipping. This greenhouse gas reduction will benefit the ocean by slowing the pace of acidification, warming and

deoxygenating but, as above, if not sustained the overall impact will be modest. There is also the probability that persisting low oil prices may unnerve the industry in adherence to undertaking much lower carbon alternatives through improved energy efficiency in both design and ship operation. There is also a possibility that persisting low oil prices may discourage the industry in its commitments to move to a much lower carbon alternative through improved energy efficiency in both design and ship operation.

Notwithstanding the positive environmental effects, there is uncertainty about the long-term benefits of the COVID-19 pandemic for the environment, while CO2 build-up will be slightly slower than previously expected (IPCC 2019), the reduction is probably not enough to substantially slow global warming (Diffenbaugh et al., 2020). Simultaneously, negative environmental impacts of the COVID-19 pandemic clearly emerged. For example, there is a pop-up concern about the surge in consumption and disposal of single-use plastics for individual protection, which poses environmental challenges (Klemeš et al., 2020, Saadat et al., 2020)- including in marine ecosystems, there is a risk that governments may lift plastic bans and reduction measures. Moreover, the existing situation of pollution in the hydrosphere that includes all water bodies and groundwater reservoirs, have not been investigated. For decennium, the hydrosphere has been gravely contaminated because of overexploitation, industrialization, and expeditious urbanization. Pollution that affects hydrosphere, such as industrial wastewater disposal, crude oil, heavy metals, and plastics, have reduced or completely stopped (Häder et al., 2020). As a representative case, the Grand Canal in Italy, where the COVID-19 immobilized the whole nation turned clear and revived a multitude of aquatic species (Clifford 2020). While the non-transparency cannot be a solitary indicator of water quality, it has been used to evaluate the overall water quality. (Woodruff et al., 1999; Davies-Colley and Smith 2001; Luis et al., 2019). Suspended particulate matter (SPM) caused by industrial waste, sedimentation, sewage disposal, other pollutants, metals, algae and bacteria results in high turbidity in aquatic environments. In earlier days, a Secchi disk was used to measure turbidity. However, due to the drawbacks of time and cost of observation, field-based methods are used. With the ascend of remote sensing techniques, researchers investigated the relationship between reflectance and turbidity in water bodies (Curran et al. 1987; Novo et al. 1989). The results of these studies are remarkable and showed that reflectance is directly proportional to turbidity. For instance, Doxaran et al., (2002) termed that reflectance between 400 and 1000 nm increases with turbidity. In distinct, when the

turbidity level is 35 to 250 mg/l, the transmittance between 400 and 700 nm correlates well with the opacity.

5. Human/ Resource Conflict

The deluge of zoonotic disease from the wildlife reservoir has been associated with exhaustive human maneuvers, close to 75% of contagious diseases are of zoonotic origin (Taylor Louise H et al., July 21, 2001) 71.8% being of wildlife origin. (eg. SARS, Ebola virus, Lyme disease, Plague, Zoonotic Influenza, Rabies etc.) (Jones et al., February 21, 2008). Novel viruses have transpired in the past two decades (Cunningham Andrew A. et al., June 05, 2017), the main transmission of these diseases is through direct/ indirect contact of humans with these infected animals through Travel, tourism and trade. Diseases can also reemerge by pathogen habituation and animal migration from their favourable conditions (Preneshni R. Naicker, et al., 2011). Illegal Wildlife trade (IWT) has an annual estimation of US $23 billion, this malefactor activity leads to considerable loss on biodiversity. (Marcos A.Bezerra-Santo et al., January 13, 2021). It is estimated that around 350 million live tropical fish, 4 Million live birds, 640,000 Live reptiles are traded every year internationally. As these animals are subjected to trading, they come in contact with several other species before getting sold in markets or getting freed back into their habitat, many emphatically become untamed pets (William B. Karesh et al., July 2005). Even if these animals are retired to their natural habitat, at any point of trading can come in contact with an infected species due to mishandling, for eg. Tiger species have declined 93% since the past century and currently only 4,000 remain, making it one of the world's most endangered species however, 7 Tiger cubs were found in Vietnam in plastic cages just a week prior 24 were found, out of which 8 did not survive (Kiều Trinh, et al., August 07, 2021).

The world economy declined due to the pandemic with a 5.2% shrinkage in global GDP, countries executed restrictions on any international transportation (The World Bank, et al., June 08, 2020). Some Countries such as Africa rely on Tourism especially in protected areas. It is anticipated that around 40 million citizens in Africa are subjected to extreme poverty, deteriorating at least 5 years of improvement to fight poverty (The World Bank, et al., October 08, 2020). Local economic shrinkage and poverty will cause people to find illegal ways of survival as a source of generating funds, increasing pressure on natural resources. Unauthorized hunting and deforestation is one such example. (Martin Loibooki et al., November 13, 2002). Agriculture is straggling compared to the feeding population hence,

people have to rely on bushmeat for food. The dense forest in Gabon (Africa) limits agriculture to 40% produce for consumption, Almost 100% of protein is acquired by hunting ie. Bushmeat. Moreover, 250 tonnes of illegal Bushmeat is exported to France and Switzerland from Central Africa as a source of income (Owen Mulhern, et al.,. November 17, 2020).

Covid-19 eruption upon fishing vessels also represents a significant threat to public health. Fifty lakh people are working in marine fisheries majorly in developing countries with dismal records on safety, health, and human rights. (Teh, 2011)

6. Impact on Education, research and Monitoring of Species

The Lack of ability to track or observe species in real time during Pandemic is causing a hindrance to biodiversity. Scientists cannot visit remote locations or any other places with abundance of biodiversity or practically conduct field based research. 350 plant species on average are discovered annually by Botanical survey of India (BSI). However, the numbers declined to 250 species in 2021 out of which 180 are completely new species and others are seen in India for the first time. Whereas, Zoological survey of India (ZSI) discovers 300 species on Average found 200 species. This finding of new species is dependent on the ability of collecting samples from specific remote areas. Travelling restrictions were implemented for long field trips hence, primary findings were dependent on samples collected on before time field trips, The funding was limited (Hindustan Times, Joydeep Thakur, et al., August 09, 2021). It is determined that around 15 million species are currently present on Earth out of which only 2 million are discovered by scientists (University of Turku, et al., July 1, 2020) Millions of these species are on the verge of extinction and time is very important in order to protect them and understand their habitat. These newly discovered species could be used to find new medicines or prevent any unknown diseases.

Local Settlements are highly dependent on biodiversity, fishing and agriculture are great examples on how education on certain aspects have been modified and taught to the next generation. These primordial settlements have been perceiving this knowledge from observation and experience developed over centuries (UNESCO- SCBD programme, et al., 2021). Cultural practices are often followed as a form of domestication, cultivation of crops and hunting for survival; these are forms of coexisting rather than imperilment. However, presently wildlife is misused to the point of endangerment. In an online survey which was conducted in 3 different provinces of China during the pandemic, results of 947 adult online users were contemplated. While most participants were against utilization of wildlife resources,

30.7% impound wild animals as pets, 30.5% admit eating wild animals, 18.5% relate sickness to contact with wild animals and only 54.4% seek treatment, These results suggests the lack of knowledge and increasing risks of animal human interaction (Hongying Li et al., August 04, 2021). Monitoring of species is affected as officers cannot patrol due to the current circumstances however, the local population can be educated on the importance of these species and use their knowledge and techniques for saving biodiversity.

7. Conservatory efforts by Organisations

The natural world relies on diversity of organisms and also to maintain its balance so to be certain that we protect and nourish this biodiversity, it is our responsibility that we gather and provide appropriate knowledge to the people, industries and governments and potentially they live in harmony with nature. In Europe, the threat to biodiversity includes pollution, overexploitation, invasion of alien species, climate change and many more. Therefore the International Union for Conservation (IUCN) monitors the state of nature including the IUCN red list of threatened species and examines the extinction risk of species . and the IUCN green list includes the Conserved and Protected Areas which provides the best-practice standard for reserved areas. This assists the team to uphold and lead conservation actions, decision-making and policy-making processes related to nature conservation. In Brussels (Belgium) the European Biodiversity Conservation Team is also a part of the IUCN global species program and their main focus is to protect biodiversity by enhancing the protected area management across Europe. The European Biodiversity Conservation Team and IUCN work together on the issues guided by the regional policies and strategies that help to protect and promote Europe's biodiversity and ecosystem. They do this by increasing and understanding the state of nature through generating, mobilizing and transferring technical and scientific knowledge about protected areas, species and their habitats (Gabrielle Flinn, et al.,. 2017-2020).

The Himalayan range in addition to being one of the largest mountain ranges on the planet, encompasses the third largest deposit of snow and ice in the world after Antarctica and the Arctic. The Himalayas have about 15,000 glaciers, which store about 12,000 km3 of freshwater. Its glaciers incorporate the Gangotri and Langtang glaciers (Langtang region), Khumbu glaciers (Mount Everest region),Yamunotri (Uttarakhand), and Zemu (Sikkim). It is proclaimed as the accommodation for about 280 species of mammals, 940 species of birds, 316 species of fishes, 200 species of reptiles and 80 species of amphibians. Although global climate change is a topic of concern in himalayas, Due to an increase in temperature the glaciers in the

highest mountain on the earth have become compact in the past few years. This region also has a considerable capability to contribute to climate protection: the extensive forests serve as natural carbon sinks. Nevertheless, the (IKI) International Climate Initiative has been encouraging the conservation and restoration of forest ecosystems in Myanmar, Nepal, Bhutan, India since 2013. Apart from being a contribution to climate monitoring this project also aids sustainable income opportunities for local communities and secures the habitat of endangered species such as the Asian elephant or the red panda. "Conservation of natural carbon sinks in the Himalayas" the IKI project is coordinated by Dr Bhaskar Singh Karky. In himalayas people are mostly dependent on the biomass based subsistence economy. There is a thin balance between the sustainability as well as depletion of forest resources and the local people are aware about this factor. Therefore, forest conservation leads to the sustainable supply of the ecosystem service. But most of the time natural calamities, economic recession, corruption, political instability and violence, leads to loss of these resources. The situation is very dynamic and hence conservation can take place rapidly therefore, the communities are prudent in protecting their green asset (Bhaskar S. Karky, et al., October 06, 2020).

ZSL (Zoological Society of London) a fund based cooperation collaborated with PTES (Peoples Trust for Endangered species) based in England and Wales which concentrates on endangered species and their habitat in a project named London Hogwatch, The main motive was to study the habitat of Hedgehogs. Scott Katy an intern of PTES made a great initiation to study the biodiversity of hedgehogs during the pandemic while maintaining social distancing by dropping off wildlife cameras directly on the door steps of volunteers without having any physical contact, this action sets a good example encouraging people to volunteer, even during these difficult times (Zoological Society of London (ZSL) & PTES, et al., May 20, 2021)

Mumbai has formed many groups and NGOs for Environmental welfare like BEAG (Bombay environmental action group) and BNHS (Bombay Natural History Society). Forest department has also planned a solar plant for the butterfly conservatory in Mumbai. The departments are introducing smart solutions for the conservation action such as : Using natural defence like restoring the mangroves, city forest restoration, forest landscape restoration, quality and quantity of park's green infrastructure, planting rich in oxygen plants such as Banyan and Peepal etc. (Jadhav, 2021).

In the metropolitan region of Mumbai, India where the record- breaking number of flamingos have migrated, painted the wetlands pink. According to local reports, The Bombay

Natural History Society (BNHS) has estimated that 25% increment of flamingos was seen this year, yet 150,000 was just the estimation of the members who monitor the species, because of the current circumstances and strict rules one cannot do their work properly. Hence there's always boon and bane to the situation we are currently facing world wide.Covid pandemic locally results from species loss, exploitation, degradation of natural areas. Species loss- results of Mumbai locality said that nature is in crisis, as they have started losing species at the rate of 1,000 times greater than at any other recorded human history of Mumbai. Hence govt. Mumbai is considering launching " Biodiversity By The Bay" campaign to galvanize urgent and transformative action by Mumbai's authority. Once rich in ecosystem and unique biodiversity-Mumbai, is now under threat; owing to unsustainable planning and rapidly growing emissions has been creating multiple impacts on the city. The BMC has promised an open space policy which is now in a developing plan (2014-34) for 6.13 sq meters of open space per person which includes forests and mangroves along with 100 new parks. (Firstpost, 2020).

Potential solutions

Adapting an ecosystem base is a smart, climate resilience solution that offers a range of benefits to local people. Restoring the coastal forest ecosystem compliments conventional engineering approaches to coastal cities and is very effective in enhancing resilience to occurring natural disasters. (Andrews, 2017) With expanded government spending; squeezing previously stressed financial plans, it is presently as crucial as could be expected that public consumption is very much designated and effective. Sponsoring exercises that sabotage the trustworthiness and flexibility of biological systems whereupon future financial wellbeing depends, is a pointless arrangement. Preceding COVID-19, government disbursement aid harmful to biodiversity, was multiple times more noteworthy than other spending for conservation of biodiversity (OECD, 2020[83]). Backing for non-renewable energy sources in 77 economies (basically OECD and G20), was USD $478 billion every 2019. Rural help conceivably generally unsafe to biodiversity 14 was on normal USD $112 billion every year for the period 2017-2019, in OECD nations alone (OECD, 2020(August 2020). Such help is probably going to drive further environmental corruption, along these lines expanding the danger of future pandemics, environment related debacles and interruption of ware supply chains. Rather than boosting exercises that hurt biodiversity, governments ought to divert endowments to exercises that convey financial results and have a positive (or possibly nonpartisan) sway on biodiversity. For instance, governments could give designated

instalments to advance biodiversity and other natural public merchandise in horticultural frameworks; but just a modest bunch of nations embrace these arrangements and they address a little portion of all out help for farming (OECD, 2020).

Demarcate on biodiversity spending targets for COVID-19 stimulus measures and recovery plans, Governments can set green targets (or requirements) for their COVID-19 stimulus packages to be certain that they support biodiversity and other environmental objectives. for instance, the EU requires 30% of the pandemic recovery package subsequent Generation European Union (NGEU) and interlinked Multiannual Financial Framework (MFF) to be earmarked for climate protection (i.e. EUR 550 billion over 2021-27), which can also benefit biodiversity by addressing one among the key drivers of biodiversity loss. Similar spending targets might be envisioned for biodiversity. Austria's response on COVID- 19 is funding of EUR 200 million to co-finance climate resilience projects for municipalities and requires 20% of this to support nature-based solutions. It's important, however, that efforts to extend the quantity of biodiversity-positive stimulus measures are amid efforts to scale back the quantity of stimulus flowing to biodiversity-harmful activities.

Conclusion

Biodiversity and human infectious diseases are intricately linked. The last decade has accounted for an utmost increase in the number of zoonotic diseases. Wildlife will continue to diminish as a result of excessive poaching and increasing pressure due to poverty (based on the current economy).Obligatory confinement ensured prompt emergence of wildlife nonchalantly, which increased endangerment. Our planet's variegated thriving ecosystem may seem like indelible fixtures but they are actually vulnerable and on brink to collapse. Jungles can become deserts and reefs can become lifeless rocks even without natural phenomena like volcanoes and asteroids. Current crises demand a needful international attention because comprehensive species play a crucial role for balancing the ecosystem, when a species perishes their duties in the ecology cannot be fully replaced by another species causing an imbalance in nature, which can further affect existing species. Conservation should be primarily focused on prevention of interactions between wildlife and humans through illegal trading and providing an alternate protein source other than bushmeat. Instead of eradicating wildlife in terms of preventing zoonotic diseases, much concentration should be brought on educating local settlements and inculcating technology along with ritualistic beliefs.

References

1. Adam Wernick. (n.d.). Horseshoe crabs save lives, but their numbers are dwindling. The World. https://www.pri.org/stories/2016-07-09/horseshoe-crabs-save-lives-their-numbers-are-dwindling
2. Aditi Tandon. (n.d.). India lockdown: Reports of 'reappearing' animals are not just misleading – they're also harmful. https://scroll.in/article/960763/india-lockdown-reports-of-reappearing-animals-are-not-just-misleading-theyre-also-harmful
3. Akinsorotan Oluseun A, Olaniyi Oluwatobi E, Adeyemi Ayomide A, & Olasunkanmi H. (n.d.). Corona Virus Pandemic: Implication on Biodiversity Conservation. Front. Water. https://www.frontiersin.org/article/10.3389/frwa.2021.635529
4. Alexis C. Madrigal. (n.d.). The Blood Harvest. The Atlantic. https://www.theatlantic.com/technology/archive/2014/02/the-blood-harvest/284078/
5. Andrews, A. (2017, MAY 22). biodiversity protection. Biodiversity Protection: Steps Taken By Indian Government. https://www.clearias.com/biodiversity-protection-steps-taken-by-indian-government/
6. Bhaskar Singh Karky. (n.d.). Conservation of the Himalayan forests. The Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU), International Climate Safety (IKI). https://www.international-climate-initiative.com/en/news/article/conservation_of_the_himalayan_forest
7. Chakraborty, I., & Maity, P. (n.d.). COVID-19 outbreak: Migration, effects on society, global environment and prevention. Sci Total Environ. 2020 Aug 1; 728: 138882. 10.1016/j.scitotenv.2020.138882
8. Clifford, c. (2020, march wednesday). The water in Venice, Italy's canals is running clear amid the COVID-19 lockdown. https://www.cnbc.com/2020/03/18/photos-water-in-venice-italys-canals-clear-amid-covid-19-lockdown.html
9. Covid 19 and surface water quality. (2020, august 20). science direct. https://www.sciencedirect.com/science/article/pii/S0048969720325298#bb0030
10. COVID-19 Impacts on Beaches and Coastal Water Pollution at Selected Sites in Ecuador, and Management Proposals Post-pandemic. (2021, july 1). frontiers in marinescience.https://www.frontiersin.org/articles/10.3389/fmars.2021.669374/full#B16
11. Cunningham Andrew A., Daszak Peter, & Wood James L. N. (n.d.). One Health, emerging infectious diseases and wildlife: two decades of progress? Phil. Trans. R. Soc. B 372: 20160167.20160167. https://doi.org/10.1098/rstb.2016.0167

12. Degnarain, N. (2020, May 16). Six Places Where Oceans, Rivers And Marine Life Have Rebounded During The Coronavirus Pandemic. https://www.forbes.com/sites/nishandegnarain/2020/05/16/six-places-where-oceans-rivers-and-marine-life-have-rebounded-during-the-coronavirus-pandemic/?sh=a2228c73fb05.
13. Desbiez, D. A., & Anteaters & Highways supporter Naples Zoo at Caribbean Gardens, USA. (n.d.). GIANT ANTEATERS IN BRAZIL. The Anteaters and Highways Project. https://www.giantanteater.org/
14. Dr. Ramya Dwivedi. (n.d.). How is COVID-19 changing hunting patterns during lockdown in India? https://www.news-medical.net/news/20210520/How-is-COVID-19-changing-hunting-patterns-during-lockdown-in-India.aspx
15. Earth5R Sustainable Development Goals & Radhika Mehta. (n.d.). 10 Impacts of Coronavirus on the Environment. https://earth5r.org/impacts-corona-virus-environment/#
16. Firstpost. (2020, October 29th). Biodiversity by the Bay: Festival's virtual exhibit features artists' vibrant reflections on Mumbai's ecosystem. https://www.firstpost.com/photos/exhibition-gallery/biodiversity-by-the-bay-festivals-virtual-exhibit-features-artists-vibrant-reflections-on-mumbais-ecosystem-8962881.html
17. Forbes & Nishan Degnarain. (n.d.). Six Places Where Oceans, Rivers And Marine Life Have Rebounded During The Coronavirus Pandemic. https://www.forbes.com/sites/nishandegnarain/2020/05/16/six-places-where-oceans-rivers-and-marine-life-have-rebounded-during-the-coronavirus-pandemic/?sh=1fd223bc3fb0
18. Gabrielle Flinn. (n.d.). Biodiversity Conservation. International Union For Conservation Of Nature (Europe). https://www.iucn.org/regions/europe/our-work/biodiversity-conservation
19. Guardian. (2016). Mystery absence of humpback whales in Hawaii has experts scratching heads. https://www.theguardian.com/environment/2016/jan/02/humpback-whales-hawaii-mysterious-absence
20. Hemali Chappia. (n.d.). Covid effect: Mumbai University sees 20% drop in student enrolment. The Times Of India. https://timesofindia.indiatimes.com/city/mumbai/mumbai-covid-effect-mu-sees-20-drop-in-student-enrolment/articleshow/81499789.cms
21. Hindustan Times,Joydeep Thakur. (n.d.). Discovery of new animal, plant species from India dip due to Covid-19 pandemic. INDIA NEWS. https://www.hindustan

times.com/india-news/discovery-of-new-animal-plant-species-from-india-dip-due-to-covid-19-pandemic-101628360766054.html

22. Hongying Li, Francesca Daszak, Aleksei Chmura, Yunzhi Zhang, Philip Terry, & Mark Fielder. (n.d.). Knowledge, Attitude, and Practice Regarding Zoonotic Risk in Wildlife Trade, Southern China. EcoHealth vol. 18,1 (2021): 95-106. 10.1007/s10393-021-01532-0
23. IDA LIM. (n.d.). After KL lakes, otters now seen in Subang Jaya too. Malay Mail. https://www.malaymail.com/news/malaysia/2020/02/02/after-kl-lakes-otters-now-seen-in-subang-jaya-too/183378
24. Improved lake water quality during the lockdown. (n.d.). https://www.sciencedirect.com/science/article/pii/S0048969720325298#bb0030
25. IQ Air. (n.d.). World's most polluted cities 2020 (PM2.5). https://www.iqair.com/in-en/world-most-polluted-cities
26. IUCN. (n.d.). Nature may have solutions your city is looking for. https://www.iucn.org/news/forests/201908/nature-may-have-solutions-your-city-looking.
27. Jadhav, D. (2021, september 4th). NGO's in Mumbai For Nature Environment Wildlife Plants and Animals. https://www.mumbai77.com/city/3250/services/nature-wildlife-plants-animal-environment-ngo/
28. Jonathan Kamoga. (n.d.). More displacements in Uganda as Lake Victoria swells. The East African. https://www.theeastafrican.co.ke/news/ea/More-displacements-in-Uganda-as-Lake-Victoria-swells/4552908-5540300-1jo629/index.html
29. Jones, K. E., Patel, N. G., Marc A. Levy, Adam Storeygard, Deborah Balk, John L. Gittleman, & Peter Daszak. (n.d.). Global trends in emerging infectious diseases. Nature 451, 990–993. https://doi.org/10.1038/nature06536
30. K C Gouda, Priya Singh, Nikhilasuma P, Mahendra Benke, Reshama Kumari, Geeta Agnihotri, Kiran M Hungund, Chandrika M, Kantha Rao B, Ramesh V, & Himesh S. (n.d.). Assessment of air pollution status during COVID-19 lockdown (March-May 2020) over Bangalore City in India. 10.1007/s10661-021-09177-w
31. Kiều Trinh. (n.d.). Viet Nam News Environment Tigers saved from illegal wildlife traffickers. https://vietnamnews.vn/environment/1005062/tigers-saved-from-illegal-wildlife-traffickers.html
32. Koju, N. P., Kandel, R. C., Acharya, H. B., Dhakal, B. K., & Bhuju, D. R. (n.d.). COVID-19 lockdown frees wildlife to roam but increases poaching threats in Nepal. https://doi.org/10.1002/ece3.7778

33. Lokhandwala,, S., & Gautam, P. (n.d.). Indirect impact of COVID-19 on environment: A brief study in Indian context. Environmental research vol. 188 (2020): 109807. 10.1016/j.envres.2020.10980
34. Marcos A.Bezerra-Santo, Jairo A.Mendoza-Roldan, R.C. AndrewThompson, Filipe Dantas-Torres, & Domenico Otranto. (n.d.). Illegal Wildlife Trade: A Gateway to Zoonotic Infectious Diseases. Trends in Parasitology. https://doi.org/10.1016/j.pt. 2020.12.005
35. Martin Loibooki, Heribert Hofer, Kenneth L.I. Campbell, & Marion L. East. (n.d.). Bushmeat hunting by communities adjacent to the Serengeti National Park, Tanzania: the importance of livestock ownership and alternative sources of protein and income. https://www.cambridge.org/core/journals/environmental-conservation/article/abs/bushmeat-hunting-by-communities-adjacent-to-the-serengeti-national-park-tanzania-the-importance-of-livestock-ownership-and-alternative-sources-of-protein-and-income/816B5C6898D
36. NASA and European Space Agency (ESA). (2020). Airborne Nitrogen Dioxide Plummets Over China. https://earthobservatory.nasa.gov/images/146362/airborne-nitrogen-dioxide-plummets-over-china
37. Neelakshi Hudda, Matthew C Simon, Allison P Patton, & John L Durant. (n.d.). Reductions in traffic-related black carbon and ultrafine particle number concentrations in an urban neighborhood during the COVID-19 pandemic. Sci Total Environ. 10.1016/j.scitotenv.2020.140931.
38. Owen Mulhern. (n.d.). Mapping the African Bushmeat Crisis. https://earth.org/data_ visualization/mapping-the-african-bushmeat-crisis/ pbs. (2008, june 10). Nature. https://www.pbs.org/wnet/nature/crash-a-tale-of-two-species-why-save-the-red-knot/597/.
39. People's Trust For Endangered Species. (n.d.). Press release: Charity warns that wildlife conservation is a forgotten sector in the Covid-19 pandemic, putting endangered species at further risk. https://ptes.org/press-release-impact-of-covid-19-on-wildlife-conservation/
40. Preneshni R. Naicker. (n.d.). The impact of climate change and other factors on zoonotic diseases. The impact of climate change and other factors on zoonotic diseases.https://www.acmicrob.com/microbiology/the-impact-of-climate-change-and-other-factors-on-zoonotic-diseases.php?aid=220

41. Reuters. (n.d.). Coronavirus pandemic provides unexpected boost for Kenyan fishermen. New York Post. https://nypost.com/2020/03/24/coronavirus-pandemic-provides-unexpected-boost-for-kenyan-fishermen/
42. Rija, A., Kideghesho, J., Mwamende, K., & Selemani, I. (n.d.). Emerging issues and challenges in conservation of biodiversity in the rangelands of Tanzania. Nature Conservation 6: 1-29. https://doi.org/10.3897/natureconservation.6.5407
43. S2w admin. (2020, september 23). Crafting Sustainable Cities– Mainstreaming (Urban) Biodiversity. https://www.terraconindia.com/2020/09/23/crafting-sustainable-cities-mainstreaming-urban-biodiversity/
44. Somerville, K. (April 11, 2020). Botswana's rhino poaching crisis: COVID-19 increases the pressure. https://www.global-geneva.com/botswanas-rhino-poaching-crisis-covid-19-increases-the-pressure/
45. Suranjita Roy. (n.d.). Wildlife during a pandemic: The other side of the coin. Down to Earth. https://www.downtoearth.org.in/blog/wildlife-biodiversity/wildlife-during-a-pandemic-the-other-side-of-the-coin-72547
46. Taylor Louise H, Latham Sophia M., & Woolhouse Mark E.J. (n.d.). Risk factors for human disease emergence. Phil. Trans. R. Soc. Lond. B356983–989. http://doi.org/ 10.1098/rstb.2001.0888
47. Teh, L. C. L. (2011, December 7). Contribution of marine fisheries to worldwide employment. onlinelibrary.wiley.com/doi/abs/10.1111/j.1467-2979.2011.00450.x
48. The World Bank. (n.d.). World Bank Confirms Economic Downturn in Sub-Saharan Africa, Outlines Key Polices Needed for Recovery. https://www.worldbank.org/en/news/press-release/2020/10/08/world-bank-confirms-economic-downturn-in-sub-saharan-africa-outlines-key-polices-needed-for-recovery
49. The Tribune. (n.d.). Pandemic has had a deep impact on wildlife: Expert. https://www.tribuneindia.com/news/jalandhar/pandemic-has-had-a-deep-impact-on-wildlife-expert-151310
50. UNESCO- SCBD programme. (n.d.). Interlinked Diversity. Linking Biological and Cultural Biodiversity. https://www.cbd.int/lbcd/step
51. University of Turku. (n.d.). New species described in 2020. ScienceDaily. https://www.sciencedaily.com/releases/2020/07/200701100030.htm
52. Vinamrata Borwankar. (n.d.). Air pollution levels in Mumbai drop by 76% post lockdown. The Times Of India. https://timesofindia.indiatimes.com/city/mumbai/air-pollution-levels-in-mumbai-drop-by-76-post-lockdown/articleshow/75708175.cms

53. Waithaka, J. (June 2020). The impact of COVID-19 pandemic on Africa's protected areas operations and programmes. https://www.iucn.org/sites/dev/files/content/documents/2020/report_on_the_impact_of_covid_19_doc_july_10.pdf
54. William B. Karesh, Robert A. Cook, Elizabeth L. Bennett, & James Newcomb. (July 2005). Wildlife Trade and Global Disease Emergence. Emerging infectious disease. 10.3201/eid1107.050194
55. The World Bank. (n.d.). The Global Economic Outlook During the COVID-19 Pandemic: A Changed World. https://www.worldbank.org/en/news/feature/2020/06/08/the-global-economic-outlook-during-the-covid-19-pandemic-a-changed-world
56. Xiao, X., Chris Newman, Christina D. Buesching, David W. Macdonald, & Zhao-Min Zhou. (07 June 2021). Animal sales from Wuhan wet markets immediately prior to the COVID-19 pandemic. Sci Rep 11, 11898 (2021). https://doi.org/10.1038/s41598-021-91470-2
57. Zhou, P., Yang, X., Wang, X., Ben Hu, & Lei Zhang, Wei Zhang, Hao-Rui Si, Yan Zhu, Bei Li, Chao-Lin Huang, Hui-Dong Chen, Jing Chen, Yun Luo, Hua Guo, Ren-Di Jiang, Mei-Qin Liu, Ying Chen, Xu-Rui Shen, Xi Wang, Xiao-Shuang Zheng, Kai Zhao, Quan-Jiao Chen, Fei Deng, Lin-Lin Liu, Bing Yan, Fa-Xian. (03 February 2020). A pneumonia outbreak associated with a new coronavirus of probable bat origin. Nature 579, 270–273 (2020). Retrieved August 31st, 2021, from https://doi.org/10.1038/s41586-020-2012-7
58. Zoological Society of London (ZSL) & PTES. (n.d.). Research: Study reveals state of South London's hedgehogs. London HogWatch. https://www.hedgehogstreet.org/research-south-london/

13. Impact of Covid-19 and Environmental Issues

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Abstract

COVID-19 is that the terribly communicable disease that is unfold by Corona virus. The pandemic scenario created everywhere the word. The corona viral infection is extremely quick, but internment condition is obligatory to interrupt the chain of spreading virus in setting. The setting has been cleared, decrease the pollution thanks to internment scenario. per internment part, we have a tendency to studied the articles from completely different newspapers, specially Times of Asian country. during this literary criticism, we have a tendency to mentioned the positive and negative impact of COVID-19 on setting by measuring the literature of newspaper.

Keywords: Positive, Negative Impact, setting, COVID-19

1. Introduction

Came first June & the therefore known as amount of Unlock clinical trial, ending the crack of doom of the fourth part of internment enforced within the country to stop the unfold of Coronavirus infection. The fourth internment was obligatory from eighteenth might to thirty first might. Earlier, lockdowns were declared from twenty fifth March to fourteenth Gregorian calendar month, fifteenth Gregorian calendar month to third might and from fourth might to seventeenth might. This COVID-19 or Coronavirus has solid a world gloom by inflicting severe injury to health, the economy and general social disruption. the whole world is facing economic & health crisis due the prevailing health pandemic caused through uncontrolled widespread community transfer of this virus. The deadly Coronavirus natural event is ever increasing within the country. within the twenty four hours of might thirty first 2020, 265 individuals have died, that is that the largest variety of deaths during a day. At a similar time, the most 7964 new cases have conjointly been according on this Single day. Not solely this, but 11,264 individuals have conjointly been discharged from hospitals during this in the future.

Per the newest knowledge of the Health Ministry, so far 1,73,763 cases are according as Coronavirus positive in Asian country. At a similar time wherever four, 971 individuals have died & eighty two,370 individuals have recovered from this infection. Not known until recently to cause infections in human, this new infectious disease emerged in urban center, Hubei province, China & named as COVID-19 (Coronavirus illness 2019) by World Health Organization. This new category of virus, referred to as SARS-CoV-2 (severe acute metabolic process syndrome Coronavirus 2) has been found to be accountable for over fifty eight,19,962 confirmed international infection cases of COVID-19, together with three,62,786 deaths, as according by World Health Organization as of thirtieth might 2020. However, the planet has been stuck by associate degree unexampled pandemic i.e. novel corona virus (covid-19). the primary known communicable disease SARS-COV-2 was discovered in Wuhan, China. The virus principally affects metabolic process organs and cause chronic infections in old individuals, diabetic patient, cancer patients and with other major sickness and triggers their system. Thus, business enterprise has been massively tormented by the continued pandemic. it's place restrictions to any or all agree teams. Home quarantine has destroyed people's mental additionally as physical health. Leisure has overcome the work house ensuing into negative result on labour productivity. Priority of business enterprise has been compromised thanks to the pandemic. Exploring places has been restricted to restrictions inflicting travellers a tough time. this subject has been chosen to enlighten the importance and procedures to a way to follow the covid norms/protocols whereas visiting traveller place.

2. Positive Impact on Environment

Due to the bizarre natural event of COVID-19, virtually each huge and tiny town and village within the affected countries like China, Taiwan, Italy, USA, France, Spain, Turkey, Iran, Germany, S Korea, U.K, India, Australia and lots of additional, is beneath partial or total internment for an extended amount of your time starting from some weeks up to some months. the most important sectors causative to pollution ar transport, industries, power plants, construction activities, biomass burning, road dirt suspension and residential activities. Additionally, bound activities like operation of metric weight unit sets, restaurant, lowland fires, etc. conjointly contribute to pollution. beneath the nationwide internment, all transport services "road, air and rail were suspended with exceptions for essential services. instructional establishments, industrial institutions and cordial reception services were conjointly suspended. As a result, air quality improvement has been noted in several cities and cities across the planet. Thanks to non-functioning of industries, industrial waste emission has reduced to an outsized extent. Vehicles are hardly found on the roads leading to virtually zero emission of

green-house gases and toxic small suspended particles to the setting. Thanks to lesser demand of power in industries, use of fossil fuels or typical energy sources are lowered significantly. Ecosystems ar being greatly recovered. In several huge cities, the inhabitants are experiencing a transparent sky for the primary time in their lives. The pollution level in traveler spots like forests, ocean beaches, hill areas, etc. is additionally shrinking for the most part. Layer has been found to own revived to some extent. The pandemic has displayed its contrastive consequence on human civilization, within the sense that, on one hand, it's caused worldwide panic scenario, however created a really positive impact on the planet setting on the opposite.

1.3 Environmental Changes witnessed in Bharat throughout lock down period

The economic closedown underneath the Covid-19 pandemic has had 2 monumental impacts on our surroundings. it's improved our air and water quality dramatically, and slashed our material consumption, water usage and waste production. Concentration of material (PM) and gas (NO2) and dioxide (SO2) emissions reduced considerably within the imprisonment amount implemented to curb the novel coronavirus illness (COVID-19) happening, consistent with a Central Pollution board (CPCB) analysis of one hundred fifteen Indian cities. The CPCB monitored the cities between March sixteen and Apr fifteen, 2020. The air quality index (AQI) of seventy eight per cent cities was and satisfactory throughout imprisonment as compared to forty four p.c cities within the pre-lockdown section. The drop might be attributed to, restricted vehicle movement, halt on construction activities, less road mud suspension and curb on industrial activity, consistent with CPCB. knowledge from the CPCB (Central Pollution management Board) and also the UPPCB (Uttar Pradesh Pollution management Board) shows that the Ganga water on its most contaminated stretch in Uttar Pradesh is carrying additional dissolved O and fewer nitrates. These conditions square measure contributive to survival of aquatic life. Its organic chemistry O demand (BOD) has correspondingly fallen, beside the concentration of total coliform, that may be a testament to improved water quality. Similar positive developments are according for the Yamuna. There square measure many reports of the Dhauladhar direct Himachal Pradesh once more being visible from Jalandhar, that is two hundred metric linear unit away. voters have conjointly seen Mt. Kanchenjunga from Siliguri and Mt. Mount Everest from components of state throughout the imprisonment. That this is going on once thirty years highlights simply however long we've got battled severe pollution. Most remarkably, the nation-wide imprisonment has significantly reduced municipal solid waste (MSW) generation. Pune daily tariff of MSW has fallen by twenty nine p.c, whereas city and Nagpur have born by twenty eight per cent and twenty five per cent, severally. Even in cities like Delhi and metropolis, one will expect the same drop as a result of a shift in shopper

demand and behavioral changes towards property consumption. Mass generation of waste diminished as searching malls, hotels and restaurants and different leisure spots were closed. However, individuals seem to be intense Associate in Nursing equal volume of products at their individual homes, discreetly. The reduction in waste was ascertained largely thanks to the closure of public places and population reduction, as lakhs of migrants left the state throughout now. Even with all the nine,000-odd industries allowed to control throughout varied phases of the imprisonment, the entire fuel consumption had drastically reduced and this translated into emission reductions. the sole contrary negative impact on environmental attributes is of medical specialty waste management(BMW). the rise within the variety of COVID-19 patients resulted in an exceedingly surge in BMW generation to the tune of ninety.6 TPD. This appears to own virtually inflated by forty fifth from the common sixty two.5 TPD amount throughout pre-COVID-19 times," consistent with the MPCB report. The MPCB prompt that adaption was example for native bodies and administration, to be ready to address the increasing demand for effective BMW management. throughout 2019, on a mean, about 62.13MT bio-medical waste was treated and disposed of per day. On the opposite hand, the migration of just about sixty five per cent of the population (about nineteen lakhs), restricted industrial work force and also the very restricted industrial, hotels and restaurants, further as marketplace activity, reduced the load of solid waste management (SWM) by fifty eight per cent throughout Phases one and a couple of of the imprisonment, whereas it absolutely was forty four per cent and thirty five per cent severally throughout the following Phases three and four.Of the six stream basins, it absolutely was found that just about all of the basins showed improvement within the water quality, in terms of organic chemistry O demand (BOD) at eighty four per cent of the locations, chemical O demand (COD) at virtually sixty five per cent of the locations (Tapi, Godavari, west-flowing rivers and nallahs basins), whereas the opposite two stream basins showed improvement at thirty per cent of locations. Positive environmental consequences embrace the seemingly decrease in pollution within the returning years. The financial condition, restriction or closure of enterprises, reduction of transport activity thanks to high hydrocarbon costs in conditions of falling demand and living standards will improve the state of the surroundings. At identical time, it's conjointly potential that thanks to the pandemic several enterprises in information intensive and infrastructure sectors can decline or go bankrupt whereas polluting activities can survive.

1.4 Negative Impact on Enviornment

It was computed that almost five hundredth reduction of N2O and CO occurred thanks to the termination of serious industries, additionally emission of NO, from the burning of fuel

indicates a proof of reduction in several countries (e.g., US, Canada, China, India, Italy, Brazil, etc.) it's the key pointer of world economic activities. acid precipitation is largely caused by NO, with the interaction O, and binary compound that many metabolic process diseases occur. however thanks to pandemic there's a deduction of of these. In several countries worldwide flights were canceled as international travelers square measure restricted to enter and depart. Thanks to the nationwide imprisonment,96% of air born from the same time last year globally, that contains a tremendous impact on the surroundings. it's a vast facilitate to resist international temperature change for the less consumption of fossil fuels. On the opposite hand, there have been additionally negative consequences shown within the surroundings. Throughout the eruption of Covid-19, medical waste generation was accumulated globally, that was a threat to public health and therefore the surroundings. For the sample assortment of the suspected patients, diagnosis, medication, and organic chemistry wastes square measure created from the hospitals. It became a challenge for the native waste management authorities to tackle true to safeguard from the infection, a mask, hand gloves, and alternative safety instrumentation square measure used. However thanks to the shortage of a correct data, the general public dump these in open places, inflicting harmful effects to the environment. There square measure direct effects on air, water, and soil pollution by increasing the speed of municipal waste (each organic and inorganic). Moreover, the natural ecosystems and totally different flora and fauna square measure at nice risk for the imprisonment ordered by different countries. Totally different protected areas together with Natural parks, marine conservation zones and life , sanctuaries, etc were left monitored as 2 people that worked in those places were stuck in their homes. It accumulated problems like life searching, illegal deforestation, and fishing activities. to boot, unforeseen termination of touristy activities in holidaymaker destinations, and within the forest areas have accumulated the percentage, as touristy is taken into account because the major supply of AN economic thought. However, we are able to additionally notice the role of environmental communication throughout this pandemic amount. It in the main includes the human interaction with the surroundings.

2. Conclusions and Future Perspectives

Although some positive impacts of COVID-19 on the surroundings were seen, these were the short effects evoked for the most part by nation-wide imprisonment. Indeed, the pandemic is anticipated to cause semi permanent adverse effects on the surroundings in future. The utilization of chemicals (soaps, detergents and alternative chemical means that of cleaning), medicines, and plastics (gloves, masks, PPE kits, syringes, etc.) is anticipated to boost more resulting in accumulated environmental pollution.

To Tackle the Continued and Future Impacts of COVID-19, the Necessity is

(i) To border policy pointers and implement them at international and national levels for correct management of plastic and chemical waste and sewer water treatment. (ii) To develop safety pointers and guarantee their implementation for doctors, hygienically staff, and hospital workers thus on keep them healthy and to additionally avoid any infectious agent unfold. (iii) To drive awareness programs and campaigns at numerous levels together with faculties, colleges, villages etc. to avoid unfold of wrong data and misconceptions and to ensure correct implementation of varied pointers. (iv) to grasp environmental and ecological impacts of COVID-19 with conjunctive analysis efforts so in future such adversities is also tackled in a very more practical method. (v) To develop info of old people that may need additional care, correct and timely treatment thanks to COVID-19 and to make sure their health and care in future. (vi) To additionally perceive the mental stress and science of youngsters WHO had been forced to measure in fastened conditions in homes and to develop surroundings and safe conditions for his or her outing, games and sports activities. The additive COVID-19 vaccinum doses administered within the country surpassed the 100-crore milestone nowadays. in keeping with government's CoWin web site, over seventy large integer individuals are administered the primary dose of covid vaccinum whereas twenty nine large integer have received the total doses. the highest 5 states that have administered the very best range of doses square measure Uttar Pradesh followed by geographical area, state, Gujarat and Madhya Pradesh.

References

1. https://timesofindia.indiatimes.com/readersblog/world-of-words/covid-19-and-its-impact-on-enviornment-34088/
2. https://meuresiduo.com/en/blog-en/the-positive-and-negative-impact-of-coronavirus-pandemic-in-the-enviornment/
3. https:/www.livemint.com/news/india/india-achieves-milestone-of-100-crore-covid-vaccine-doses-administered-1163479001844-html

14. Isolation and Screening of Probiotic Yeast from Marine Environment

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Abstract

The research era increase the interest in the marine environment and the microorganisms. 17 yeasts isolated from the Water and sediment samples of Dadar Chaupati, Mumbai. Out of that, only 2 yeasts has shown the antibacterial activity against two pathogens Staphylococcus aerues 96 and Klebsiella pneumonia 535. The F13 yeast has shown growth at pH 1 to 3 and tolerance to bile salt 0.3%. This F13 yeast has shown the probiotic property. The aim of the project is to isolate potent yeast from different marine sediment and water samples, followed by screening of the isolates on the basis of antibacterial activity against pathogens.

Key words : Yeast, probiotic, pathogens, marine environment, antibacterial activity

1. Introduction

The Ocean is the mother of life that has given rise to many biological activities on planet. It contains a variety of microorganisms that are different in their physiology and adaptations. The marine environment is a very large source for the isolation of new applicable microorganisms that are potent producers of bioactive primary and secondary metabolites. A number of biologically active compounds such as anti-tumour, anti-cancer, anti-microtubule, anti-proliferative, cytotoxic, photo protective as well as antibiotic, antifouling properties has been isolated from the marine sources (Ira and Se-Kwon, 2010). Penetration of biotechnology into marine environment has opened up new horizons for finding novel microorganisms for trapping their potential resources. However, culturally independent methods have demonstrated that marine sediments and water contain wide range of unique microorganisms (Ravenschlay *et*

al., 1999; Stach et al., 2003). Isolation and identification work was performed by Chen *et al.*, (2009). They had reported that twelve seawater samples were collected from the coastal marine waters of north-eastern Taiwan and 109 yeast cultures were isolated from the samples. The results showed that Candida tropicalis was the most frequently recovered yeast found in the coastal waters of north-eastern Taiwan. Other species found in this study included C. glabrata, Saccharomyces yakushimaensis, Kazachstania jiainicus, Kodamaea ohmeri, Pichia anomala, Issatchenkia orientalis, and Hanseniaspora uvarum. Bernel *et al.*, (2015) had designed to describe a series of in vitro tests that may aid the discovery of probiotic strains from Actinomycetes. They reported five out of 31 isolated strains showed antimicrobial activity against three Vibrio species, exhibited good growth at salt concentrations ranging from 0% to 10%, grow at pH < 3, they showed different enzymatic activities and 99% identity with several Streptomyces species.

2. Materials and methods

2.1 Collection of marine sample

Marine water and sediment samples were collected from Dadar chaupathy Mumbai. Samples were collected from 5-15 cm depth.

2.2. Enrichment and Isolation of marine Yeast

Potato Dextrose broth was used for isolation and enumeration of marine yeast. 1 ml of each marine water sample was inoculated in 10 ml of sterile Potato Dextrose broth prepared containing 3% NaCl and incubated for 7 days. The broth culture was serially diluted and subjected for isolation by spread plate method using 0.1 ml of last three dilutions (10^{-4} , 10^{-5} , 10^{-6}) on Potato Dextrose Broth containing 3% NaCl and incubated at 30^0C for 5 to 7 days. 1 g of sediment sample was mixed with 10 ml of sterile saline (0.85% NaCl), homogenized by incubating on rotary shaker (150 rpm) for 10 min. These homogenized samples were inoculated at 10 % (v/v) level in Potato Dextrose broth with 3% NaCl and incubated at 30^0C for 7 days. The enriched samples were subjected for isolation on Potato Dextrose agar containing 3 % NaCl and incubated under 30^0C for 7 days. The plates were observed and isolated colonies were purified and sub cultured on PDA slant and stored at 4 ^{0}C for further studies.

2.3 Primary screening by Agar well diffusion method

Antimicrobial activity of cell free extract was evaluated by the agar well diffusion method against the indicator organisms (Tagg and McGiven, 1971). A lawn of pathogens was made over the surface of Muller Hinton Agar plates (HiMedia, Mumbai, India) by spreading 0.1 ml of 24 h old culture of pathogens. The crude cell free extract of all isolates of 100 µl quantity was incorporated in respective wells and plates were incubated at 37^0C for 24 hours. The results were recorded by observing and measuring zone of inhibition (Nithya et al., 2012). Amongst isolates those were selected showing broad spectrum antibacterial activity expressed in terms of zone of inhibition

2.4 Secondary screening: (Probiotic properties)

a. Tolerance to acidic pH was examined by growing the selected actinomycetes and fungal isolates in Starch Casein broth and Potato Dextrose broth at a pH of 1, 2, 3. The suspension of isolates (1 OD) were inoculated in broth medium, incubated at 30^0C for 7 days, and the presence or absence of growth was recorded on the 7th day and onward (Agrawal et al., 2000)

b. Tolerance against bile salt: The suspension of actinomycete and fungal isolates (1 OD) were inoculated in Starch Casein broth and Potato Dextrose broth with different concentration of bile salt viz., 0.2%, 0.3%, 0.4% and incubated at 30^0C for 7 days and observed the growth of isolates on that bile salt medium (Bernal et al., 2015)

Result and Discussion

The different thirty seven strains of yeast were isolated from different sampling region mentioned in our work. C. tropicalis has been found in the Indian Ocean waters and in intestines of marine animals distributed in the Pacific and Atlantic Oceans (Kutty and Philip, 2008; Wang *et al.*, 2008). Amongst all our isolates we have selected one potential marine isolates which was an excellent probiotic property and broad spectrum antibacterial activity by applying different levels of screening strategies.

The yeast strain F13 was showing highest antibacterial activity against MTCC pathogen Staphylococcus aureus 96 and MTCC Pathogen Klebsiella pneumonia 535 respectively, which is given in a fig.

Being resistant to low pH and tolerance to bile salt are one of the major selection criteria for probiotic bacteria (Quwehand *et al.*, 1999). F13 has shown tolerance at pH 3.0 and bile salt 0.3%.

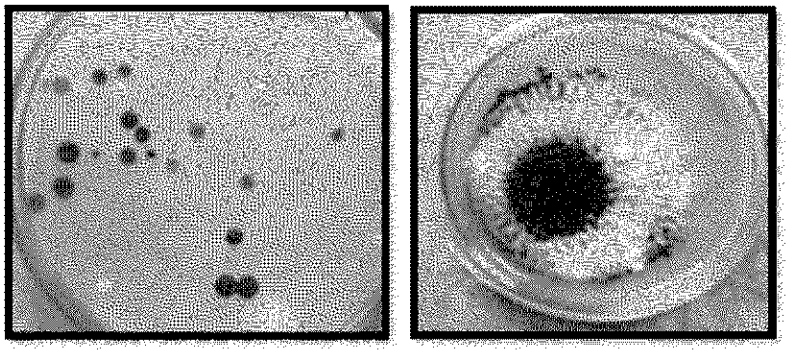

Fig. 1: Isolation of Yeast from marine samples

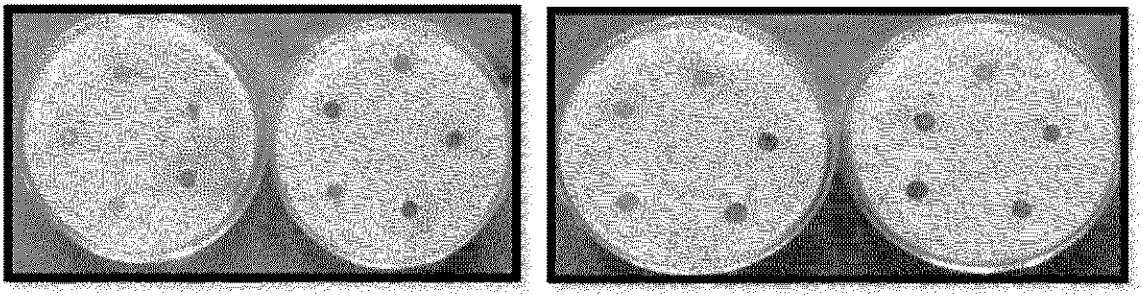

Fig.2: Antibacterial activity of yeast F13 against pathogens

3. References

1. Agarwal N., Kamra D.N., Chaudhary L.C., Shahoo A., Pathak N.N. **(2000)**. Selection of Saccharomyces cerevisiae strains for use as a microbial feed additive. Letters in applied Microbiology. **31(4)**, 270-273. DOI: 10.1046 /j.1472765x.2000.00826x.
2. Bernal, M.G., Campa-Cordova, A., González, M., Marrero, R. and Mazon-Suastegui, J. **(2015)**. Isolation and in vitro selection of actinomycetes strains as potential probiotics for aquaculture. VetWorld. **8(2)**, 170-176.DOI: 10.14202/ vetworld. 2015.170-176.
3. Chen, H. and Hoover, D.G. (2003). Bacteriocins and their food applications. Comprehensive Reviews in Food Science and Food Safety. 2, 83-97.
4. Ira, B. and Se-Kwon, K. (2010). Immense Essence of Excellence: Marine Microbial Bioactive Compounds. Marine Drugs. 8, 2673-2701.
5. Nithya, K., Senthilkumar, S., Udhayshree and Gurusamy. (2012). Characterization of bacteriocin producing lactic acid bacteria and its application as food preservative. African Journal of Microbiology Research. (6), 1138-1146.

6. Quwehand, A.C., Kirjavainen, P.V. and Salminen, S. (1999). Probiotics: Mechanisms and established effects. International Dairy Journal. 9, 43-52.
7. Rajvanshi, A., Nigam, V., Kulshreshtha, S. and Pareek, R. (2012). Characterization of bacteriocin production from a new lactic acid bacteria. World journal of pharmacy and pharmaceutical sciences. 1(3), 1100-1112.
8. Stach, J.E., Maldonado, L.A., Masson, D.G., Ward A.C., Goodfellow M., Bull A.T. (2003). Statistical approaches for estimating actinobacteria diversity in marine sediments. Appl Environ Microbiol. 69, 6189-6200.
9. Tagg and Mc Given. (1971). Assay system for bacteriocins. Applied Microbiology. 21, 943.

15. Isolation, Screening and Identification of Probiotic *Lactobacillus Rhamnosus* L43 from Marine Environment

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Abstract

Marine environment is a rich source of ecological diversity and nutrients which are useful to grow of metabolite producing microorganisms. A total of 89 lactic acid bacteria (LAB) strains were isolated from Water and sediment samples of Dadar Chaupatti, Aksha beach, Mumbai. Out of 89 LAB strains only 11 isolates are showing antagonistic potential against pathogen. Further out of 11, L43 has shown the highest antibacterial activity against *Escherichia coli* and *Enteroccous sp.* by agar well method. According to the biochemical characterization, isolates was affiliated with the genera Lactobacillus sp. The strain with maximum inhibitory potential was characterized using 16S rRNA sequencing analysis and was detected as *Lactobacillus rhamnosus L43*. This study reports on the diversity of lactic acid bacteria in the water and sediments of coastal marine environment.

1. Introduction

The marine environment is the increasing research interest in presence diverse microbes and their potentially to produce the novel natural products. (Jensen and Fenical, 1994). The very less study of marine environment in case of Lactic acid bacteria with inhibitory activity against pathogens.(Kathiresan and Thiruneelakandan, 2008). Lactic acid bacteria (LAB) are Gram-positive, usually non-motile and non-sporulating, catalase negative bacteria that produce lactic acid as a major sole product of the fermentative metabolism. The different species of LAB have adapted to grow under widely differing environmental conditions, and they are widespread in nature (Buntin *et al.*, 2008). Previous studies showed that the metabolites produced by LAB have antimicrobial abilities because of organic acids (lactic acid, acetic acid), diacetyl, hydrogen peroxide and some low molecular weight proteins called bacteriocins (Ross *et al.*, 2002; Saidi *et al.*, 2011). However, only limited wok had focussed on LAB of marine origin. The LAB has been intensively studied as probiotics in

mammals and in fresh water fishes (Sica *et al.*, 2010). Their diversity in coastal marine environments and in marine fishes is still unknown. Hence, the investigation of this group of bacteria in coastal marine environments becomes relevant and could provide new strains with application potentiality. In this study, we worked on the isolation, screening and identification of LAB from marine environment.

2. Materials and Methods

Bacterial strains

a. The indicator strains *Escherichia coli* and *Enterococcus faecalis* obtained from MTCC, Chandigarh and further maintained as frozen stocks at -20°C in the presence of 25% glycerol.

b. The LAB indicators were grown in MRS broth (Hi-Media) at 30°C for 48 h. Sampling and LAB isolation The water and sediment samples were collected from the coastal areas of Beaches of Mumbai. Aliquots of 10 mL of sediment suspensions were inoculated in 100 mL MRS broth (pH 6.5) supplemented with 2% NaCl and incubated at 30°C for 48 h. 1ml of water sample were inoculated in 100 Ml MRS broth and incubated at 30°C for 48 h. For LAB isolation, broth samples were serially diluted in sterile saline and plated on MRS agar (pH 6.5) supplemented with 2% NaCl and incubated at 30°C for 96 h. After incubation, the bacterial colonies were selected from plates, based on differences of form, size, colour, elevation and border (Itoi et al., 2008; Sica et al., 2010). The selected colonies were streaked out for pure culture on the MRS agar. Isolates were examined for Gram reaction and production of catalase. Selected strains were stored at - 20°C in 2% NaCl added MRS agar slants supplemented with 25% v/v glycerol for further studies. Antimicrobial activity assay Agar well-diffusion method was used to detect antibacterial activity (Chin et al., 2001). Characterization of the isolated LABs.The LABs strains isolated were characterized to the genus level based on biochemical tests such as catalase and oxidase reaction. One strain with potent inhibitory activity was characterized to the species level using 16S rRNA sequencing. The 16S rRNA gene of the isolate was sequenced (ABI 3100 sequencer and genotyper; Genei) after the DNA isolation and PCR amplification.

3. Results and Discussion

a. Isolation and Screening of Iolates

83 strains isolated from water and sediment samples of marine environment of Mumbai. Out of 83, 11 strains has shown antibacterial activity further only one strain L43 had shown highest antibacterial activity against *Escherichia coli* (17.5 mm) and *Enterococcus faecalis* (15mm) which is given in a photoplate. Similar type of effect was studied by Anas in 2011 using isolated strain of *Lactobacillus* and reported its inhibitory activity against *Staphylococcus aureus, Bacillus cereus and Salmonella typhi* but no bactericidal effect was observed towards *E. coli*. As compare to Anas *Lactobacillus*, the *Lactobacillus plantarum* reported by Udhayshree in 2012 has shown inhibitory activity towards pathogens belonging to family *enterobacteriaceae* viz. *Escherichia coli, Salmonella typhi, Pseudomonas mirabilis, Klebsiella pneumonia* and *Pseudomonas aeruginosa* and also towards *Bacillus cereus, Staphylococcus aureus.*

Amongst them the strain L43 is found to be highly stable and growth is maximum at pH 3.0, 0.3 % bile salt. Similar finding obtained in work of Prasad *et al.*, (1998), in which four acid tolerant strains were identified from Lactic acid bacteria LAB isolates based on their 80% survival after exposure to pH 3 for 3 h. Similar result were obtained by Ganong, (1994); Keller, (2000) showed that the tolerance to low pH and low bile salt, although the food remains in the stomach is maximally up to 4 h.

b Biochemical Characterization test

The potent isolates characterization is given in the table no. 1 and Photoplate

Table 1: Characterization of potent isolate L43

Characteristics	**Result**	**Characteristics**	**Result**
	Morphological Characteristics		
Shape	Round, circular	**Gram Staining**	Gram Positive
Size	0.5-2.5mm	**Motility Test**	Non-motile
Colour	Watery	**Spore**	Non-sporulating
	Decomposition/Enzymatic studies		
Oxidase Test	Negative	Beta-galactosidase Test	Positive
Catalase Test	Negative	**H_2S production test**	**Positive**
Nitrate Reduction	**Positive**	Casein Hydrolysis Test	Negative

Test			
Lysine Hydrolysis Test	Negative	Gelatine Hydrolysis Test	Negative
Starch Hydrolysis Test	Negative	Urease Test	Negative
	IMViC Set		
Indole test	Negative	**Methyl- red test**	**Positive**
Voges-Proskauer Test	Negative	Citrate Utilization test	Negative
	Sugar Fermentation Test		
Galactose	**Positive**	Raffinose	Negative
Maltose	**Positive**	Ramnose	Negative
Mannose	**Positive**	**Sucrose**	**Positive**
Trehalose	**Positive**	Sorbitol	Negative
Lactose	**Positive**	**Dextrose**	**Positive**
Xylose	**Positive**	**Fructose**	**Positive**
Arabinose	**Positive**	Cellobiose	Negative
Adonitol	**Positive**		

c Genotypic Analysis

The selected marine isolate L43 was identified as *Lactobacillus rhamnosus* L43 by the use of molecular tool as 16 S rRNA identification. The phylogenetic analysis has shown the 97% similar to *Lactobacillus rhamnosus* KC012630.1 . Figure 1 and 2 represent the sequence and phylogenetic analysis of strain L43.

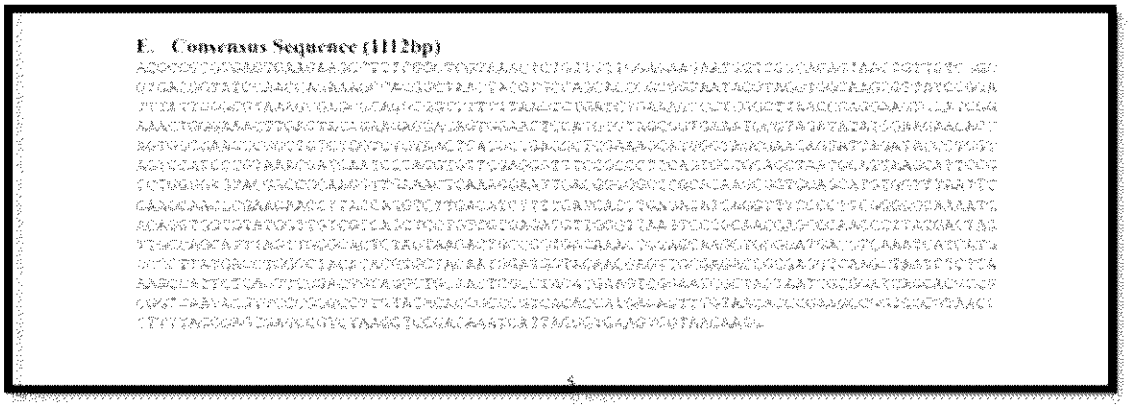


Fig. 1: Sequence of L43.

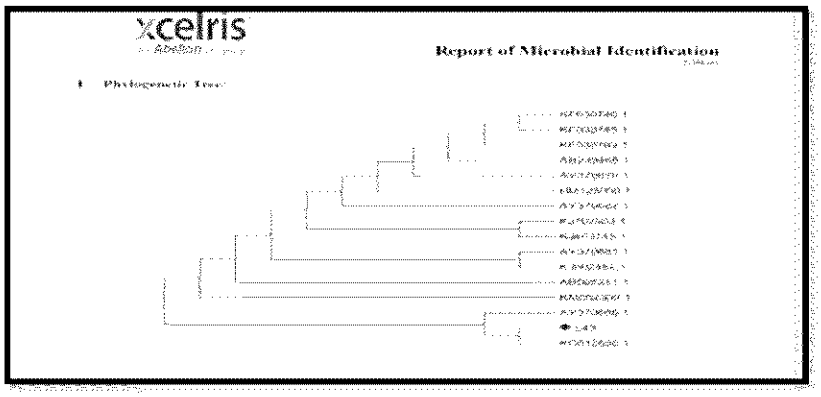
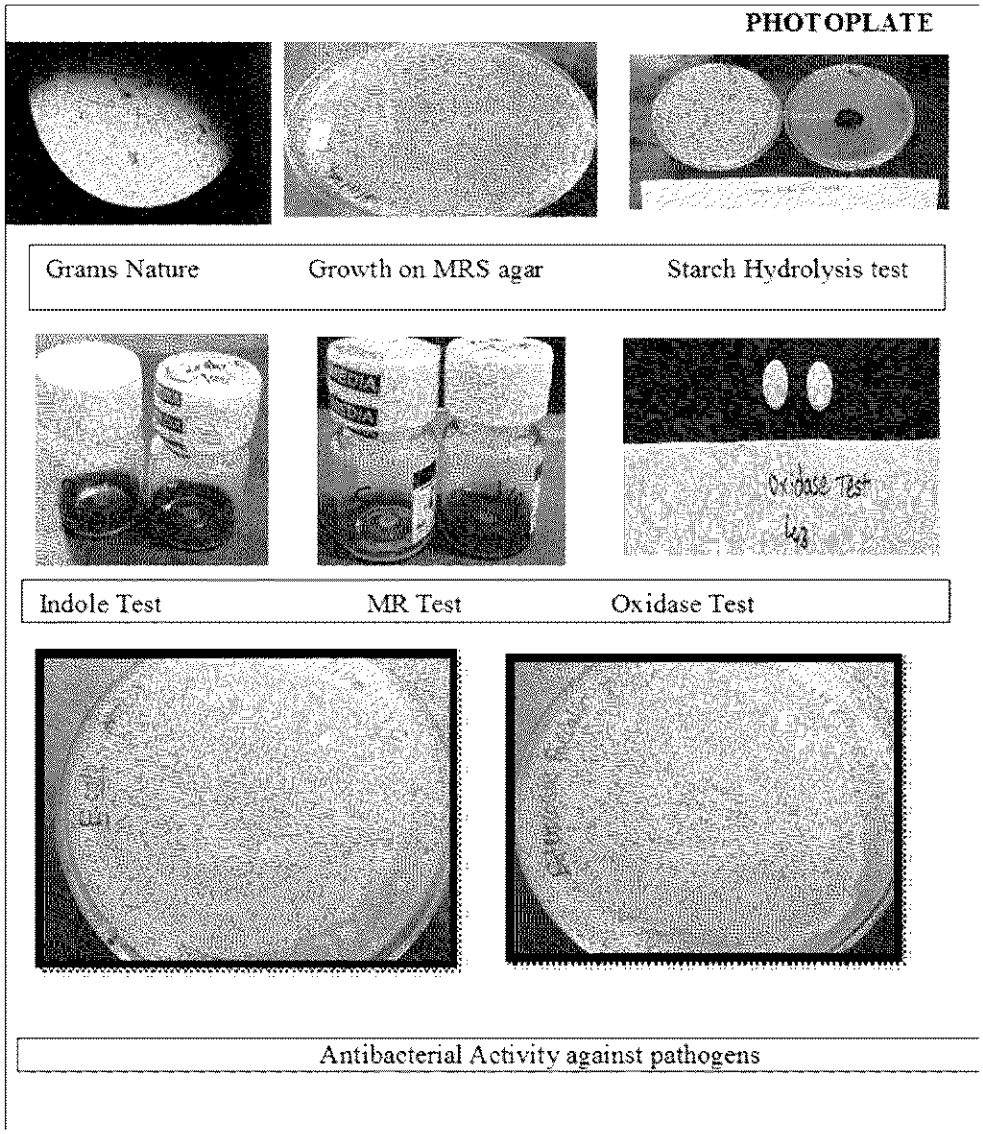


Fig. 2: . Evolutionary relationship among listed organisms



4. Conclusion

The present study area falls under all coastal areas of Mumbai, had rich heterotrophic bacterial populations which indicate the presence of degrading organic materials from the untreated sewage and anthropogenic wastes from human settlement around the bay area. Surface water and sediments have high *Lactobacillus sp.*, which may be received from the runoff, sewage, birds and animal activities. The marine water and sediment have a rich diversity of bacteria and potential to produce primary and secondary bioactive compounds. Based on the phylogenetic tree analysis the identified species is *Lactobacillus rhamnosus* L43. The study reported on the biodiversity of Lactic acid bacteria (LAB) in the water and sediments in the coastal areas of Mumbai.

References

1. Aasen, I.M., Moretro, T., Katla, T., Axelsson, L. and Storro, I. **(2000)**. Influence of complex nutrients, temperature and pH on bacteriocin production by *Lactobacillus sakei* CCUG42687. *Appl. Microbiol. Biotechnol.* **53**, 159-166.
2. Altschul, S. F., Gish, W., Miller, M., Myres, E. W. and Lipman, D. J. 1990. Basic local alignment search tool. J. Molecular biology. 215(3): 403-410.
3. Arroyo, R., Martin, V., Maldonado, A., Jimenez, E., Fernandez, L. and Rodriguez, J. M. 2010. Treatment of infectious mastitis during lactation: Antibiosis versus oral administration of lactobacilli isolated from Breast milk. Clin. Infect. Dis. 50(12): 1551-1558.
4. Buntin, N., Chanthachum, S. and Hongpattarakere, T. 2008. Screening of lactic acid bacteria from gastrointestinal tracts of marine fish for their potential use as probiotics. Songklanakain J. Science and Technology. 30(1): 141-148.
5. Calo-Mata, P., Arlindo, A. and Boehme, K. 2008. Current applications and future trends of lactic acid bacteria and their bacteriocins for the biopreservation of aquatic food products. Food Bioprocess Technol. 1: 43-63.
6. Chin, H. S., Shim, J. S., Kim, J. M., Yang, R. and Yoon, S. S. 2001. Detection and Antibacterial Activity of a Bacteriocin Produced by Lactobacillus plantarum. Food Sci. Biotechnol. 10: 335-341.
7. De Oliveira, A. J. F. C. and Pinhata, J. M. W. 2008. Antimicrobial resistance and species composition of Enterococcus sp. isolated from waters and sands of marine recreational beaches in South-eastern Brazil. Water Research. 42(8-9): 2242-2250.

8. De Vuyst, L. and Leroy, F. 2007. Bacteriocins from Lactic acid bacteria: Production, purification and Food applications. J. Mol. Microbiol. Biotechnol. 13: 194-199.
9. Itoi, S., Abe, T., Washio, S., Ikuno, E., Kanomata, Y. and Sugita, H. 2008. Isolation of halotolerant Lactococcus lactis from intestinal tract of coastal fish. International J. Fish Microbiology. 121(1): 116-121.
10. Jeevaratnam, K., Jamuna, M. and Bawa, A. S. 2005. Biological preservation of foods – Bacteriocins of lactic acid bacteria. Indian J. Biotechnology. 4: 446-454.
11. Jensen, P. R. and Fenical, W. 1994. Strategies for discovery of secondary metabolites from marine bacteria: Ecological perspectives. Annu. Rev. Microbiol. 48: 559-584.
12. Kalmanzon, E. and Zlotkin, E. 2009. Pharmacology of surfactants in skin secretions of marine fish. In: Fish defences Pathogens, parasites and predators. Vol. 2. Ed. Zaccone, G., Perrrivore, C., Mathis, A. and
13. Kapoor, B. G. Science Publishers. pp.169-201 Kathiresan, K. and Thiruneelakandan, G. 2008. Prospects of lactic acid bacteria of marine origin. Indian J. of Biotechnology. 7: 170-177.
14. Oliveira, R. B. P., Oliveira A de L. and Gloria, M. B. A. 2008. Screening of Lactic acid bacteria from vacuum packaged beef for antimicrobial activity. Brazilian J. of Microbiology. 39: 368-374.
15. Prasad, J., Gill, H., Smart, J. and Gopal, P. K. **(1998)**. Selection and characterization of *Lactobacillus* and *Bifidobacterium* strains for use as probiotics. *Int. Dairy J.* **8**, 993-1002.
16. Rakers, S., Gebert, M., Uppalapathi, S., Meyer, W., Maderson, P., Sell, A. F., Kruse, C. and Paus, R. 2010. 'Fish matters': the relevance of fish skin biology to investigate dermatology.' Experimental dermatology. 19: 313-324.
17. Ross, R. P., Morgan, S. and Hill, C. 2002. Preservation and fermentation: Past, present and future. International J. Food Microbiology. 4: 446-454.
18. Saidi, N., Hadadji, M. and Guessas, B. 2011. Screening of bacteriocinproducing lactic acid bacteria from West Algerian Goat's milk. Global J. of Biotechnology and Biochemistry. 6(3): 154-161.
19. Sarika, A. R. 2011. Ph. D. Thesis. Manonmaniam Sundaranar University, Tamil Nadu, India. p. 219.

20. Sarika, A. R., Lipton, A. P. and Aishwarya, M. S. 2010. Bacteriocin production by a new isolate of Lactobacillus rhamnosus GP1 under different culture conditions. Advance J. Food Science and Technology. 2(5): 291-297.
21. Sica, M. G., Olivera, N. L., Brugnoni, L. I. Marucci, P. L., Cazorla, A. C. L. and Cubitto, M. A. 2010. Isolation, identification and antimicrobial activity of lactic acid bacteria from the Bahia Blanca
22. Estuary. Revista de Biologia Marina y oceanografia. 45: 389-397. Strus, M. 1997. The significance of lactic acid bacteria in treatment and prophylaxis of digestive tract disorders. Postepy Hig Med Dosw. 51(6): 605-619

16. Ayurveda and Covid- 19, Changing Mindset of Modern World from Allopathy to Ayurveda

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Abstract

11th March 2020 COVID – 19 was officially declared as global pandemic. It is an infectious disease caused by (SARS-CoV-2). Most common symptoms are fever, sore throat, tiredness and dry cough. Even after the introduction of vaccines, vaccine breakthrough is arising and there are chances of third wave of COVID – 19 in India. This has made us to look back and follow a thousand years old Ayurveda, to boost our immunity and live a healthy lifestyle. As the saying goes "prevention is better than cure" this principle has been perceived by Ayurveda since thousands of years it promotes a certain lifestyle and natural therapies which might boost our immunity in this time. In Ayurveda, single drug or compound formulation (rasayana) are used to boost immunity (bala or vyadhiksamatwa).

Keywords: COVID – 19, Ayurveda, immunity, vyadhiksamatwa, rasayana, dosas, dhatus, immunomodulatory, SARAS – COV – 2.

Introduction

WHO was informed of cases of pneumonia of unknown cause in Wuhan city, China on 31st December 2019. The Chinese authorities identified the cause was a novel corona virus and temporarily named it "2019 – nCoV". This new strain was subsequently named "SARAS - CoV - 2" which causes COVID – 19 disease. Not only humans but a wide range of animals are being affected by this single – stranded large RNA virus. Some people infected with SARAS – COV – 2 might not show symptoms and act as a carrier. Symptom and signs are none specific such as fever (85-90%), cough (65-70%), sputum production (30-35%), and shortness of breath (15-20%).

COVID – 19 virus spreads timely through droplets of saliva or discharge from the nose when an infected person coughs or sneeze. So, it is necessary that to practice respiratory etiquette. People above 60 years of age facing medicals conditions like cardiovascular disease, diabetes, chronic respiratory disease and cancer are at a high risk to develop this disease. Government of India, Ministry of AYUSH, suggests preventive health measures for boosting immunity with special reference to respiratory health. Immunity is termed as a complex biological system which has the capacity to recognise and reject what is foreign. The immune system helps to protect the host from the foreign organism and minimise self – damage.

Immune system is the secondary defence mechanism. Immune system consists of dense network of cells, proteins and the lymphoid organs which are strategically placed to ensure protection. Immune defence can be divided into innate immune response and adoptive or acquired immune response. Innate immune response act immediately to protect against and invading pathogen whereas adaptive immune response takes more time to develop but has a long-lasting immunity.

In ancient times, concept of immunity revolves around Ayurveda, which offers a holistic approach and a potential promise regarding immunotherapies. Ayurveda emphasizes the promotion of health by strengthening and boosting immunity to act as a resistive force against daily physiological extremes moreover as timeserving pathogens. This force is termed as "vyadhiksamatwa" in Ayurveda. This concept explains both preventive as well as curative treatment as the self – explanatory terms – "Vyadhibalavirodhitvam" and "Vyadyutpadapratibandhakatvam".

Vyadhiksamatwa is extremely important in the daily life of human being for prevention and recovery of diseases. Etiological factors try to produce disease when become in contact with the body simultaneously with the body tries to resist the disease-causing factors. Vyadhiksamatwa in Ayurveda is not just immunity against a specific infectious agent or disease but it also provides resistance against the loss of integrity proportion and interrelationship among the individuals' dosas and dhatus. Ayurveda consist of countless useful dravya, formulation, mode of conduct to increase immunity (bala or vyadhiksamatwa).

Research Methodology

Rasayana Therapy

People all globally are infected by the pandemic disease COVID – 19. Since ancient times Ayurveda had showed its impact and termed epidemics as "1. Janapadodhvansa or 2.

Marak". In the treatment of said rasayana therapy along with swasthavritta paripalana (dinacharya and rutucharya) were clearly mentioned. Satmaya ahara, nidra (regular proper sleep), yogic asanas and bhramacharya must be followed to increase vyadhiksamatwa.

Here Rasayana Therapy is Discussed in Detail

Rasayana is associate degree Ayurvedic rejuvenation medical care that helps in promotion and maintenance of health, it suggests that nutrition in the least stages from macro to small cellular level. It boosts the vital force of life (ojas) and then immune system, thus prevent against ill effects of ageing and diseases; as it replenishes the vital fluids of the body. Rasayana maintain vasadhatu and other dhatus (body tissues) in equilibrium for a longer period. Such state of improved nutrition keeps away ageing which can be understood as vayasthapana or jaranasana.

Rasayana is consists of two words: rasa- and –ayana. Rasa- means important seven vital tissues (saptadhatu; e.g. rasa, rakta, mansa, medha, asthi, majja, and sukra). –ayana refers to as path or channel. So, rasayana area unit those who helps in correct uptake, growth and improvement of necessary saptadhatus. Rasayana therapy prevents ageing and provides longevity, improve mental health, increased lustre, body complexion and glow up skin, excellent potentiality of the body and the sense organs.

Rasayana chikitsa boosts the immune system i.e. Ojas. Rasayana is concerned w the immunity enhancement. In rasayana treatment, body constituents are adapting to a selective tissue endowment programme. In modern science, this concept means enhancement of immune responsiveness of the body against pathogen by non-specifically activating. The immune system with immunomodulatory agents of plant origin. Rasayana strengthen the host resistance of an individual helping to prevent diseases and ageing. Rasayana chikitsa or rejuvenation therapy promotes and preserves health and longevity in the healthy, and to treat disease in sick. Rasayana is helpful in improving immunity of the person to him/her from the opportunistic diseases. The rasayana drugs can be categorised as kamya rasayana (for promotion of health of individuals) and naimittika rasayana (for cure of disease).

The mechanism by that actions of rasayana will be determined with fashionable aspects area unit as follows: nourishing perform, Immunomodulatory action, inhibitor action, anti-ageing action neuro – protecting action, etc. the normally used rasayana medicine that facilitate to reinforce immunity are:

1. Tinospora Cordifolia - It is commonly known as Vuduchi or Amruta. It contains chemical constituents such as tinosporine, tinosporide and cordifilide. It has antioxidents, phagocytic activities, antipyretic action as well as immunomodulatory properties. It is also referred as medhyarasayana in charaka samhita. In India, many cases of liver damage from people consuming T. cordifolia as a supposed "immunity booster" during COVID – 19 pandemics.

2. Emblica Officinalis - It is commonly known as Amlaki or Indian gooseberry which are rich source of vitamin c. it consists of low molecular weight hydrolysable tannins. It also contains ellagic acid, linoleic acid, which shows activities against carcinogenesis. It also shows activities such as cytoprotective, anti – inflammatory, antimicrobial, antioxidant, and immunomodulator activities. Amlaki, is also called "the mother in Ayurveda" due to it supports the whole body/ mind and immune system. Its high vitamin c content is traditionally been used against cough and influenza as well as scurvy (vitamin c insufficiency). It also tonify the hard, maintain sugar level, and strengthen the liver and digestive system.

3. Withania Somnifera - Withania somnifera is also known as ashwagandha or Indian ginseng. The major chemical constituents are withaferin A, withanone, and withasomnine. It shows anti-inflammatory, antimicrobial, antioxidant, and antiviral activities. Ashwagandha is traditionally used for many conditions related to stress such as insomnia, ageing, anxiety, etc. it also calms the brain, reduce swelling, lower blood pressure and alter the immune system.

4. Mangifera Indica - It is commonly known as Amra or mango. It contains mangiferin, quercetin, gallic acid as chemical constituent. It shows antiviral as well as anti – influenzal activity. Mango plays a crucial role in eliminating problems related to indigestion and excessive acidity, it supports eye health and promotes gut health. The powerful antioxidants enhance immunity and helps to counter bacteria and toxins.

5. Ocimum Sanctum - It is also known as Tulsi or holy basil. It contains vornyl acetate, cadinene, camphene, eugenol and limonine as chemical constituents. It shows, antibacterial, antifungal, adaptogenic, antiviral, and immunomodulartory activities. Within Ayurveda, Tulsi is known as "mother medicine of nature" or the "queen of herbs". In India, Tulsi is been used in spiritual ritual as well as for the treatment of various diseases. Perhaps it is in of the best examples of ayuvedas holistic lifestyle approach to health. It is used for the treatment of wide range of conditions including hiccups, vomiting, cough, asthma, diarrhoea, and cardiac disorder.

6. Zingiber Officinale

It is also known as Soonthi (adrak) or ginger. Major chemical constituents are α and β zingeiberins, zingeberol, zingerone, gingerol, α curcumin, etc. it has anti – inflammatory, antioxidant, antihistaminic, anticholinergic activities and it also has bioavailability enhancer properties. Ginger contains antioxidants, compound that prevents stress and damage through the DNA. It also prevents high blood pressure, cardiac diseases, and pulmonary diseases and promotes healthy ageing. It is traditionally been used against cough, cold, and fever.

7. Curcuma Longa

It is also known as Haridra or Haldi (turmeric). It contains curcumin, curcunome, curcome, eugonol, curcumin, etc. are the major chemical constituents. It has established antibactierial, anti-inflammatory, and antioxidant properties. In ayurvedic treatment, turmeric is used for various respiratory conditions (e.g. asthma. Bronchial hyper activity, and allergy.). It is also effective against runny nose, cough, and sinusitis. It is frequently used in "kaadha" during the COVID pandemic.

8. Azadirachta Indica

It is commonly known as Neem or Margosa. It contains nimdin, nimnidin, and arachidic acid, etc. as major chemical constituent. It has anti – inflammatory, antimicrobial activities. Neem has strong antioxidant, neutralising free radicals that may influence the development of some condition. It is effective against several types of viruses, bacteria and fungi.

Probable Mode of Action

With proper medication when Rasayana bring about to take, it helps in growth and improvement of crucial seven vital tissues, which increases oja. Regeneration of cells and body tissue helps to increase immunity. Rasayana drugs of different rasas are taken and digested jatharagini followed by bhutagni. The phase vata, pitta, and kapha, produced along with sara part i.e. ahara, rasa which produces pure rasa dhatu, and then continues the chain of production of other raktadi dhatu with the help of dhatavagini up to ojas formation. The formed dhatu keep nourishing the body till they are taken. Rasayana drug improves the nutritional value of the poshak rasa which helps to obtain better quality of dhatu and some rasayana drug at level of agni and strotas by increasing the ability of digestion and metabolism. Amalaki, amrita, pippali, etc. cause excellence of all dhatus. Vyadhiksamatwa depends on the presence of bala in the body. Rasayana drugs also influence oja thereby increasing the sharira bala. A person

with good amount of bala is referred to as saptdhatusara which provides ability to resist external disease-causing agent. Thus, rasayana act as immunomodulator and boost immunity.

Probable Mechanism through Which Immunity Prevents Infection.

In order to survive and replicate virus infect host cells. The cells of immune system cannot detect the virus and therefore do not know that the host cell is infected. To overcome this cells have a system that allows them to show other cells what is inside them – they use molecules called class I major histocompatibility complex proteins (MHC class I) to show pieces of protein from inside the cells up to the cell surface. Infected cells have fragments of proteins made by virus. A special type of cell called T cell circulates looking for infection. One of its type called cytotoxin T cell kills the cell that are infected with viruses with toxic mediators. They've specialised protein on their surface that help them to identify virally – infected cells. The proteins are called T cell receptors which recognise a particular antigenic peptide bond to an MHC molecule. If the cell is infected T cell receptors warns T cell of an infection as a result it releases cytotoxin factors to kill the infected cell and therefore prevent invasion of virus.

Result and Discussion

Ayurveda will definitely play a polar role to reinforce preventive measures provided within the tips by Ministry of Health and Family Welfare (MoHFW). This understanding of COVID-19 indicates that smart immune standing is significant to hindrance and to safeguard from unwellness progression. Gargle with heat water intercalary with a pinch of turmeric and salt. Water poached with Triphala (dried fruits of Emblica oficinalis, Terminalia chebula, Terminalia bellerica) or Yashtimadhu (Glycyrrhiza glabra) can be used for gargling. Nasal instillation of medicated oil like eucalyptus oil/ tulsi oil once or doubly in a day, particularly before going out and once coming to home. Steam inhalation with Ajwain (Trachyspermum ammi) or Pudina (Mentha spicata) or volatile oil once each day. Use heat water or poached with herbs like ginger (Zingiber oficinale) or coriander (Coriandrum sativum) or basil (Ocimum sanctum / genus Ocimum basilicum), or cumin (Cuminum cyminum) seeds etc., for drinking purpose. Fresh, warm, diet diet Golden Milk (Half tea spoon Haldi (Curcuma longa) powder in a hundred and fifty millilitres hot milk) once in the dead of night. Avoid just in case of symptom. Drink Ayush Kadha or Kwath (hot infusion or decoction) once each day.

Conclusion

Through Ayurvedic concept of vyadhiksamatwa we can keep diseases at bay and also prevent psychosocial discrepancies. We should various regiments and follow conducts described in Ayurvedic text in order to attain good vyadhiksamatwa. Thus, we can conclude that rasayana has a vital role in immunity enhancement and prevention of bacterial or viral diseases. So, it is required to create awareness about the Ayurvedic concept of rasayana drugs, which will prevent disease and enhance immunity and promote of the health of every individual.

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References

1. Colledge, Nicki R. Et.al., Davidson's Principles and Practice of Medicine, 21st Edition, pg – 70.
2. Colledge, Nicki R. Et.al., Davidson's Principles and Practice of Medicine, 21st Edition, pg – 70.
3. Colledge, Nicki R. Et.al., Davidson's Principles and Practice of Medicine, 21st Edition, pg – 70.
4. https://www.who.int/health-topics/coronavirus#tab=tab_1
5. https://www.ayush.gov.in/
6. http://www.ccras.nic.in/content/rasayana-ayurvedic-rejuvenation-therapy
7. https://organicindiausa.com/amalaki/
8. https://www.webmd.com/vitamins/ai/ingredientmono-953/ashwagandha
9. https://maharishiayurvedaindia.com/blogs/ayurveda-knowledge-center/health-benefits-of-mango
10. https://www.webmd.com/diet/ss/slideshow-health-benefits-ginger

11. https://www.ncbi.nlm.nih.gov/books/NBK92752/#:~:text=In%20Ayurvedic%20practices%2C%20turmeric%20is,dissolving%20gallstones%2C%20and%20relieving%20arthritis.
12. Laing, Kerry., "Immune responses to viruses", (2016), British Society for Immunology. http://www. Immunology.org/public-information/bitesized-immunology/pathogens-and-disease.
13. Mathew, George k., Aggarwal, Praveen., Medicine, 3rd Edition,pg-180. Colledge, Nicki R. Et.al., Davidson's Principles and Practice of Medicine, 21st Edition, pg – 70.
14. Malathy Iyer (4 July 2021). "Mumbai: Study says liver damage likely due to autoimmune response to giloy". Mumbai News - Times of India. https://timesofindia.indiatimes.com/city/mumbai/mumbai-study-says-liver-damage-likely-due-to-autoimmune-response-to-giloy/articleshow/84104472.cms
15. Pattanayak P, Behera P, Das D, Panda SK. Ocimum sanctum Linn. A reservoir plant for therapeutic applications: An overview. Pharmacogn Rev. 2010;4:95–105. [PMC free article] [PubMed] [Google Scholar] [Ref list]
16. Sastry, J.L.N., Dravyaguna Vigyana, Chaukhamba Orientalia, Varanasi, Vol-II, 2010, pg-33-49.
17. Sastry, J.L.N., Dravyaguna Vigyana, Chaukhamba Orientalia, Varanasi, Vol-II, 2010, pg-220-224.
18. Sastry, J.L.N., Dravyaguna Vigyana, Chaukhamba Orientalia, Varanasi, Vol-II, 2010, pg-375-381.
19. Sastry, J.L.N., Dravyaguna Vigyana, Chaukhamba Orientalia, Varanasi, Vol-II, 2010, pg-681-682.
20. Sastry, J.L.N., Dravyaguna Vigyana, Chaukhamba Orientalia, Varanasi, Vol-II, 2010, pg-430-433.
21. Sastry, J.L.N., Dravyaguna Vigyana, Chaukhamba Orientalia, Varanasi, Vol-II, 2010, pg-519-525.
22. Sastry, J.L.N., Dravyaguna Vigyana, Chaukhamba Orientalia, Varanasi, Vol-II, 2010, pg-513-517.
23. Sastry, J.L.N., Dravyaguna Vigyana, Chaukhamba Orientalia, Varanasi, Vol-II, 2010, pg-123-127.

24. Sharma R.K., Dash Bhagwan., Caraka Samhita, Chowkhamba Sanskrit Series Office, Varanasi, Vol-II , 2013, pg-140.
25. Sharma R.K., Dash Bhagwan., Caraka Samhita, Chowkhamba Sanskrit Series Office, Varanasi, Vol-II , 2013, pg-140.
26. Sharma, R.K., Dash, Bhagwan., Caraka Samhita, Chowkhamba Sanskrit Series Office, Varanasi, Vol-III , 2013, pg-8.
27. Sharma, R.K., Dash, Bhagwan., Caraka Samhita, Chowkhamba Sanskrit Series Office, Varanasi, Vol-III , 2013, pg-46.
28. Singh, Karam., Verma, Bhavna., 2012, 'The Concept of Vyadhikshamatva in ayurveda', "AyurpharmInternational Journal of Ayurveda and Allied Sciences": Vol-1(5), 99-108.
29. Singhal, G.D., Susruta Samhita, Chaukhamba Sanskrit Pratishthan, Delhi,Vol-I, 2007, pg-60
30. Singh N, Hoette Y, Miller R. Tulsi: The Mother Medicine of Nature. 2nd ed. Lucknow: International Institute of Herbal Medicine; 2010. Pp. 28–47. [Google Scholar] [Ref list]
31. Skandhan, Avni KP, Bell, Daniel J .et.al."COVID-19",(2002) Radiopaedia. http://radiopaedia.org/articles/covid-19-3
32. Soni, Manish kumar., Sharma, Omprakash., 2018, 'Importance of Rasayana in Immunity', "World Journal of Pharmaceutical and Medical Research": Vol-4(3), 196-198.
33. Tyrrell DA, Bynoe ML. Cultivation of viruses from a high proportion of patients with colds. Lancet 1966: 1: 76–77.
34. https://www.ayush.gov.in/docs/ayush-Protocol-covid-19

17. Covid-19 & Higher Education in India: Development in Higher Education from Traditional to Technical after Covid-19: A Indirect Support to New Education Policy-2020

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Abstract

Indian Education system is one of the best education methods in the world, which caters to the second largest population of the world with about 138 crore people. Out of that only about 4 crore people pursue higher education, which contributes only about 3% of the total population of the country. But this population is comparable to the population of the entire country of Iraq, Afghanistan, Sudan, Ukraine etc. and contributes a large sector of higher education in the world. Though we are in 21st century with science and technology, the teaching methodologies, which are primarily used in India, even today, are chalk and talk method. Only about 15 to 20 % of the teachers and students use Information and Communication Technology (ICT) for Blended E - Learning. The main reasons for not using the ICT tools in teaching by the teachers as well as students are mainly myths about culture and tradition, lack of awareness about these tools, non-availability of such kind of tools in remote areas, fear of loss of personal touch and basically not to have confidence to operate such kind of systems. During pandemic of COVID – 19, when communication without movement became important and mandatory for survival, people started looking out for alternative options even in the sector of higher education. At that time people understood the intricacy of ICT as one of the most effective tools to be used to communicate, conduct lectures, give assignments and do the assessments. Various social media such as YouTube Channels,

Facebook, Instagram, Linked In, Tweeter and many more provided awareness and efficient resources to shirk the taboos and adopt to the new environment and ecology of higher education. It is enforced emergence of positive trend of Use of ICT tools for Blended E Learning in the Higher education.

Key Words: Higher Education, ICT Tools and Blended E - Learning

Introduction

"The higher education is that which does not merely give us information but makes life in harmony with all existence" - **Rabindranath Tagore.**

India had a well-functioning higher education system as early as 1000 B.C. (Suma Chitnis, 2000). These ancient systems were mainly concerned with dispersing Vedic education, unlike present day universities (Surja Datta, 2017). The roots of the modern Indian education system are present in the legacy of colonial system (Shaloo Sharma, 2002), which was imposed by East India Company of Great Britain followed by the British government in the form of Asiatic Society in 1784; establishment of the first three official universities at Bombay (Mumbai), Calcutta (Kolkata) and Madras (Chennai) in 1857; Followed by the University of Allahabad in 1887 (N. Jayaram, 2007). Hence, the sector of higher education was long affected by the governance of the Britishers. Even when Britishers left the country and we became independent in 1947, higher education system in India continued its emphasis upon the languages and humanities till 1980s (MaII Stratford University, 2012). Certain leading institutes of professional education such as Indian Institutes of Technology (IITs), Regional Engineering Colleges (REC) and Indian Institutes of Management (IIM) were some of the noteworthy exceptions to this inclination. These institutions were inspired by the reputed universities in the United States and other countries and tried their levels best to receive some foreign funding (Pawan Agarwal, 2007). Due to the changing needs of the economy, increase in the population of middle class and increased stress on the government for financial resources after 1980, resulted in slow growth of the higher educational institutions funded by the State Government. This commanded amplified role of the private sector in the education system (Irshad Ahmad, 2013). There was development of large, young middle-class population, which grew richer in early 90s and the education system started supporting entrepreneurship. Hence, education did not remain only as the status symbol but became a necessity of life to be a part of the race and ultimately to win it (P. Agarwal, 2006). This scenario boosted competitive proficiency supported by technological development all over the world and led to globalization

of higher education through privatization with policy implementation by the Government in 1991 (Jasmit Kaur, 2014).

Due to entry of the private sector in education system, there were some major changes in the field of higher education of India with assistance from science and technology (Saloni Wadhwa, 2019) but then too bulk of it remained unchanged and continued with the traditional methods. To find innovative, new methods in the field of higher education is important tool (Pawan Soni, 2013). There are various methods implemented by the experts but there are evidences that some of the efficient methods can prove to be extremely useful for the students. By using these methods, Teachers can keep the students interested and engaged but in certain situations it becomes a challenge (Jaques Hallack, 2000). Hence, use of Information and Communication Technology (ICT) for Blended E Learning can be one of the best solutions.

Objective

There are several examples that ICT plays a significant role in higher education. Government initiative to launch "Gyan Darshan" in 2000 to broadcast educational programmes for the students and teachers, innovation of UGC to start Country Classroom, E – Gyankosh by IGNOU, Gyan Vani by IITs and Technology based Learning by NPTEL are some of the significant examples (Hadiya Habib, 2017). The use of ICT for strengthening the capacity of investors, inventors, and entrepreneurs can be a good solution to local problems. Use of ICT can effectively upgrade knowledge and number of the students. For example, Microsoft Word can motivate the students to learn writing skills or Excel can encourage them to understand numerical skills, which boosts their cognitive skills. It can improve collaborative learning of the teachers, students and parents (Adi Suryani, 2010). Despite so many benefits of modern technology and techniques, it has been seen that ICT is not been implemented effectively and efficiently in higher education system in India. There are several reasons for this problem in higher education in India. Hence, we need to focus upon various root causes of it and think if we can implement ICT enabled Teaching and Learning?

Hypothesis

Due to pandemics of COVID – 19, there is a need to implement ICT enabled Teaching and Learning process massively in Higher Education System of India not only to restore it but to think beyond the current situation. There are problems in implementation of this methodology in India. We can implement ICT enabled Teaching – Learning effectively in India.

Research Methodology and Discussion

The ICT tools are used in Western or Developed countries and plays a vital role in higher education but even they can face some problems in efficient implementation (Lim and Khine, 2006). UK, USA, Australia, Canada, Netherlands, and Hong Kong also faced some difficulties in implementation of ICT Tools in education (British Educational Communications and Technology Agency, 2004). Those difficulties were regarding acceptance and readiness of teachers, infrastructural support from the concerned institution and provision of budget. According to Manternach-Wigans et. al., 1999; there are five main reasons for non-acceptance of ICT tools.

They are insufficient computer training of the teachers, insufficient support from the institution, lack of involvement of institutional authorities, inadequate infrastructural support and installation of inappropriate software, which are against ethics and values of the institution. There are other reasons for rejection of ICT tools such as teachers fear being getting humiliated in front of the students if they cannot operate the technology correctly or in some case if technology suddenly stops working. They may be also anxious if the learners can handle the technology more efficiently than them. Some of them may be are even "technophobic." Some are not serious during their training sessions because they are aware of the fact that they are not in a position to implement it in their institutes due to insufficient access to technological resources viz. insufficient hardware, poor management of available resources, unsuitable software and low quality of hardware. The teachers are also overloaded with extra workload, facing technical problems, and the most vital point is of barriers of attitude and belief.

Rationale

There are four main rationales to implement ICT enabled Technology (Cross and Adam, 2007)

Rationale	Basis
Social	Technology plays, particularly important role in the society and there is a need for familiarizing students with technology.
Vocational	Need to prepare students for job market with required skills in technology.
Catalytic	Application of technology for improvement of execution and efficacy in the process of Teaching, Management and other relevant social activities.
Pedagogical	Enhancement of Learning, Academic Flexibility and Effective curriculum delivery through Technological Tools.

When we talk of higher education system in India in context with ICT enabled Teaching and Learning, more or less all the above-mentioned reasons are responsible along with other possible reasons such as myths about culture and tradition, lack of awareness about these tools, non-availability of such kind of tools in remote areas, fear of loss of personal touch and basically not to have confidence to operate such kind of systems. On the other hand, we need to discuss about benefits of implementation of ICT tools in higher education but before that we need to understand the basic concept of this. ICT enabled Education is the system, where various communication devices such as computer, mobile phone, television, radio along with network of hardware and software with enabled satellite system. It includes effective distance learning by using technology of videoconferencing. It is a gateway of connectivity of all the stakeholders of academia not only in each area, state or country but it is a global platform for sharing and gaining unlimited knowledge trough renowned and reliable resources.

Data Analysis and Interpretation

Hence, we need to acquire, understand, imbibe and gain expertise in ICT enabled Blended E – Learning for bright future of our present and coming generations. It is not only implemented pertaining to Teaching – Learning process but can be effective in various other academic and administrative sectors. Hence, it is not only important but essential that in the present scenario of the era of modern information society, we need to have access to all possible sources of knowledge via ICT to maintain stride with fast developments of latest technology (Bhattacharya and Sharma, 2007). In view of ICT, education is classified in three main categories as follows (Ajit Mondal & Dr. Jayanta Mete, 2012):

1. E-Learning: It is a general term used for computer-enhanced learning, which is commonly associated with the field of advanced learning technology. It deals with the technology and associated methodologies in the field of learning by using networked along with multimedia technologies. It is also called as "online learning".

E-learning has the following advantages

- It helps to eliminate time as well as geographical barriers among students and teachers.
- It enables group collaboration.
- It gives an access to new educational approaches.
- It provides rapid dissemination of education to targeted learners.
- It gives a perfect blend of education with family and work life.

2. Blended Learning: It is combination of multiple approach, which includes face to face teaching and learning, self-paced learning as well as online classroom with synchronous and asynchronous interaction.

3. Distance Learning: In this type, the students work on their own at home or may be at their offices and maintain the communication with the instructor of through messaging, e-mail, electronic platforms, videoconferencing, chat rooms, and other forms of computer-based communication. It can be also called as open learning. Most of the distance learning programs include various computer-based training system and innovative communications tools to create a necessary classroom. We are able to use Internet and World Wide Web, in the virtual form through all the computer platforms, which is the foundation of distance learning systems.

When ICT in education is lacking, most of the responsibility of teaching and learning is owned by the teachers. With the help of ICT tools and technology, we can transfer these responsibilities to the students so that they can learn to self-manage their studies. It helps to individualise the teaching and guidance method as per need of the student and boosts confidence and self-esteem of the students.

The benefits of ICT Enabled Teaching and Learning are as follows: (UNESCO, 2002)

Stakeholder	Benefits
Students	Have easy and enhanced access, Plasticity in content and delivery of knowledge, Blend of work with education, Learner-centric methodology, Improved quality of education along with new ways of interaction.
Employers	Cost effective professional development with high level of quality education, Upgradation of skills of employee with enhanced productivity, Development of innovative learning culture, Costs and time sharing with the employees, Increased possibility of training.
Governments	Increase in capability and cost efficiency of education and training systems, Easy reach to target groups which was limited due to conventional methodologies, Support in and enhancement of quality with relevance to educational structures, Ensuring connectivity of educational institutions and New curricula in tune with emerging networks and information resources, Promotion of innovative methods to provide opportunities for lifelong learning.

Limitations

There are certain limitations or disadvantages of ICT Enabled Teaching – Learning as follows

The information provided by unknown resources can be misleading and misguiding

1. There is always a risk of cyber-attacks and hacking
2. The Teachers may be addicted to the traditional methods

3. A fear of replacement of convention education curriculums by ICT
4. Difficulty to manage the online courses
5. There can be misuse of the technology
6. It may not be accessible by everyone and from everywhere
7. Teachers need to be trained to handle ICT tools
8. Implementation of computers and the internet may be expensive
9. Some belief that computers are going to limit imagination

Suggestions

Our country and the world as whole, is currently facing the situation of COVID – 19 pandemics, where there are lot of difficulties and problems as far as higher education system is concerned.

They are basically Completion of the decided curriculum**,** Conducting examinations**,** Completion of the assessment**,** Declaration of results and Admissions for the next semester.
We must do these activities by considering the guidelines and regulations issued by the Central Government, State Government, Affiliating University and Top Management of the College. At the same time, we need to take cognisance of health and hygiene issues. Hence, if we wish to do it with traditional methodologies, it is practically impossible. We think that ICT enabled Teaching and Learning in the form of E – Learning, Blended Learning and Distance Learning along with Online System of Examination amalgamated with LMS for Assessment and Admissions can be a recommended solution. With this type of approach, we are going to save the energy by curtailing the electricity, time due to avoiding travelling to attend the Colleges and even money. With these recommendations, we sincerely feel that we will be able to lead India in post COVID – 19 situations for sustainable development in the field of higher education.

Conclusion

The increased use of information and communication technologies (ICTs) can bring in changes in teaching and learning methodologies at all levels of higher education systems (HES), which can lead to:

1. Quality enhancements in the field of higher education.
2. Traditional methods of teaching and learning can be converted to online and virtual environment mode.
3. There can be enumerable possibilities of integration of ICT in the education system.
4. The use of ICT in higher education can not only improve classroom teaching and learning process but can also provide the facility of e-learning.

5. ICT tools can enhance the method of distance learning for the students from remote area.
6. The Teachers will be able to reach to all possible remote areas to share their expertise.
7. Learners will be able to access environment of qualitative learning at any time from any corner of the world.

Hence, it is Crucial and Necessary that

Teachers and facilitators should adopt all possible new technology in their teaching styles to furnish pedagogical and educational gains to the learners.

1. Successful implementation of ICT to influence and empower teachers to support them in their engagement with the students in the teaching and learning rather than acquiring computer skills and obtaining software and equipment.
2. Democratization of education through ICT enabled teaching and learning.

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References

- *Ajit Mondal, & Dr. Jayanta Mete, (6 December 2012) University of Kalyani, West Bengal* ICT in Higher Education: Opportunities and Challenges.
- Agarwal, Pawan, (1 April 2007). "Higher Education in India: Growth, Concerns and Change Agenda". *Higher Education Quarterly*. **61** (2): 197–207. doi:10.1111/j.1468-2273.2007.00346.x. ISSN 1468-2273.
- Agarwal, P, (2006). Higher Education in India: The Need for Change", Working paper No 180, Indian Council for Research on International Economic Relations.
- Bhattacharya, I. & Sharma, K, (2007). India in the knowledge economy – an electronic paradigm, International Journal of Educational Management Vol. 21 No. 6, pp. 543–568.
- British Educational Communications and Technology Agency, (2004), pp. 1-29.
- Cross, M. & Adam, F. (2007). ICT Policies and Strategies in Higher Education in South Africa: National and Institutional Pathways', Higher Education Policy 20 (1), 73–95.

- Chitnis, Suma (3 February 2000). "Higher Education in India". Black Issues in Higher Education. **16**: 28. ProQuest 194193481.
- *Datta, Surja, (2017). A History of the Indian University System Springer Link.* doi:10.1057/978-1-137-53571-9. ISBN 978-1-137-53570-2.
- Hadiya Habib, (December 2017). Research scholar, Department of Education. Role of ICT in Higher Education. © 2017 IJCRT | Volume 5, Issue 4 | ISSN: 2320-2882.
- Hallak, Jacques, (2000). "Globalization and its Impact on Education." In Mebrahtu. T Crossley. M. Johnson, D.
- Irshad Ahmad Kumar and Shahida Parveen, (April 2013). Teacher Education in the Age of Globalization, Research Journal of Educational Sciences, Vol. 1(1), 8-12.
- Jayaram, N, (2007). "India". *International Handbook of Higher Education*. Springer International Handbooks of Education. 18. Springer, Dordrecht. pp. 747–767. doi:10.1007/978-1-4020-4012-2_38. ISBN 9781402040115.
- Kaur Jasmit, (2014). "Journey of Higher Education in India "From Pre-Globalisation to Globalised Era". International Journal of Educational Planning & Administration. Volume 4, Number 1, pp. 1-6 ISSN 2249-3093.
- Lim, C., P. & Khine, M., S. (2006). Managing teachers' barriers to ICT integration in Singapore schools. Journal of Technology and Teacher, 14 (1), 97-125.
- MAII Stratford University, (2012). The Evolution of Indian Higher education, may,
- Manternach-Wigans *et. al*, (1999), cited in BECTA, 2004, p. 9.
- Pawan Soni, (September 2013). Indian education in decade of education, Education Insider.
- Saloni Wadhwa, (2019). Higher education in India, www.preservearticles.com.
- *Sharma, Shaloo, (2002).* History and Development of Higher Education in India. *Sarup & Sons.* ISBN 9788176253185.
- Suryani, Adi, (2010). ICT In Education: Its Benefits, Difficulties, And Organizational Development Issues. Jurnal Sosial Humaniora. 3. 10.12962/j24433527.v3i2.643.
- UNESCO, (2002). Open and Distance Learning Trends, Policy and Strategy Considerations, UNESCO.

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