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1. In-Vitro Antifungal Activity of Murraya Exotica Fresh Plant Extract Against Aspergillus Niger and Fusarium Exosporium

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Abstract

Plants are rich source of antibacterial antifungal and antiviral properties. These properties are used by plants to protect themselves from foreign particles or pathogens. With the advancement of techniques now we were extracting the chemicals and using to cure plant and animal infection. The in vitro antifungal activity of aqueous extract from Murraya Exotica plants used in traditional medicine for the treatment of various diseases. Extract efficacy was evaluated using the agar well diffusion assay against two fungi i.e. Aspergillus Niger and Fusarium Exosporium. Zone of inhibition against fungi studied. The significance of these results in relation to pharmacognosy will be discussed.

Keywords: Antifungal activity, medicinal plants, Murraya Exotica, agar well diffusion assay.

Introduction

A variety of microorganisms including fungi, bacteria, viruses, harbour the soil. Out of these microorganisms, few are beneficial for the soil, some don't harm the soil at all neither benefit from it, but some of them have the potential to cause major damage to plant growth as well as the quality of soil. They may lead to reduction in plant growth which takes place by blocking the nutrients that the plant must absorb, or they might cause physical damages which lead to unusual appearance of the plant in turn reducing the market value. Soil borne disease can be a major limitation for plants. The pathogen may remain dormant in the soil and can become

pathogenic again as soon as the host is available. Preventive measures taken for the soil to avoid contamination and healthy environmental conditions can be effective for healthy plant growth.

Fungi are ubiquitous and infection caused due to them has become common. Pathogenic fungi are responsible for causing fungal diseases of the plants. They cause alterations during developmental stages including post-harvest. There is a wide range of fungal genera that causes problems in the quality of fruit, vegetable or crop which are related to aspects such as nutritional value, organoleptic characteristics and limited shelf life. In some cases, fungi are directly or indirectly responsible for allergic or toxic disorders among humans and animals because of the production of mycotoxins or secondary metabolites produced by the fungus.

Generally, for the control of phytopathogenic fungi use of synthetic fungicides is done. These chemical fungicides have tremendous side effects on the plant as well as on the animals feeding on them or even the human consuming the plant products as it may contain harmful chemicals. Hence, there has been an increasing demand to make use of natural products that can serve as antifungal agents causing less damage to the environment and living organisms.

Biologically active compounds found in plants are much safer than the synthetic fungicides. Hence, extracts and oils of medicinal plants has been used since it contains a lot of secondary metabolites as compared to any other plants.

Objectives

1. Project is to be done to test the In-vitro antifungal activity of the medicinal plant against pathogenic fungi.
2. To assess antifungal activity in Liquid culture medium (Broth medium).
3. To determine the zone of inhibition of extracts on fungal strains.
4. To know more about natural fungicides so they can effectively be used as an alternative to synthetic fungicides.
5. No addition of harmful chemicals is to be done.

Materials nd Method

Materials

A. Fungi Used

1. Aspergillus Niger

Isolation - Aspergillus culture was obtained by doing agar plate method and the culture was observed under microscope and sub-culturing was done to obtain pure cultures of Aspergillus niger.

Seven days old culture of fungi was used. The culture of Aspergillus niger was maintained on PDA medium throughout the project.

Taxonomic position [According to the classification system of Alexopoulos and Mims (1979)]:

Kingdom	:	Mycetae
Division	:	Amastigomycota
Sub-division	:	Deuteromycotina
Form-class	:	Deuteromycetes
Form-sub-class	:	Hyphomycetidae
Form-order	:	Moniliales
Form-family	:	Moniliaceae
Form-genus	:	Apergillus
Form-species	:	niger

Figure I: Aspergillus niger pure culture

Macroscopic characters - The colony is black in colour and the reverse surface is white to light yellow in colour.

Microscopic characters - Hypha is septate and hyaline. Conidiophore is present and arises from the basal foot of the. Its conidiophores are smooth-walled, hyaline or turning dark towards the vesicle. Conidial heads are biseriate with the phialides borne on brown, often septate metulae. Conidia are globose to sub globose (3.5-5.0 um in diameter), dark brown to black and rough- walled. It is known to create increased amount of pathogenicity in various species of plant.

2. Fusarium oxysporum

Isolation - Fusarium culture was obtained by placing banana peel on agar which gave pinkish white colonies surrounding the peel. The colony was first identified under microscope and then sub-cultured and Fusarium oxysporum pure cultures were obtained.

Seven days old culture of fungi was used. The culture of Fusarium oxysporum was maintained on PDA medium throughout the project.

Taxonomic position [According to the classification system of Alexopoulos and Mims (1979)]:

Kingdom	:	Mycetae
Division	:	Amastigomycota
Sub-division	:	Deuteromycotina
Form-class	:	Hyphomycetidae
Form-order	:	Moniliales
Form-family	:	Tuberculariaceae
Form-genus	:	Fusarium
Form-species	:	oxysporum

Figure II: Fusarium oxysporum pure culture

Macroscopic characters - Colonies are initially white in colour and turn pinkish or purplish in colour at maturity. The reverse of the plate shows purplish colour.

Microscopic characters - Hyphae are septate and hyaline. Conidiophores are short and simple (mostly not branched). Conidia maybe ellipsoidal, slightly curved in shape.

B. Plants used

Murraya exotica- (Orange jasmine, Family: Rutaceae). The plant is related to Murraya koenigii or Curry plant, which is used as a spice in India but the leaves of Murraya exotica has a citrus flavour. M. exotica has been used to induce labor. It has been used in Cuba for painful inflammatory conditions. Species have been used in traditional medicine, with various parts of the plants used to treat fever, pain, and dysentery.

C. Culture Medium Used

1. Liquid Culture Medium

a. Richard's Broth

Potassium Nitrate	: 10 g
Potassium Monobasic Phosphate	: 5 g
Magnesium Sulphate	: 0.25 g
Ferric Chloride	: 0.02 g
Sucrose	: 50 g
Distilled water	: 1000 ml

All above constituents was added in conical flask. The flask was plugged and autoclaved at the pressure of 15 lbs./sq.inch. at 121°C for 20 minutes. Streptomycin was added before using the broth.

b. Potato Dextrose Broth, (Bilgrami, 1978)

Potato	: 200 g
Dextrose	: 20 g
Distilled water	: 1000 ml

Peeled and chopped potatoes were boiled in distilled water, till the water became starchy. Solution was filtered through muslin cloth and the volume was raised to 1000 ml by adding distilled water. Filtrate was then transferred to a conical flask and dextrose was added. The flask was plugged and autoclaved at the pressure of 15 lbs./sq. inch at 121°C for 20 minutes. The pH of the media was checked (5.6 ±0.2). Streptomycin was added before pouring the plates.

2. Solid Culture Medium

a. Potato Dextrose Agar (PDA), (Bilgrami, 1978)

Potato	: 200 g
Dextrose	: 20 g

Agar	: 20 g
Distilled water	: 1000 ml

Peeled and chopped potatoes were boiled in distilled water, till the water became starchy. Solution was filtered through muslin cloth and the volume was raised to 1000 ml by adding distilled water. Filtrate was then transferred to a conical flask and dextrose and agar were added. The flask was plugged and autoclaved at the pressure of 15 lbs./sq. inch at 121°C for 20 minutes. The pH of the media was checked (5.6 ±0.2). Streptomycin was added before pouring the plates.

b. Richard's Agar

Potassium Nitrate	: 10 g
Potassium Monobasic Phosphate	: 5 g
Magnesium Sulphate	: 0.25 g
Ferric Chloride	: 0.02 g
Sucrose	: 50 g
Agar	: 18 g
Distilled water	: 1000 ml

All above constituents was added in conical flask. The flask was plugged and autoclaved at the pressure of 15 lbs./sq. inch. at 121°C for 20 minutes. Streptomycin was added before using the agar.

3. Chemicals Used:

Ethanol - Used as a solvent for extraction of secondary metabolites from plant materials. (Murraya exotica)

Dimethyl sulfoxide (DMSO) -Used to dissolved ethanol extract of plant material (Murraya exotica).

4. Other Requirements

Petri plates, Conical flasks, Micropipettes, cork borer, forceps, nichrome loop, Laminar Air Flow, etc. The entire experiment must be carried out in Aseptic conditions with sterilized glasswares.

Method

A. Aqueous Extract Preparation

Extract Preparation of Murraya exotica

Leaves of Murraya exotica was washed, air-dried, crushed and soaked in Distilled water and kept on shaker overnight (150 rpm for 24 hours). Next day the mixture was filtered using muslin cloth. The extract was stored at 4°C.

Extract of Different Concentration

Concentration (%)	Dried Powder (gm)	Distilled water (ml)
10%	10	100
20%	20	100
30%	30	100
40%	40	100
50%	50	100

B. Ethanolic Extract Preparation

Extract Preparation of Murraya exotica

Plant material (Leaves) were carefully washed and oven-dried (120°C for 2 hours) and put in shade and aerated place later for drying completely. The dried leaves are ground into a fine powder and the powder is then soaked in Ethanol and kept at shaker overnight (150 rpm for 24 hours). Next day the mixture was filtered using muslin cloth and then Whatmann filter paper and the concentrations were made using another organic solvent i.e. DMSO (Dimethyl sulfoxide). The concentrations made and used were 5%, 10%, 20%, 30%, 40%.

C. Testing of Plant Extract (Aqueous/Ethanolic) of Murraya exotica

1. In Liquid Culture Medium

49 ml of Richard's Broth was added to each conical flask and during the time of experiment 1 ml of plant extract (Murraya exotica) was added to it. The total volume should sum up to be 50 ml in each conical flask. A control flask was maintained to compare the growth and efficacy. The flasks were plugged and autoclaved for sterilization and homogenization of Richard's broth and extract.

Preparation of the concentrations of aqueous extract of Murraya exotica

Concentrations g/ml (wt./vol.)	Volume of extract (ml)	Volume of Richard's Broth (ml)
Control	0	50
5%	1	49
10%	1	49
20%	1	49
30%	1	49
40%	1	49
50%	1	49

After 7 days of incubation, the fungal growth was observed visually and biomass was measured for different concentrations.

Biomass Estimation - The flasks filtrate was separated by filtration with Whatmann no. 1 filter paper. The weight of filter paper was taken prior. After complete filtration, the mat left

on the filter paper was dried completely in oven/incubator (180°C for 2 hours). The dry weight was taken and biomass was calculated.

Observations are recorded and given below.

2. On Solid Culture Medium

The antifungal activity on Solid medium was studied using Agar well diffusion method. In Agar well diffusion method, sterilized PDA is poured into the petri-plates aseptically. Then the media was allowed to cool. About 5 mm diameter well (reservoir) was made in the centre of the petri-plate using a sterilized cork borer. The plates were then inoculated with fungal discs at equidistant radii. About 100µl of the plant extract of respective concentration was filled in the well by using sterilized micropipettes. A control petri-plate was maintained without extract for comparison purpose.

Petri-plates were incubated for 7 days to observe the zone of inhibition. The observations and pictures are given below.

Observations and Results

A. Observations for Aqueous Extracts

1. In Liquid Culture Media

Excellent	+++++
Very Good	++++
Good	+++
Fair	++
Poor Growth	+
No Growth	-

Table no 1 (a) - For Murraya exotica on Aspergillus niger

Concentration of Extract	**Weight of Whatmann filter paper (g)**	**Weight of paper + Biomass (After drying)**	**Weight of Biomass (g)**	**Visual Fungal growth in PD Broth**
Control	0.822	1.394	0.572	++++
10%	0.823	1.350	0.527	++++
20%	0.821	1.360	0.539	++++
30%	0.820	1.334	0.514	+++
40%	0.831	1.267	0.436	++
50%	0.831	1.260	0.429	+

Figure 1 (a): Aspergillus niger grown on PD Broth + Murraya exotica aqueous extract

Table no 1 (b) - For Murraya exotica on Fusarium oxysporum

Concentration of Extract	Weight of Whatmann filter paper (g)	Weight of paper + Biomass (After drying)	Weight of Biomass (g)	Visual Fungal growth in PD Broth
Control	0.658	0.956	0.298	++++
10%	0.664	0.932	0.268	+++
20%	0.690	0.942	0.252	++
30%	0.697	0.956	0.259	++
40%	0.685	0.933	0.248	++
50%	0.689	0.907	0.218	+

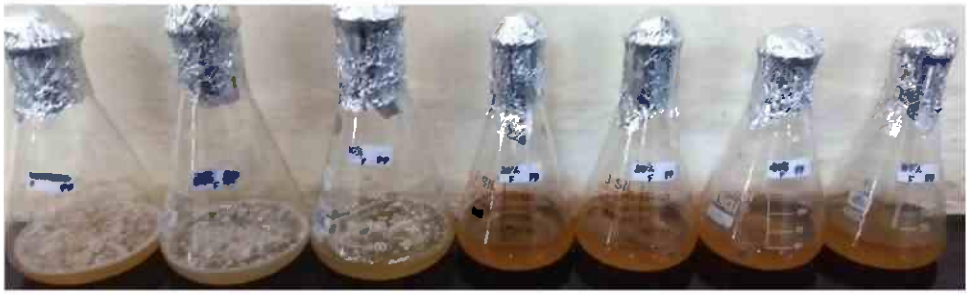

Figure 1 (b): Fusarium oxysporum grown on PD Broth + Murraya exotica aqueous extract

2. On Solid Culture Media

Table no 2- For Murraya exotica on Fusarium oxysporum

Concentration of Extract	Inhibition zone observed on the 8th day (cm)		
	I	II	Average
Control	0.1	0.4	0.25
10%	0.1	0.4	0.25
20%	0.1	0.1	0.1
30%	0.2	0.7	0.45
40%	0.2	0.3	0.25
50%	0.7	0.5	0.6

Figure 2: Fusarium oxysporum inoculated on PDA plate with Murraya exotica aqueous extract

B. Observations for Ethanolic Extracts

1. In Liquid Culture Media

Table no 3 (a) -For Murraya exotica on Aspergillus niger

Concentration of Extract	Weight of Whatmann filter paper (g)	Weight of paper + Biomass (After drying)	Weight of Biomass (g)	Visual Fungal growth in Richard's Broth
Control	0.830	1.536	0.706	+++++
5%	0.820	1.515	0.695	++++
10%	0.832	1.518	0.686	+++
20%	0.830	1.466	0.636	++
30%	0.831	1.468	0.637	++
40%	0.828	1.450	0.622	++

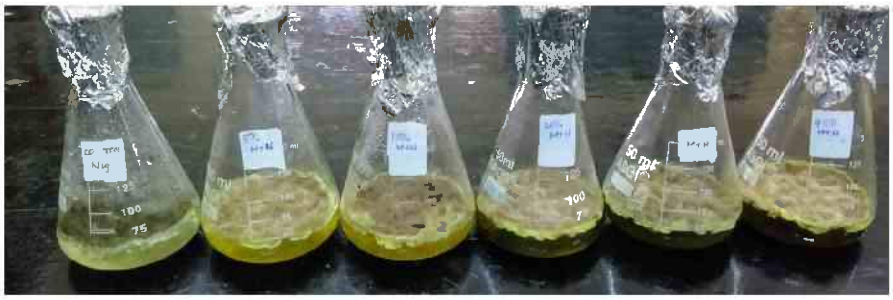

Figure 3 (a): Aspergillus niger grown on Richard's Broth + Murraya exotica ethanolic extract

Table no 3 (b) -For Murraya exotica on Fusarium oxysporum

Concentration of Extract	Weight of Whatmann filter paper (g)	Weight of paper + Biomass (After drying)	Weight of Biomass (g)	Visual Fungal growth in Richard's Broth
Control	0.884	1.236	0.352	++++
5%	0.865	1.134	0.269	+++
10%	0.881	1.149	0.268	+++
20%	0.883	1.139	0.256	++
30%	0.855	1.110	0.255	++
40%	0.856	1.074	0.218	+

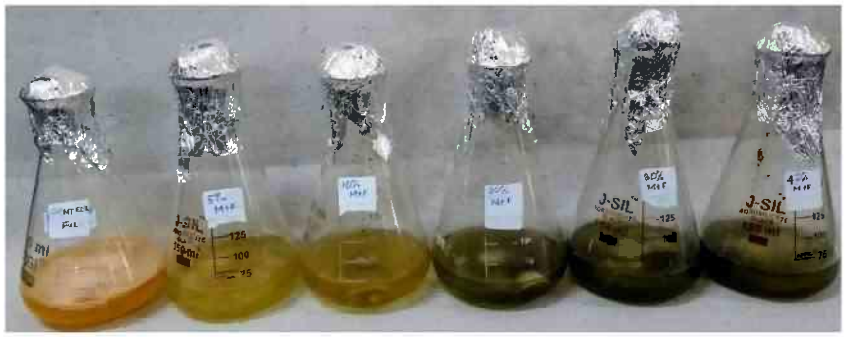

Figure 3 (b): Fusarium oxysporum grown on Richard's Broth + Murraya exotica ethanolic extract

2. On Solid Culture Media

Table no 4: For Murraya exotica on Fusarium oxysporum

Concentration of Extract	**Inhibition zone observed on the 8th day (cm)**		
	I	**II**	**Average**
Control	0.5	0.6	0.55
5%	0.1	0.1	0.1
10%	0.3	0.4	0.35
20%	0.3	0.6	0.45
30%	0.2	0.9	0.55
40%	0.5	0.7	0.6

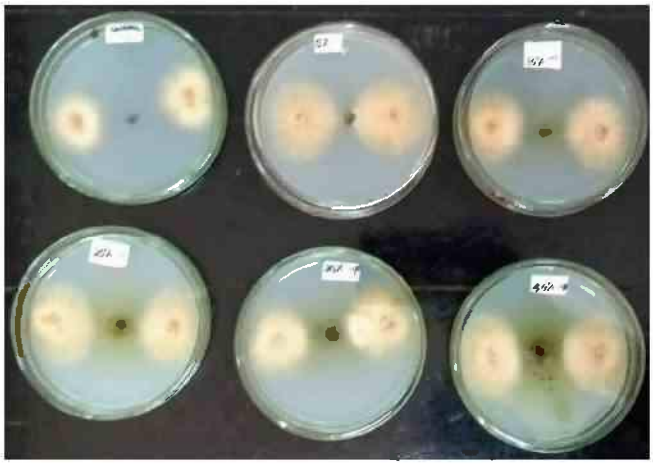

Figure 4: Fusarium oxysporum inoculated on Richard's Agar plate with Murraya exotica ethanolic extract

Results

The results indicated that extract of Murraya exotica has effective antifungal properties. Although, Aspergillus niger was still very resistant, it did show a fair amount of reduction in biomass at higher concentrations of plant extracts (both aqueous and ethanolic). Fusarium oxysporum on the other hand was very sensitive to plant extracts and hence was very slow growing too.

A. On Liquid Culture Medium

1. For Aqueous Extracts of Murraya exotica

- In case of Aspergillus there was a good amount of inhibition at 40% and 50% concentrations, but complete inhibition was not observed.
- Aqueous extract of Murraya showed considerable inhibition of growth especially in Fusarium oxysporum on higher concentrations (40% and 50%).

2. For Ethanolic Extract of Murraya exotica

- The ethanolic extract of Murraya wasn't as effective as the aqueous extract. It showed little hindrance in growth in both cases.
- Aspergillus didn't show much of inhibition in the ethanolic extract of Murraya but it did show a difference in colony colour as compared to the colour of control on Richard's media.
- Fusarium showed a little inhibition in the ethanolic extract of Murraya but not considerable inhibition was attained.

B. On Solid Culture Medium

Aspergillus niger is very resistant to the plant extracts (Aqueous and Ethanolic). When inoculated on equidistant radii it tends to overgrow on the reservoir in between too. Hence, agar well diffusion method was not an effective method to test the inhibition for Aspergillus niger.

The agar well diffusion method showed a clear inhibition zone on higher concentrations of both Aqueous and Ethanolic extracts for Fusarium oxysporum only.

1. For Aqueous Extracts of Murraya exotica

Fusarium oxysporum showed a clear zone of inhibition in 50% concentration for aqueous Murraya exotica. 30% also showed a considerable inhibition zone.

2. For Ethanolic Extract of Murraya exotica

30% and 40% ethanolic extracts of Murraya on solid media showed very clear zones of inhibition in case of Fusarium oxysporum. The diameter was measured and recorded in observations.

Discussion

Plants are susceptible to fungal attacks which causes major loss of yield and causes damage to the quantity and quality of crops and its product. In order to overcome this problem synthetic fungicides are brought to use to lessen the effects of fungi. The usage of chemical/ synthetic fungicides results in accumulation of toxic chemicals in the plant which may lead to undesirable effects. To avoid these problems and promote healthy growth of plants simultaneously eradicating the fungi from the plant, there is a growing need to create natural fungicides which has minimal or no side effects on the plant.

Both fungi (Aspergillus niger and Fusarium oxysporum) which fall under the sub division Deuteromycotina, against which antifungal extracts were tested are pathogenic fungi which caused disease of the plants and are most common contaminants of crops worldwide. The active components present in Murraya exotica were extracted using water (aqueous) and ethanol (organic solvent). According to a research study, Murraya exotica showed the presence of 76 volatile compounds which were identified as essential oils and showed a marginal antifungal activity against Aspergillus niger. Murraya exotica contains coumarins and flavonoids. Essential oils tested against A. niger and C. albicans in broth technique showed antifungal activity better than antibacterial activity. (Noura S. Dosoky, Prabodh Satyal, Tilak P. Gautam and William N. Setzer, 2016). Flavonols can be extracted using ethanol and hence ethanol was also used as a solvent.

For testing the efficacy of extracts, (aqueous and ethanolic) of Murraya exotica on pathogenic fungi A. niger and Fusarium oxysporum. 2 types of methods were performed - 1. Liquid culture media method (Broth method) and 2. Solid culture media method (Agar well-diffusion method).

On Liquid culture media for Aqueous extracts Murraya exotica extract showed considerable decrease of Aspergillus niger mycelia on higher concentrations whereas, Fusarium oxysporum was extremely sensitive and was very slow growing. Complete inhibition was not achieved using Murraya aqueous extract.

On solid culture media maximum inhibitory zones were observed at 50% concentration in Fusarium oxysporum for both aqueous plant extracts. Aspergillus niger does not show a zone and also grew on the reservoir.

On liquid culture media for Ethanolic extracts, Murraya showed reduction in growth of fungi at most high concentrations but no inhibition for both A. niger and F. oxysporum. On solid media however, Murraya on Fusarium oxysporum showed largest inhibition zone at 30% and 40% and

Conclusion

The above investigation has brought us to the conclusion that Ethanolic and Aqueous plant extracts of Murraya exotica is effective against the pathogenic fungi i.e. Aspergillus niger (which causes mold disease) and Fusarium oxysporum (which is a wilt causing fungi). In this particular study Aqueous extracts showed better inhibitory results as compared to Ethanolic solvents. Aspergillus niger showed more resistance against plant extracts at most concentrations.

Fusarium being sensitive to the antifungal compounds present in extracts has shown considerable decrease in biomass and the plant extracts (aqueous and ethanolic) showed complete inhibition at the highest concentrations used (50% for Aqueous extract and 40% for Ethanolic extract).

Although complete inhibition was not observed in the case of Murraya extracts, but it can be concluded that there is definitely some hindrance in normal growth of pathogenic fungi by Murraya exotica. More the concentration of the extract larger is the diameter of the zone of inhibition.

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2. A Review: "Pandemic Led food Price Anomalies Hence Basic Infrastructure Changes Required to Tackle with Pandemic"

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Abstract

Due to Covid-19 food markets and commodity prices. The results of interrupted time series analysis (ITSA) on official figures on daily wholesale and retail prices (n=284) for major commodities revealed that prices for chickpea, mung bean, and tomato rocketed up soon after thelockdown. We find no indication of a structural break in food prices as a result of the lockdo wn, meaning that the price variations generated by the lockdown were insufficient to impact the longrun price trend. The result was corroborated by ITSA, which found that the bulk of

commodity prices had returned, indicating a negative post-intervention trend. We also used an online survey of 729 consumers and a dipstick (telephone and personal interview) survey of 225 farmers to triangulate the results. Despite the fact that agricultural-related operations were allowed to continue throughout the lockdown, farmers reported difficulties in selling their winter produce, with the exception of wheat, which was covered by state procurement. The lockout fell during the wheat harvest, which is the country's second most produced and eaten cereal, culminating in a record purchase of 38.98 million tonnes in 2020. According to a consumer study, the pandemic restricted access to food markets, and the majority (75.31 percent) of respondents experienced an increase in the price of food goods regardless of the severity of COVID occurrence. The pandemic has had a mild (59.53 percent) to severe (3.3 percent) impact on consumers' livelihoods, with 92 percent reporting a shift in shopping behaviour. The Kruskal-Wallis test on the CCBCI (Composite Consumption Behaviour Change Index) revealed a substantial shift among customers who reported an income

change during the lockout. According to the poll, the pandemic has resulted in huge and unprecedented panic purchases by consumers. We strongly advocate for the establishment and operation of appropriate social safety nets to protect vulnerable consumers and producers from pandemic persistence and recurrence.

Keywords:

- Covid-19
- Retail And Wholesale Price
- Supply Disruption
- Interrupted Time Series
- Food Waste
- Food Loss

Introduction

Viruses have decimated humans in multitudes than all the main armed conflicts within the past Century (Adda 2016). In the wake of the deadliest pandemic of the fashionable history, COVID-19, India acted early nudging people for a voluntary curfew (Janata Curfew) Followed by a nationwide 21-day lockdown Starting 25 March 2020, as a technique to flatten The curve of spread of the viral infection and also to use the lockdown period to spice up the Health infrastructure lest the unabated spread would have overwhelmed the public health System. Shutdown of economies during a previous viral outbreak led to significant reduction in Transmission rates. Lockdown guidelines, media hype, international experience of longer lockdown in developed Economies and a demography dominated by a relatively young generation who haven't Witnessed a pandemic before caused panic of an unprecedented nature among the people. Lockdown let several daily wage earners to experience a negative income shock. The Household income declined for 37.9 per cent of the sampled households (on March 29, 2020); further reduced to 43.5 per cent (on April 5, 2020) and 43.7 per cent (on April 12, 2020). Reduced income not only affected the consumption quantity but pattern also. The Restrictions imposed by the Government barring agricultural related activities – as it coincided with the Rabi season (October – March) harvest – disrupted the normal functioning of markets. Though relaxation allowed for agricultural activities was expected to enable Markets to function without any impediment, the supply of essential food commodities was disrupted owing to closure of wholesale markets, especially fruits and vegetables. All these Led to change in the

consumers' behaviour, resorting to panic purchase and stockpiling by the Well to do of food commodities and fast moving consumer goods (FMCG).

Effect of lockdown on food prices

Rice, wheat, chickpea/gram, and moong/mung bean wholesale prices have all increased significantly since the lockdown, with rice, chickpea, and moong showing a downward trend after the lockdown. Wholesale prices rose immediately after the lockdown due to disrupted supply, but then fell due to a demand slump caused by the closure of restaurants and hotels, as well as the cessation of celebrations, ceremonies, parties, social and religious gatherings, and interstate traffic, which prevented demand from wholesalers from other states and institutions. Pulses had a stronger effect than cereals, and the negative trend signalled that the price increase would eventually fade. We find no significant effect of the lockdown on wholesale or retail prices of edible oils (soya and palm), and the trend was also negative due to an increase in edible oil imports after the lockdown. We also get no significant effect of the lockdown on wholesale prices of milk and vegetables. The 'level' coefficients had a positive sign (excluding edible oils) indicating an increase in wholesale prices post-lockdown, while being non-significant in several commodities. Except for rice, wheat, and edible oils, the lockdown raised retail food costs. The government's open market sales, a scheme that supplied food for free (Pradhan Mantri Garib Kalyan Anna Yojana and Atma Nirbhar Bharat Package) (self-reliance) for migrants/stranded migrants adversely affected by the lockdown, are to blame for the drop in retail prices of rice and wheat. Furthermore, per kg of gramme, moong, and potato, there was a substantial rise of 3.03, 6.06, and 10.32.

However, the shutdown of wholesale marketplaces impacted the supply of critical food commodities, particularly fruits and vegetables, which are more prone to supply disruption. Food loss and waste increased in the supply chain due to extremely perishable goods with uncertain production during the epidemic, as well as restrictions on transportation. When rising per capita earnings failed to reduce the degree of undernutrition in India, over three months of lockdown and unemployment make the achievement of the sustainable development target of zero hunger and malnutrition appear improbable. Food waste increased during lockdown due to storage restrictions, overcooking, and hoarding, to name a few issues. Lockdown was reduced by 30% compared to pre-lockdown due to disruptions in demand from hotels, shops, restaurants, and ceremonies, as well as the inability to pack and transport additional milk, fruits and vegetables, and other items. Certainly, the food LOSS has escalated as a result of the supply

chain disruption caused by the lockdown. Despite this, over 1.3 billion tonnes of food are thrown away globally each year.

COVID-19 has posed difficulties in terms of food security, access, and waste management (ReFED 2020). Furthermore, it was discovered that mobility restrictions and a labour scarcity had entirely disrupted supply chains, resulting in not only shortages but also squandering of available food and resources at the farm level. The food grain supply remained unaffected since the Food Corporation of India (FCI) managed to relocate the buffer supplies in time with the help of NGOs, e-commerce, and local grocery stores. However, according to a report from India's Ministry of Consumer Affairs, approximately 1550 tonnes of food grains had been squandered at FCI storage facilities since May 4, 2020.

During the lockdown, manufacturers realised less and customers paid higher prices, while retailers profited. Wheat, vegetables, fruits, fish, poultry, meat, coffee, and pepper producers suffered as a result of a lack of labourers, transportation, subdued demand, and lower pricing, while retail food costs soared. Food price increases have the potential to create societal instability. During the global food price rises between 2008 and 2011, countries with generous social safety nets saw less societal discontent. As a result, it's critical to understand the impact of lockdown on prices and consumption patterns, as well as the impact of COVID-19 on wholesale and retail prices, as well as food consumption. The study's specific goal is to use longer time series data on daily prices to understand the pre- and post-intervention trend in prices, as well as to see if the COVID-19 outbreak has caused a structural change in food prices, followed by a reflection of consumers' and producers' perceptions of the pandemic's impact.

Returning to "business as usual" and ecologically detrimental investment patterns and activities must be avoided if the economic recovery from the COVID-19 disaster is to be long-term and resilient. Global environmental emergencies like as climate change and biodiversity loss, if left unchecked, might cause substantially more social and economic harm than COVID-19. To avoid this, economic recovery solutions should be structured to "build back better." This implies more than simply re-establishing economies and livelihoods. Recovery plans must also stimulate investment and behavioural changes that will lower the possibility of future shocks while also increasing society's resistance to them when they do occur. A focus on well-being and inclusivity is at the heart of this strategy. Alignment with long-term emission reduction targets, factoring in climate resilience, decreasing biodiversity loss, and boosting supply chain circularity are all important characteristics to consider when evaluating whether recovery

packages can "build back better." In fact, well-designed recovery strategies can address multiple of these elements at once, such as accelerating the transition to accessibility-based mobility systems and investing in low-carbon, decentralised energy systems. The first goals for governments in combating the COVID-19 pandemic have been to end the health emergency and undertake swift economic rescue measures, the latter primarily geared at supplying critical liquidity and protecting livelihoods in the face of sudden income losses. As the health crisis in some countries fades, focus has shifted to developing stimulus measures to kick-start economic recovery. This policy brief looks at how these stimulus packages can lead to a recovery that "builds back better," that is, one that not only gets economies and livelihoods back on their feet quickly, but also ensures long-term prosperity.

Conclusions

Using publicly available data as well as a poll, we looked into the impact of COVID-19-induced lockout on food costs and consumption. Except for edible oils, there was a considerable increase in wholesale food costs soon after the lockdown. Gram, mung bean, and tomato retail prices all increased by 3.03, 6.06, and 10.32 per kilogramme, respectively. Rice and wheat retail prices fell dramatically as a result of government intervention as a primary staple crop through welfare programmes, whereas edible oil prices rose as a result of increased imports. We detected indicators of prices reverting to pre-lockdown levels, since post-lockdown trends of commodities that had price increases were negative. The supply shock was not large enough, according to the AO test, to create a sudden shift/structural break in wholesale and retail food prices. Thus, it can be concluded that during the lockdown, agricultural marketing activities were relaxed, and farmers' resistance prevented soaring food prices, as evidenced by the farmers' dipstick poll. Around 75% of survey respondents (consumers) claimed that food prices climbed during the lockout, 33% were laid off or had their income reduced, 92 percent changed their purchasing habits, and 44% decreased and 34% raised their monthly consumption spend as a result of the lockdown. Consumer behaviour altered significantly among customers whose income was changed (due to layoff/reduction) during lockdown, according to CCBCI, although it was equivalent across COVID-19 incidence intensity.

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3. A Review: Pharmacognostic Evaluation of Abies Webbiana Leaf: A Herbal Ingredient

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Abstract

To test the healing power of Abies webbiana (Wall ex D. Don) Lindl, leafy plants belong to the Pinaceae family has grown in Northern India, Afghanistan, China (Tibet), Nepal, and Pakistan. It has a large tree that grows up to 50 m tall. The leaves of this plant are useful for Siddha and Ayurveda Systems of Medicine. It also works as expectorant, carminative, stomach, and tonic. That's the key ingredient in the construction of Siddha as Thalisathi choornam and Thalisathi vadagam, used for respiratory problems such as fever, cough, cough, tuberculosis, indigestion, loss of appetite of appetite, and vatha diseases.

Key Words:- Abies webbiana, Pharmacognosy, Phytochemicals, Gas Chromatography-mass spectrometry, Herbal Medicine

Introduction

Abies Webbiana Lindl is also known as Thalisapathiri in Tamil, Talisapathra or Patradhyam in Sanskrit, and Himalayan Silver in English. This is widely distributed in the highlands of the Himalayan region from Kashmir to Assam States in India. Its long and growing coniferous tree up to 60 m tall and sturdy branches spread horizontally, shoots covered with short brown hair. The leaves are light, cover thick and spread all over directions, and fragrant, shiny, midrib on the surface arranged low in the middle but raised at the bottom, the length of each leaf about 1.5-2.3cm long; cones are blush in color, as well the seeds have wings, the petiole is very short, gray-brown and astringent to taste. It acts as a stomach remedy, carminative, expectorant, and tonic in Siddha drug system. This plant powder is ground with a

vinegar that can be used over the head due to headache and sinusitis. The powdery mildew is also helpful for sore throat and mouth pain wound. Some people also use it as a toothpaste for toothache. Used for chronic cough, cough, fever, tuberculosis, vomiting, constipation, gastritis and bone fever. It is also cited as a key ingredient in many Siddha formulations for Thalisathi choornam, Thalisadi vadagam, Thuthuvalai Nei, Thippili rasayanam, Elathi curnam. The leaves of this plant have different uses against Ayurveda many diseases such as Swasa (short-lived lung diseases),Kasa (cough), Glulam (Tumor), Diseases (amoebiasis), Hikka (hiccup),Chhardi (vomiting), (helminthiasis), and Mukharoga (mouth chaos). *Abies Webbiana* leaf reported to have antibacterial properties, antifungal, mast cell stabilizing, anxiolytic, antitumor, anti-inflammatory, antitussive, female antifertility, febrifuge, antispasmodic properties, and central nervous system. It is also effective in fighting hyperglycemia, pregnancy and arthritis. Antimicrobial activity of *Abies webbiana* extracts as well the bronchodilator and antiplatelet functions of Abies webbiana were investigated. It was analyzed that the extraction of the leaves of this plant works well bedtime and swelling. Ghosh and Bhattacharya applied for the plan the chromatographic process uses different solvent solvent in sequence visualize the chemical diversity of the Abies webbiana leaves as well later they found amino acids, flavonoids, saponins, tannins, alkaloids, lipids, triterpenoids, and steriods. In phytochemical experiments specific chemical components have been identified monoterpenes, bioflavonoid glycosides, phytosterols were supposed to be discovery and the new name of the alkaloid 1- (4'-methoxyphenly) - aziridine which is a combination of nitrogenous and new bioflavonoids alone. Although a few works have been done on Abies Webbiana leaf, no information about plants and chemicals measurements involving gas chromatography-mass spectrometry analysis. *Abies webbiana* is often used as a traditional Indian medicine. Icon investigate that the pharmacognostic properties of this plant are identify and verify the materials to use as one of the several ingredients.

Sub Topics

Microscopic Studies

The flexible part of *A. webbiana* taken with the help of razor blade, and very small parts were selected. The section is thin stained with various stain solutions with blue toluidine "O," 1% phloroglucinol, red Sudan, and iodine iodine potassium. I small powders of powder

A. webbiana leaf powder were and studied .The presence of calcium carbonate crystals was detected by taking a small amount of powdered medicine and treating them acetic acid, and

correction was observed under a microscope.The presence of fats and fatty acids was analyzed by taking a single dose of 1-2 drops of Sudanese red solution, afterwards was gently burned and its preparation was irrigated with ethanol, and slides are inserted and viewed under a microscope. Mucilage was investigated for taking a small amount of powdered medicine once they are treated with Chinese ink (1:10 with water), and the slides were installed and viewed under a microscope. To test for starch, a small amount of powdered medicine treated with iodine solution (0.02 M), and that the slides are uploaded and viewed under through a microscope. The presence of tannins was tested with treatment a pinch of powdered medicine and 1-2 drops of ferric chloride, once the slide was inserted and viewed under a microscope.

Chemical Standardization

The pH of the aqueous solution of *A. webbiana* powder changed into measured the use of the pH meter at 24.four°C. The willpower of the overall ash content of A. webbiana leaf powder turned into executed .The Powder (1.0896 g) turned into introduced to a pre- weighed silica crucible and heated in the muffle furnace at 400°C for approximately three hrs. Then, the crucible was accurately positioned in the desiccator and allowed to chill to room temperature, and the load is finally measured. The proportion weight of the ash is calculated the usage of the system (Weight of the ash/Weight of the drug x one hundred). The percentage of acid-insoluble ash is calculated the use of the method, (Weight of the residue/Weight of the powder×100), wherein the burden of the residue is the net

weight of ash. The loss on drying (LOD) turned into envisioned by way of taking (1.0605 g) Powder in a pre-weighed dish after which positioned inside the hot plate at a temperature of one zero five°C and the LOD turned into calculated using the system (Weight of the dish earlier than LOD−Weight of the dish after LOD/Weight of the pattern×a hundred). The alcohol and water-soluble extractives of the powder have been analyzed. Dry powder (1.0034 g) became taken in beakers separately, and 50 ml of alcohol within the first beaker and 50 ml of water changed into delivered in the 2d one and shaken properly manually. The beakers were kept aside for 24 hrs, after which 10 ml of the answer was taken which became kept in hot air oven at a hundred and five°C. Eventually, the share weight of the extract is calculated the usage of the formula (Weight of residue/Weight of the drug×100).

Extract Preparation

For preparing extract, 10 g of dry powdered cloth changed into excited about 100 ml of hexane, chloroform, ethyl acetate, ethanol, methanol, and water one, after the other in man or

woman conical flasks. The mixer was then stored for around 24 hrs at room temperature (37°C). Then, the contents had been filtered through a filter out paper located on the funnel, and the quantity of the extract changed into mentioned and as a result the extracts that become obtained had been used for phytochemical screening.

Phytochemical Screening

The presence of phenolic compounds changed into recognized compounds by taking 1 ml of extract with 5 ml alcohol and a pinch of ferric chloride. The presence of alkaloids was

detected using Dragendorff's' test, in which, 0.5 ml of extract became concerned about 0.2 ml of acetic acid and 1 ml of Dragendorff's reagent and shaken well after that the presence of flavonoids was detected by using including 2 ml of extract with 1 ml of hydrochloric acid and a pinch of magnesium turnings and was boiled for few minutes. The terpenoids have been detected by taking 0.5 ml of extract with tin pellet and 0.2 ml of thionyl chloride and both was heated lightly. The extract (0.5 ml) was combined with 0.1 ml of lead acetate and found for tannins. To identify the presence of saponins, 0.5 ml of extract was combined with 5 ml of distilled water and shaken vigorously. For confirming the presence of steroids, the extract and 0.5 ml of acetic anhydride had been taken and few drops of concentrated sulfuric acid had been introduced. To realize the presence of quinones, 0.5 ml of extract changed into introduced with 0.1 ml of sulfuric acid. For coumarins check, 0.5 ml of extract turned into mixed with 0.2 ml of sodium hydroxide. The extract (0.5 ml) became combined with Fehling's (A and B) to reveal the presence of sugars.

GC-MS analysis

Extract preparation for GC-MS, 10 g of dry powdered fabric was enthusiastic about 100 ml of methanol in conical flasks. The mixer changed into saved for 24 hrs at room temperature (37°C). Then, the contents had been filtered via a clear out paper placed at the funnel and the quantity of the extract changed into stated. The extracts had been stored within the water tub around 3 hrs for drying. After drying, the methanol extract was analyzed by the usage of fuel chromatographic device coupled with mass spectrometry. Silica capillary column was used. Oven temperature become programed with a boom of 6°C/mins to 150°C; injector temperature turned into 280°C; carrier gas become helium with the flow rate of 1 ml/min. sample was injected with split ratio round of 1:10. Ionization energy was turned inside the electron ionization mode and ion supply temperature was set at a 162°C, and mass changed into scanned in the range of 40-450 amu. The resulted mass spectrum was compared with inbuilt NIST

library database and also with fragments of numerous compounds which become gift inside the extracts had been diagnosed.

Results and Disscussion

Microscopic Results

Transverse phase leaf discovered the presence of upper and lower epidermis, vascular package, and oil-containing cells. Upper epidermis is made up of single layer of round formed thick walled cells with thick cuticle. It's far observed with the aid of layers of elongated palisade parenchyma cells, which is accompanied through numerous large sized brown colored oil-containing cells present. Lower epidermis is made of single layered papillose cells with thick cuticle. Open vascular bundle present within the center of the leaf. Xylem is present in the adaxial side, whereas phloem found in abaxial aspect of the leaf.

Xylem is made of 3-4 layered lignified cells which such as xylem tracheids and xylem fibers. Phloem is made from several layered compressed cells. Spherical formed with parenchyma cells were seen within the proper and left side of the vascular package deal. The vascular package deal is surrounded through a group of small and huge sized oil-containing cells. Easy and compound, spherical, oval and polygonal formed starch grains were seen in parenchyma cells. The presence of prismatic calcium oxalate crystals and tanniferous cells had been also found.Starch grains are simple spherical, oval, and polygonal in shape. It is proven that the presence of tracheary elements with spiral and pitted thickening together with bundle of fibers changed and was located. Epidermal cells were gift with beaded mobile walls and sunken stomata; while defend cells and epidermal cells are lignified. The floor view of the square epidermal cells and some cells embedded with brown content are also visible. The businesses of sclereids with the extensive lumen and striated thick walled

have been additionally visible. Oil-containing cells and crystal fibers had been also determined in Abies webbiana powder.

Chemical Equation

The LOD test process concludes a number of variable matters (i.e. Dry water in medicine). A LOD of a leaf Webbiana the material was 6.90%, indicating the presence of a low level of humidity content in the drug, which will be helpful in microbial inhibition damage to herbal medicines. According to Ayurvedic Pharmacopoeia of India, complete ash and acid-insoluble ash of A. webbiana should be less 6 and 0.5% and our results are compliant (5.23% and 0.57%, respectively).Water-soluble and alcohol-soluble ingredients of Abies Webbiana leaf powder was found to be 23.79% and 18.37%, respectively, The results fall within the range

specified by Ayurvedic Pharmacopoeia of India. (Extractive soluble in alcohol is not less than 14% and water soluble extractive is not less than 15 %.) Herbal aqueous pH extract is one of the visual parameters that can be used find the quality of medicinal herbs. The pH value of the liquid is defined as common-logarithm of hydrogen ion concentration. Aqueous extract of Abies webbiana leaf powder is shown slightly acidic pH. Generally, herbal extracts with a neutral pH desirable for use as a drug and if the pH falls too high. Consumption of drugs is unfitted in the range of acidic or alkaline.

Chemical Standardization of *Abies Webbiana* Leaf

Sr no.	Parameters	Results (%)	Reference values (%)
1.	LOD	6.90	-
2.	Total ash	5.23	Not more than 6
3.	Acid-soluble ash	0.57	Not more than 0.5
4.	Water-solubleextractive	23.79	Not less than 15
5.	Alcohol-solubleextractive	18.39	Not less than 14
6.	PH	5.25	-

Phytochemical

Phytochemical experiments reveal the presence of sterols, terpenes, sugars, phenols, flavonoids, tannins, saponins, and quinone in methanol extracted from A. webbiana. Hexane extraction showed the presence of saponins and quinone, while only quinones found in chloroform and ethyl acetate were extracted. Sterols, terpenes, phenols, and flavonoids are detected in the extraction of ethanolic while water is found in sterols, sugars, and saponins. Identified the presence of these phytochemical elements is possible. It is responsible for the therapeutic properties identified by this plant. Sterols act as an anti-inflammatory, antispasmodic, analgesic, and antidiuretic agent, and they also improve fertility. Terpenes are antibacterial, too anti-inflammatory agents. Phenols are compounds that occur naturally in plants. Phenol plants antioxidant groups reduce various stages of cancer process.

According to pharmacological, phenols provide protection against the heart diseases and prevent oxidative damage to biomolecules such as DNA, lipids, and proteins play a role in chronic diseases such as cancer and heart disease. Flavonoids are present antifatigue, antihyperlipidemic activity, major detection function, and the function of iron chelating. Antibacterial tannins, antifungal, analgesic, and anti-inflammatory activities

Synonym:- A. spectabilis (D.Don) Spach.Linus webbiana Wall

Family:- Pinaceae.

Accommodation:- Himalayas from Kashmir to Assam in the highlands 1,600-4000m

English:- Indian Silver Fir, West-Himalayan Fir, East Himalayan Fir.

Ayurveda:- Taalis, Talispatra, Taalisha, Patraadhya,Dhaatriparni, Dhaatripatra.

Unani: - Talisapatra

Siddha / Tamil:- Talisapatra

Folk:- Badar, Chilrow, Lorinda, Raisalla, Taalispatra. (Taalispatra, Taalispatra and Talespattre are also equated with tamala leaves news.)

Action:- Expectorant, bronchial sedative, decongestant, anticatarrhal, antiseptic, carminative.

Important application: - For (*Abies alba Miller*) needle oil in catarrhal upper and lower respiratory tract disease (internal and external without); except for rheumatic and neuralgic pain. Contraindicated in bronchial asthma and cough (German Commission E.) Bioflavonoid,

Abiesin, n-triacontanol, bet-sitosterol and betuloside there are leaves. Essential oils from the leaves contain alpha-pinene, l-limonen, delta-carene, dipentene, l-bornly acetate and l-cardinene as primary voters.

Dosage:- Needles-2-6 g powder.

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Uses

These leaves (Abbies Webbiana) are also used to make medicine; the dose of these drugs is very useful for old respiratory disease with them have therapeutic value The therapeutic value is as follows

It helps in the following scenario

1. Asthma and Chronic Bronchitis
2. The common cold

1. Asthma and Chronic Bronchitis: these leaves reduce mucus production and reduces the symptoms of these diseases the leaves have anti-inflammatory and mucolytic properties. Mental health is reduced by Anxiolytic properties and also brings sound sleep at night.

2. Common Fever: It helps to get rid of the common cold infection in 1-3 days to its antiviral properties these leaves are used in the dark peppers and ginger extract from these leaves release water take out.

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4. Qualitative and Comparative Analysis of Homemade Prepared Probiotic Food as a Potential Source for Health Benefits

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Abstarct

Probiotics are the living microorganisms which can be administered in adequate amounts to confer health benefits for the host. They have been studied for both human and animal applications by using them in known amount. They are known and proven to give health benefits to the human beings when consumed in proportionate quantity. The literature on probiotics, describes how probiotics work in human ecosystems and outlines the impact of probiotics on human health and diseases. There are various products available in the market under the brand of "Probiotic Food", which can be consumed directly for the health benefits. Similarly, we can prepare various types of probiotic foods at home by using some simple techniques. The products available in the market are expensive and may not be affordable for common people but if we can make the homemade probiotic food, it can be made available to common people at cheaper rates but we need to do qualitative as well as quantitative analysis of the homemade products to compare them with the products available in the market. This paper deals with the comparative analysis of the probiotic foods available in the market and prepared at home. The authors have concluded a diverse range of health benefits from consumption of probiotics, largely due to their impact on immune function or on microbes colonizing in the body.

Key Words: Qualitative Analysis, Probiotic Food, Homemade, Health Benefits

Introduction

Probiotics are live microorganisms that when administered in adequate amounts confer a health benefit on the host (UNFAO/WHO 2001). Probiotic lactic acid bacteria strains are used in various food formulations. The supplementation of lactic acid bacteria in cereals with potential probiotic strain may possibly impart beneficial health effects. Culture viability is a reasonable measure of probiotic activity in the products and the ability of the strains to attain high cell population with rapid growth is very important. Reviews on the impact of probiotics on human health and disease are numerous and have emphasized different components of the field, such as use of probiotics in medical practice (Montrose and Floch 2005; Picard et. al. 2005), use in pediatric populations (Saavedra 2007), immunomodulation (Galdeano et. al. 2007), and intestinal diseases (O'Hara and Shanahan, 2007; Sheil et. al. 2007). The following discussion highlights specific areas of probiotic intervention in human health and disease.

Early analysis evaluating probiotics in humans centered on relieving intestinal distress, often with subjects affected by Associate in Nursing viscus infection or antibiotic-associated complications. As this product idea developed more, the worth of probiotics to stop, instead of treat, malady was appreciated a lot of totally. Toward this finish, studies are conducted in healthy populations, with finish points like decreasing the incidence of colds (de Vrese et. al. 2005), winter infections (Turchet et. al. 2003), or maybe absences from work (Tubelius, Stan, and Zachrisson 2005) or day care (Weizman, Asli, and Alsheikh 2005). These controlled human studies offer support that sure probiotic strains consumed as a part of a daily diet can increase the quantity of illness-free days. Infants were helped by eubacteria reuteri, that ablated crying time thanks to intestinal colic (Savino et. al. 2007). The application of probiotic microorganism strains for fermentation of cereal substrates is associate in nursing approach for the event of practical foods that area unit a locality of the daily food intake. Cereals have proven to be Associate in Nursing applicable base for carboxylic acid bacterium fermentation.

Cereal grains like wheat and Rice area unit consumed as food everywhere the planet. It's wide used for numerous processed foods. Wheat chapattis area unit the most important food things ready from wheat wide utilized in northern Asian nation. Eleusine coracacna (Millet) employed in southern Asian nation, significantly in Mysore. Eleusine coracana ball preparation typically includes boiling, baking and pudding. Wheat and Eleusine coracana based mostly product represent the most important a part of the human diet in several elements of Asian nation. With this in mind, a probiotic cereal mix of Wheat, Ragi, Rice, Curd, Yakult and

Mixture of Wheat, Ragi, Rice is ready by supplementation of eubacteria lactis. Probiotic product area unit distinctive in this keeping the microbes alive should be a thought through the stages of product idea, formulation, and therefore the sales / distribution method. The everyday problems close development conjointly applies: product ought to be tasty (if in food form), convenient, and priced competitively. however further considerations should be addressed: optimizing growth conditions for the probiotic, shaping a product which will deliver the probiotic with success during a viable and practical kind to the site within the body and thru the tip of time period within the product, and determinant the role of the overall product (including fermen¬tation finish product or alternative practical ingredients) on healthful properties. These issues aren't trivial, and sadly not all product marketed as "probiotic" fitly address them.

Several studies document samples of foods and supplements that either don't contain the number of probiotics stipulated on the label or don't use the proper scientific terminology to call the microbes gift. additionally, some product bear labels suggesting health effects that haven't been documented. Some product (many yogurts be this category) don't build any claims of probiotic efficiency or efficaciousness however merely list the genus and species of further live bacterium. The implication is that these bacterium area unit "good for you." Actually, there could also be very little proof that the product as developed area unit efficacious.

Probiotic product development and expands on a document developed by a working group of the United Nations Food and Agriculture Organization (UNFAO/WHO 2002) that provides guidelines for probiotic products. This process involves choice of strain or combination of strains (not all strains of probiotics would be expected to function equally well in different roles), what amounts to use, what studies to conduct to document functionality, how to label the product, and how to communicate about the product. All these issues are interrelated and must start with an understanding of what health effect is envisioned for a product.

Materials and Methods

Plant Materials: Wheat, Ragi, Rice, Sugar

Chemical Materials: *Lactobacillus lactis* Tablets, Yakult, Curd, Alcohols, Saffranin Stain, Iodine Solution

Equipments: Centrifuge, Spectrophotometer, Homogenizer, pH meter, Microsocpe

Preparation of the Cereal Blend

1. The selected cereals (Wheat, Rice and Ragi) are separately cleaned to remove the foreign particles and soaked overnight.
2. The next day water is decanted and is washed twice with tap water followed by distilled water.
3. The soaked cereals are then allowed to malt at room temperature for 48hours.
4. The malted samples are taken in equal proportion for the preparation of probiotic cereal blend.
5. The mashed cereal blend is boiled with continuous stirring.
6. Sugar (2.0%) is added to the product during stirring.
7. The cereal blend is then pasteurized for 20min in cotton plugged Erlenmeyer flask (250ml) and allowed to cool.

Preparation and Supplementation of inoculum to the cereal Blend

1. The probiotic isolate *Lactobacillus lactis* is purchased from market.
2. The tablets are diffused and homogenized in autoclave water.
3. The prepared cereal blend was inoculate (1.0%) with native Lactobacilus lactis probiotic is olate.
4. It is mixed evenly and allowed to ferment at 37^0C for 24 hr.
5. It was stored at 4^0C till further use.

Biochemical analysis

Detection of Phytosterols

Lipid in the dal sample in the form of phytosterols is estimated by modification of method given by tomita et al; (1970). In this method the seeds is taken 1 gm and crushed in 10ml 80% alcohol and warmed the mixture slightly. After they were allowed to cool for 5 to 10 mins and filtered through Whatman no. 1 filter paper. For estimation of phytosterols the filtrate is collected. The extract is taken in a flask 0.5 ml and glacial acetic acid 2ml and the color reagent added 2ml. by adding 80% of alcohol the total volume is adjusted at 5ml. for 10 minutes incubate in an ice bath at 0°C and the absorbance was read at 440nm.

Detection of Reducing Sugar

By using anthrone reagent method Quantitative estimation of reducing sugar is carried out. For extraction of reducing sugar from the pulses, 1 gm of each sample was ground with 10ml and 80% alcohol to get a homogenate mixture. By adding 80% of alcohol the total volume of homogenate is 20ml. for 10 minutes the mixture is centrifuged at 5000rpm. The supernant is

collected. 1 ml of supernant is taken separately and heated on a water bath till no smell of alcohol. To make the volume 2ml distilled water is add.

To this solution, 4ml anthrone reagent (0.2 anthrone reagent dissolve in 100ml concentration sulphuric acid) is add carefully, drop by drop from the side of test tube. From the same manner by using distill water blank was prepared. To avoid loos by evaporation all the test tube is covered for 10 minutes and kept in boiling water bath at 100°C. In a room temperature the test tube is kept for cooling and the absorbance was measured at 625nm.

Detection of proteins

On a various sample of pulses, the quantitative estimation of proteins is carried out by the Lowery's method, 1951. The method is divided into 2 parts from the sample extraction of proteins and estimation of proteins, from the extract. For extraction of proteins for 10 minutes in a 80% alcohol 1 gm of each sample is soaked and then crushed, in a hot 80% alcohol to get homogenized mixture. For 5 to 10 minutes the mixture is centrifuged at 200rpm.

Observations

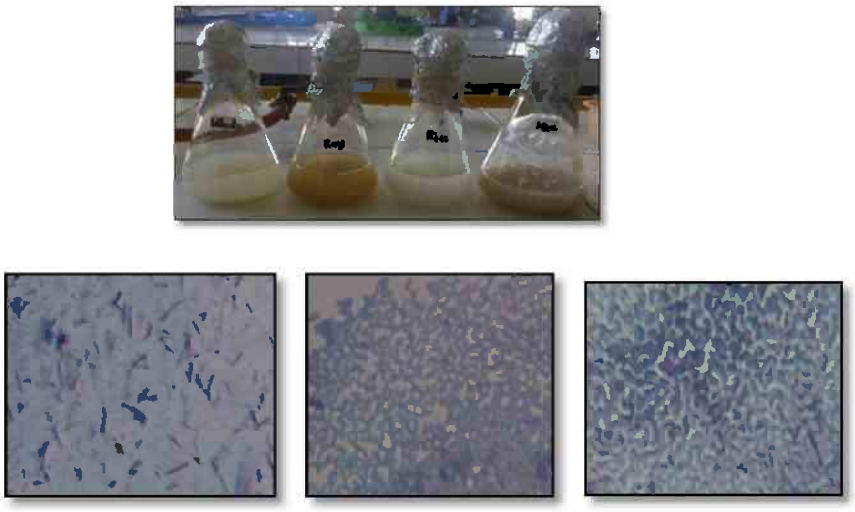
The prepared probiotic cereal blend is subjected to sensory and microscopic evaluation (Table 1). The evaluation criteria were physical appearance, texture, shape, taste, pH and colour. The prepared probiotic cereal blend is subjected to Biochemical evaluation (Table 1). The evaluation criteria were Proteins, Calcium, Carbohydrates and phytosterols.

Table 1: Study of various parameters

Sr. No.	Particulars	pH	Texture	Colour	Taste	Gram's Test
1	Wheat	6.4	Smooth	Turbid	Agreeable	+ve
2	Rice	6.4	Smooth	White	Agreeable	+ve
3	Ragi	6.4	Smooth	Yellowish Buff	Agreeable	+ve
4	Mixture	6.4	Smooth	Light Buff	Agreeable	+ve
5	Curd	6.5	Smooth	White	Agreeable	+ve
6	Yakult	6.6	Smooth	Yellowish Buff	Agreeable	+ve

Table 2: Study of Biochemical parameters

Sr. No.	Particulars	Phytosterols	Calcium	Proteins	Carbohydrates
1	Wheat	1.7gm	315mg	19.9gm	77.0gm
2	Rice	0.7gm	25mg	8.0gm	80.3gm
3	Ragi	1.30gm	344mg	7.30gm	72gm
4	Mixture	1.23gm	288mg	11.73gm	76.33gm
5	Curd	3.0gm	160mg	3.7gm	5.0gm
6	Yakult	0.1gm	36.2mg	0.8gm	11.5gm



***Lactobacilus lactis* (Gram +ve Bacteria)**

Results and Discussion

The comparative analysis from Table.1 shows that probiotic food prepared from wheat has pH 6.4 with smooth texture having turbidity. The taste is agreeable with presence of *Lactobacillus*, which are Gram +ve bacteria. Similarly, probiotic food prepared from rice, ragi as well as the mixture of all three also have pH 6.4 with smooth texture having white, yellowish buff and light buff colours respectively. The tastes of all the products are agreeable with presence of *Lactobacillus,* which are Gram +ve bacteria. Probiotic Curd is with smooth texture, white colour, agreeable taste with pH of 6.5 and presence of Gram +ve bacteria. The pH of Yakult was 6.6 with smooth texture, yellowish buff colour and agreeable taste. It also showed presence of Gram +ve bacteria.

The comparative analysis from Table.2 shows that probiotic food prepared from wheat has 1.7gm of phytosterols, 315mg of calcium, 19.9gm of protein and 77.0gm of carbohydrates. Similarly, in case of rice and ragi 0.7gm and 1.30 of phytosterols, 25mh and 344mg of Calcium, 8.9gm and 7.30gm of proteins, and 80.3gm and 72gm of carbohydrates respectively present. When we compare this with mixture of above three we are getting the best i.e. 1.23gm of phytosterols, 288mg of calcium, 11.73gm of proteins and 76.33gm of carbohydrates.

Conclusion

All the types of probiotic foods i.e. Curd and Yakult from the market and probiotic food prepared from the cereals used in this work are comparable to each other with slightly acidic

pH, smooth texture and agreeable taste with good benefits. Hence, all the products which is available in the market as well as prepared at home can be used wisely.

Acknowledgement

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5. A Review: Impact of Covid-19 on Indian Agriculture Sector

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Abstract

Although Covid-19 pandemic has caused atrocities in the Indian agricultural sector substantially. Inspite of that, the recent GDP statistics approximates post-Covid situation showcase soundness and flexibility in agriculture sector, the only sector to list a productive growth of 3.4% We aim to incorporate the early testimony of the Covid-19 impact on the Indian agricultural sector such as production, marketing and consumption followed by a set of potential strategies to recover and prosper post-pandemic. Recent Survey shows that the pandemic has struck the production and marketing through labour and logistical limitations.

The pandemic inflicted a sizeable physical, social, economic and emotional damage on all the shareholders of agricultural sector. We gave a 10-point master plan that goes from social safety nets, family farming to help and flourish post-pandemic.

Introduction

The spread of Covid-19, from Wuhan, China, the headquarters has eventually spread through the whole world and become known as a pandemic. India has so far become a hotspot for the virus, next to the USA, infecting 9.6 million (14.6% of global infection) as of December 6th, 20201 which has resulted in a reduction of 23.9% gross domestic product.

As Compared to weather shock like drought, flood or a trade embargo, A pandemic shock can have a large consequences on economies due to lost human lives. Doubtlessly, all these shocks affect agricultural sector nevertheless, pandemic shocks have resulted in damage to all the sectors of an economy. The pandemic destroyed the demand and supply of food that impacted the global supply chain; while droughts tend to be localized impacting only the familiar sector or shareholders.

Pandemic creating a panic situation was not enough that, locust infestation from East Africa to India also had a catastrophic effect on agriculture (Timilsina et al., 2020). Natural calamities like cyclones and floods in eastern and western states caused destruction making it worse Farmers encourated a hard time in sowing summer (April–June) and south-west monsoon (July–October) season crops, harvesting winter (March–April) crops and making marketing moves

Effect of Covid-19 on Agriculture Sector of India i.e Production, Marketing and **Consumption**

The unpredictability created by the crisis, limitations on inter-state trade and non-presence of transportation destroyed the supply chains of food and hiked food prices (Kalsi et al., 2020) and affected daily farm activites .

Investigation by the means of official time series price data of 284 days traverse from 01.11.2019 to 10.08.20209 of major food materials stipulate that the wholesale and retail prices of pulses, wheat flour and milk was 1–5% higher a month post-lockdown; prices of edible oils and staple cereals (rice and wheat) were 4–9% lower because of removing import restrictions and government interventions like free distribution of food grains.

Vegetable prices jumped off with tomato prices increasing by 77–78% in a week and 114–117% a month post lockdown. Markets saw sudden hike arrivals in May owing to suffer sale and market remedy insulated farmers from lower prices. Relatively cities and rural areas saw hiked price increased than the urban area sector.

According to the Survey results, showed that ¾ of the consumers witnessed a price hike in food materials during the lockdown (Table 1). The thing of major concern is that the escalating costs might lead to social discontent (Bellemare, 2015); nevertheless, the Indian government has controlled the scenario quite artfully with well-timed market reforms and social safety nets for the poor, migrants and farmers. Due to Covid19, the lockdown in India disturbed food markets which compelled the consumers to change their utilisation patterns.

Consumers made the distinction between what they wanted and what they really needed. Various surveys report that individuals suffered from job losses or their income got reduced significantly during lockdown.

Change in the behaviour pattern was also visible in the consumers. They were also seen to reduce consumption of non-essentials, reduced market visits, stocking and consumption behaviour.

To strengthen the Indian agricultural sector post COVID-19, some stratagies has been devised-:

Following are Some Points

1. Social Insurance

The sudden stoppage of production leading to job and income loss and demand reduction. Due to this pandemic, food loss and wastages happened that severly affected the food and nutrition security in particular to the vulnerable sector, though briefly, and can have lifelong impacts on capabilities. The government and private interference should warrant managing the food loss and waste, reviving the demand and food intake. For managing the food waste at household level, adoption of good food management habits like preparation of shopping lists and planning the course of meals are to be used.

2. Proper Conduct of Risk in Price and Revenue

There was very little effect of Covid-19 on food prices (except for vegetables).

Nevertheless, food prices are infested by highly changing nature which effects are directly seen into price risk to farmers. To provide safety to farmers from the price risk, Indian government should make some changes to stabilize the price funds. Further ahead, crop insurance in India generally covers only the yield risk; Covid-19 has given thd opportunity to the Indian government to transform the crop insurance scheme which covers the revenue (yield and price) Risk of farmers.

3. Concentrating more on Secondary Agriculture than Primary Agriculture

Due to Covid-19 lockdown, disruption in Indian agricultural labour markets is seen which caused huge reverse migration. A survey reports that nearly about 45% of the migrants returned home during lockdown (Imbert, 2020). Structural weakness in the system should be addressed to for enabling recognition of farming as an enterprise. Processes which add value to primary agricultural production systems and enterprises which source raw materials from crop residues, by-products and waste from primary agriculture should be promoted.

4. Family farming

While making a strategy to strengthen the Indian agricultural sector, one should focus on the concept of sustainability. Nothing comes closer as family farming to the exemplar of sustainable food production (FAO and IFAD, 2019). Family farmers not only yield food; but also they save biodiversity, produce nutritious and local foods, develop new planning and they also employ their creativity to face the social, economic and environmental challenges.

Conclusion

The destruction caused by Pandemic was seen on both the Indian and global agricultural system. Without comprehending the effects of Covid 19, one cannot solve the global food security chain.

A host of food exporting nations viz., Kazakhstan, Myanmar, Russia and Vietnam have imposed cereal trade restrictions like bans, quotas and licensing, which are distorting the global food supply. Disruptions in supply and/or value chains lead to food wastage that caused innumerous up and down in prices and having inference to food and nutritional security. For the post-pandemic economy restoration we have to focus more on the agriculture sector and uplifting the revenue.

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6. A Review: "Role of E-books in Pandemic"

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Abstract

This study aims to show the impact of E-books during COVID-19 pandemic. Survey method was used to understand the demand and usage of e-books in the pandemic. The data was collected through articles, website to conduct the study. Due to pandemic closing down all the libraries and universities, students and people had a hard time trying to learn or read new things during the pandemic. So, this is when e-books came in handy. This study will show the importance and growth of e-books by analyzing all the data and information in this article.

1. Introduction

At the end of December 2019, an outbreak caused by Covid-19 from the Wuhan city located in China affected millions. The outbreak of Covid-19 caused a global pandemic; World health organization (W.H.O) declared it as an international public emergency. The virus spread across India very fast as the variant was very contagious. But due to this it also caused the world to come at a halt. People were either starting to work from home or they had to lose their jobs. Human interaction was restricted as everything was shut down across the globe. Due to this many libraries were shut down causing people and students a huge setback since their source of knowledge was limited and not available most of the time.

The Covid-19 pandemic caused a huge setback in academic year in schools and universities. Students were unable to get their study materials and research material from books as libraries were totally shut down. Now the other alternative to get the information they needed to study for exams or get knowledge was called "e-books". The electronic books or known as e-books are a good way to learn the information without the access of a library. The e-book market has not been popular as people still preferred the old way of reading things. But since the pandemic it's the only easiest way to get new books during the pandemic.

2. E-books during Pandemic

According to a report, 90% of libraries of North America has offered e-books to the people to their patrons and allowed people to take e-book loans which has raised above 53% on average. (Aaron Pressman, June 18, 2020)

Pre-pandemic the e-books concept was not familiar with many people as most of the people preferred "physical books over e-books". On the other hand, only teenagers and students have been familiar with e books many adults still fail to understand the concept or never used an e-book.

2.1 E-books for students

During pandemic, e-books has been the practical source of information for students since all the information can be downloaded and read anywhere on their phones or pc. For this the library and IT department had to emerge and help out the students in providing the information they needed. (Laura Graham-Clare, July 20, 2020)

E-books has been the most affordable options for classrooms as it can provide multiple copies to many students without needed to send them back to library. Students can also rent the e-book or purchase them. The price is as cheap as 0.99 cents which helps student to get access to every information they want. As student reads the book day and night it might irritate them to read due to smaller fonts and can't be able to see properly during night time, but e-books completely solves that problem. Helping students to choose the font size, color, and even the font type. They can easily turn the brightness up as per their need and even zoom in the book if it's difficult to read due to smaller fonts.

Due to so many options available and e-books available for students at their fingertips, this will help in keeping the literacy rate high during the pandemic. As e-books can be sent or downloaded easily you can simply search to whichever page you've left to or search any word you want without any hesitation and continue reading. Also, students are liking the concept of learning digitally as its user friendly, cost-effective. It'll also help students with learning disability or with visual impairments.

According to a study, you can observe in Fig.1 the demand curve of e-books.

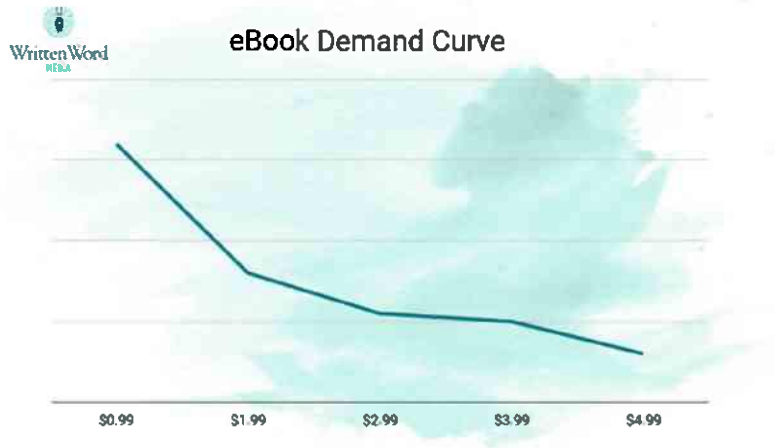

Fig. 1 Demand Curve

You can observe the cheaper ones were in higher demand and as we move up from cheaper ones the copies drop 33-35% from 0.99 to 3.99 and as we move to the final drop of 38% we see the costlier ones were in less demand. (Ricci Wolman, October 21, 2020)

In another Fig.1.2 we assume we would sell 100 e-books at 0.99 so we can observe how many books have been sold in different price range.

Fig 1.2 copies sold

2.2 E-Books for People

As much as e-books has helped students to cope up with academic studies, Children's and adult e-books has seen a large increase in demand since the pandemic. Adults have been reading a lot of fiction as well as non-fiction (Self Help, Travel, Religion) e-books. The total increase of non-fictional books was up 122%. With that people have been also interested in reading 'Sweet Romance' 'Mystery' 'Fantasy' e-books. (Ricci Wolman, October 21, 2020)

The non-fiction genres were cheaper than the other genres making the readers to spend more money on this category of books. This made the readers to read more books during this stay-at-home order.

According to a study, two thirds of book readers say they are consuming more e-books since lockdown began. Meanwhile children from age 9-17 are more interested in reading spy/detective/mystery stories.

2.3 Advantages of E-Books

There are many benefits and advantages of e-books-

A. E-books are delivered almost instantaneously. You can buy, download, and start reading them within minutes, without ever leaving your place. You don't need to go to a library or bookstore to buy books, nor wait for days to let them arrive, it takes a lot of time via mail.

B. No trees are chopped down to manufacture paper for eBooks. It certainly helps the environment.

C. When you need any information, you can get it quickly by downloading an E-book. It also helps you find the exact word you're looking for with the help of search option.

D. Many E-books are sold with combo offers or package, which you won't find such deals with printed books. So, this proves more value for your money.

E. E-books take up less space. You don't need any space to keep your books. You can keep hundreds and thousands of eBooks on your phone, computer or tablet.

F. E-books are portable so you can carry a whole library of hundreds of books, in a laptop, smartphone, without carrying their weight.

G. E-books can be interactive and contain audio files, video and animations, which helps to convey the author's message more clearly.

H. The fonts in E-books can be resized, making it easier to read on small screens. We can also listen to some of the eBooks, similar to listening to audio books.

I. Nowadays, anyone can find E-books about any possible topic or subject, fiction and non-fiction, paid or free. (Remez Sasson)

4. Conclusion

The COVID-19 has certainly affected many people throughout the year but e-books and many other helpful alternatives has helped people to stay entertained and learn something new without getting out of their house providing a safe environment.

5. Declaration Authors contribution

All the author's mentions have significantly contributed to the writing and development of this article.

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2. Laura Graham-Clare, July 20, 2020
3. Ricci Wolman, October 21, 2020
4. Remez Sasson

7. Review on Effect of Berberis Vulgaris on Covid

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Abstract

In the year 2019, It was the month of December the world witnessed the devastating global pandemic, which affected the life of millions of people globally.

During this time there was no medicine which can be used to cure the corona-virus disease, so the importance were given to the ayurvedic herbs and medicine , which were used to reduced the symptoms of the covid, since the covid is the disease which is related with the respiratory system or we can say that its is a respiratory infection.

There were many herbs which were used to treat this infection one of the herbs which can be used was **Berberis vulgaris** Since the different and various parts of the plants can be used for treatment of this disease.

Keywords:- Covid, Berberis Vulgaris, Biomedicine, Semi-Tropical, erberis, Antioxidant, Phytochemical.

Introduction

Covid- 19 pandemic Was first detected in Wuhan in late 2019 COVID belongs to the family of Mars Co the number of infected people and resulting deaths have increased drastically because of rapid viral infection across the globe [WHO]. There are various species of plant which are grown and found widely in the world which have some specific and prominent medicinal uses; they contain many active constituents. Which have direct effects on the human body which are used in both conventional and herbal medicine which also offer benefits that pharmaceutical drugs lack. Does biomedicine offer much better than others?

Berberis vulgaris Commonly known as true Burberry this is hub which usually found in northern West of Himalayas its ayurvedic name is Daruharidraa (var) [Indian herbal remedies vol 1]

Since it belongs to genus burberrys it is a native to semi tropical region of Asia the biggest producers Iran hello which produces batteries vulgaris with 11,000 hectare of land under cultivation before 3000 years ago Chinese dateback the use of Burberrys vulgais different parts of the plant are used in food and Pharmaceutical industry [The British Herbal Compendium, British Herbal Medicine Association.]

There are various and different types of alkaloids in different part of this plant according to the old traditional method it is used to treat fever acute coryza which is commonly known as cold liver disease hyperlipidemia and bleeding B. vulgaris is the most prominently used plant of this genus since it contains alkaloid have it have anti inflammatory antioxidant and hypertensive and hypolipidemic activities .

Taxonomical Classification

KINGDOM :plantae

DIVISION :angiosperm

CLASS : Eudicots

ORDER : Ranunculales

FAMILY : Berberidaceae

GENUS : Berberis

SPECIES : B.vulgaris

BINOMIAL NAME. : B. Vulgaris

Plant part which are used

Root and bark are a part of plant which are used

The B vulgaris contain anti oxidant and alkaloids compound .They also have a good mechanism of action to preventing and treating disease the traditional use of berberis well Gary end various property reported by the various study and research state that it contains large amount of phytochemical material including vitamin K, Several triterpenoids, ascorbic acid , phenolic compounds ,And more than 25 alkaloids that is why these hubs is used in the treatment of cancer diabetes bacterial disease since they have anti cancer antioxidant and anti inflammatory and hepatoprotective effect.

B. vulgaris contains isoquinoline alkaloids such As berberine (BBR) acanthine, bargustanine, Berbamine, berlambine, palmatine and secondary Metabolites such as aesculetin, ascorbic acid, caffeic Acid, pectin and tannin BBR, a type of isoquinoline alkaloid which have a long history of medicinal application, which is the major and active component of B. vulgaris

[Ayurvedic Pharmacopoeia of India, Part I., Vol I to IV) (API), Ministry Of Health, Govt. of India, New Delhi.]. The recent studies have proved that BBR also exhibits several pharmacological activities such as antioxidant, anti-inflammatory, antidiarrheal, antimicrobial and anti-tumor activity Furthermore, BBR has a broad range of therapeutic potential uses including lowering blood glucose, adjusting blood lipids, which increases the insulin sensitivity and consequently also ameliorating resistance to insulin .

Search Strategy

This review was carried out by means of the Databases of Scopus, PubMed and Google Scholar. All The above databases were searched from the available The search words contained MetS, dyslipidemia, Obesity, hypertension, diabetes, COVID , B. vulgaris and BBR. All Articles which included reports of the effect of B. Vulgaris and BBR on MetS were taken into account. The Reference lists contains the articles which were also Explored to identify additional studies.

Sub Topic

Since mentioned above that the Berberis vulgaris contains berberino

So now lethatave a look on That

Effect of berberion on Intestinal function and inflammatory mediators in severe patients with COVID-19 symptoms (BIOFIM)

COVID-19 rapidly spread across the world from China causing thousands of deaths

This study shows that cytokine storm and substituent multiple organ dysfunction one of the main cause of death of patient in COVID similar to SARS CoV infection

The patient with the aged 18 to 80 years who were confirmed with the COVID-19 were enrolled in this study group called as berberine group in general patient word diagnosed with the COVID-19 pneumonia must also meet other of the following criteria like appearing shortness of breath with respiratory rate of over >= 30 times per minute and spo2

[https://clinicaltrials.gov/ct2/show/NCT04479202]

Patient in the berberine group were given about berberine 0.3 gram TID or tube fed daily Duration was for 14 days from the date of infection the patient in the barbarian group was having the problem like nausea abdominal pain diarrhea etc the laboratory test was also performed to evacuate lookaside C- reactive patient and procalcitonin Level at same time the main outcome of the barbarian group was berberine patient in the intervention group receives

berberine daily which causes changes in the diarrhea frequent and Bristol stool scale the person were recovering well with this berberine drugs

In addition to the standard treatment regimen for COVID-19, the berberine hydrochloride capsule (Pharmaceutical grade) 300 mg will be given three times a day for 2 weeks. Berberine capsule (300 mg) is formulated at the School of Pharmacy with the inert ingredients of aerosol and avicel. S2 mom

B vulgaris also contains alkaloid

Alkaloids show potential as treatments for COVID-19

So basically on the basis of the information available and stated

"Basically alkaloids are widely known to be effective within the treatment of varied and harmful diseases like neurological disorders, infectious diseases, cancer, metabolic disorders, and lots of other such diseases which are dangerous. These secondary metabolites from mainly plants also are shown to possess more prominent effects on viruses like influenza viruses, herpes simplex virus, human immunodeficiency virus, and hepatitis C virus."

Major targets of alkaloids in combating SARS-CoV-2. TMPRSS2: transmembrane serine protease 2,ACE2: angiotensin-converting enzyme 2, and SARS-CoV-2: severe acute respiratory syndrome coronavirus-2 [evidence based complementary and alternative medicine ,Vol 2021 Dr Ramya Dwivedi]

A listed list of alkaloids supported in vitro studies and in silico studies with potential and resourceful anti-SARS-CoV-2 activity is presented within the review – alongside the chemical structure, mechanism of action, references and type of study.

While the virus employs different mechanisms like inhibition of the most protease (Mpro) and RNA-dependent RNA polymerase (RdRp), also as interaction with coronavirus-associated structural proteins, alkaloids interact with the coronavirus structural proteins, also because the nonstructural angiotensin-converting enzyme 2 (ACE2) within the cell wall , and inhibit the RdRp and 3-chymotrypsin-like protease (3CLpro).

On combating SARS-CoV-2, the

Out Come

"Hence, the herb / plant which derived many alkaloids like cepharanthine, berberine, lycorine, tetrandrine, ergotamine, crambescidin 786, , noscapine, palmatine and quinine with prominent antiSARS-CoV-2 effects along side antipyretic, anti-inflammatory, antitussive and lung injury, immune modulatory, and protective effects against neurotoxicity, hepatotoxicity

cardiotoxicity, and nephrotoxicity could be promising candidates for COVID - 19 treatment," the researchers summarized and concluded."

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6. Plants used in Ayurveda, Rashtriya Ayurveda Vidyapeeth (National Academy of Ayurveda),

8. A Review: Role of Standard Precautions and Use of Personal Protective Equipment during Pandemic

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Abstract

The flow flare-up of the Covid illness (Covid-19) has gotten a pandemic. All Covid- 19 influenced nations on the planet are carrying out control intercessions and making an honest effort to battle against the sickness to end the further spread of the disease and to decrease mortality. The general population wellbeing labor force and medical care staff in clinical settings are assuming a significant part in the early identification of cases, contact following and treatment of patients. The accessibility of individual defensive gear (PPE) and their reliable, appropriate use by medical services suppliers and general wellbeing experts is a vital factor in fighting any irresistible infection in an emergency.

The necessity of PPE has dramatically expanded, as an ever increasing number of nations are encountering the Covid-19 pandemic. The fast spread of the pandemic has made an impermanent deficiency of PPE in numerous nations, including India. The absence of PPE has influenced the spirit of medical care laborers (HCWs) and other bleeding edge champions in battling the Covid-19 infection, as in excess of 22,000 wellbeing laborers in 56 nations have experienced Covid-19. Some of them have capitulated to it across all nations, including India (WHO). We have audited the accessible writing to comprehend the difficulties in guaranteeing satisfactory accessibility and reliable utilization of PPE and the systems for the levelheaded utilization of PPE in India. Our examination uncovers that India has reacted quickly to upgrade the openness of PPE and set up methodologies for the sensible utilization of PPE to diminish the rate of the Covid-19 contamination to an absolute minimum in medical services settings. In the present article, we report the current status of Covid- 19 among HCWs. We have assessed the

difficulties furthermore; the flood techniques took on by India to deliver or acquire great quality PPE and supply it to all administration conveyance focuses in satisfactory amounts.

Background

This archive sums up WHO's suggestions for the objective utilization of individual defensive hardware (PPE) in medical care and local area settings, just as during the treatment of load; in this unique situation, PPE incorporates gloves, clinical veils, goggles or a face safeguard, and outfits, just as for explicit systems, respirators (for example N95 or FFP2 standard or same) and covers. It is expected for those engaged with disseminating and overseeing PPE, just as general wellbeing specialists and people in medical services and local area settings, and it gives data about when PPE use is generally suitable.

Keywords: Personal protective equipment, PPE, Coronavirus, Covid-19, Health care worker, India

The Situation of the Covid-19 Pandemic in India

As on 19 April 2020, India has recorded 17,265 total infected cases and 543 deaths spread over 32 states and UTs. Of the total Covid-19-infected cases, 2,546 patients (14.75%) have recovered from the infection. The overall case fatality rate is 3.14 per cent (MoHFW-Govt. of India, 2020b).160 Journal of Health Management 22(2)Covid-19 infection among doctors, nurses and other field-level functionaries involved in various duties combating the disease in India has been reported. Two doctors died from Covid-19 in Madhya Pradesh, while several doctors and nurses have been reported with infection from Rajasthan, Maharashtra and Delhi. The Covid-19 infection has been reported among the police and army as well (Deccan Herald, 2020; India News, 2020; The Hindu, 2020; Today News, 2020and Delhi. The Covid-19 infection has been reported among the police and army as well (Deccan Herald, 2020; India News).

Status of PPE Availability and Its Use

Shortage of PPE is reported worldwide due to rise in demand, panic-buying and irrational use (WHO, 2020g). The global shortage of PPE was experienced during the Ebola outbreak of 2014–2016 in West Africa, which resulted in a high number of infected HCWs (900 infected, 500 deaths). A WHO report on the HCWs of Ebola infections in Guinea, Liberia and Sierra Leone from January 2014 through March 2015 concluded that HCWs had a 21 to 32 times greater risk of contracting Ebola due to multiple infection prevention and control failures, including lack of PPE (WHO, 2015). This report highlights the importance of access and

availability of PPE at the right place and right time and of the right quality and right quantity. It also emphasizes prioritizing PPE use by HCWs as per PPE guidelines in such situations. In the current rapidly evolving pandemic of Covid-19 in India, all states and UTs are reporting the disease. The Covid-19 pandemic has resulted in a sudden increase in demand for PPE in all states (Financial Express, 2020). Further spread of the Covid-19 infection in the country in the coming days and weeks may further enhance the demand for PPE. It has not given decision-makers and hospital managers enough time to procure and distribute PPE in adequate quantity.

In such exceptional situations, strategies for increasing procurement and local manufacturing capacities of PPE are warranted, with adequate planning. Government of India (GoI) has promptly taken appropriate and early steps to deal with the increased demand for PPE. GoI has placed orders to import good-quality PPE conforming to standards and simultaneously boosted internal capacity to manufacture PPE in large quantity. The Defence Research and Development Organization (DRDO), India, has developed low-cost and high-volume PPE at a large scale (The Economic Times, 2020d).

Many private sector units also started manufacturing PPE to meet the demand (MoHFW)

Challenges in Augmenting Access to PPE

Commonly, PPE include items such as gloves, safety glasses and shoe covers, earplugs or muffs, hard hats, face cover, masks or respirators, coveralls, vests and full bodysuits. The guidelines issued by GoI on the rational use of PPE kits for Covid-19 focuses on using gloves, coverall or gowns, goggles, N95 masks, shoe covers, triple-layer medical masks and head covers (MoHFW-Govt. of India, 2020d; Occupational Safety and Health Administration, 2020), based on the risk assessment. During the Covid-19 pandemic, access to PPE is one of the key concerns for HCWs' safety. Certainly, the safety of HCWs and other functionaries performing different roles in the containment of Covid-19 pandemic is always a priority.

The PPE shortage resulted due to low buffer stock and lack of preparedness and processes to quickly procure PPE at facilities in situations of unexpected increase in demand. Panic-buying by the general public also contributed to the shortage. The deficiency of PPE represented a test, as it is a significant reason for pressure among HCWs. Specialists what's more, attendants should utilize appropriate PPE while looking at patients in the emergency region or treating patients in an inpatient office or emergency unit). Public HCWs performing field overviews for dynamic reconnaissance in a lockdown circumstance puzzles the difficulties

looked because of long working hours and non-availability or lack of good- quality PPE. Abuse or unseemly utilization of PPE added to the deficiency.

The Coronavirus infection is profoundly infectious. Be that as it may, absence of appropriate logical proof identifying with the nature what's more, destructiveness of SARS-CoV-2 (Coronavirus) makes vulnerability among HCWs and program administrators with regards to the emergency. An examination by Seongman et al. (2020) negated the utilization of careful and cotton veils as defensive measures for patients with suspected or affirmed Coronavirus to forestall transmission (Seongman et al., 2020). The rules on the utilization of PPE by wellbeing laborers suggest that a full set of PPE is fundamental in high-hazard circumstances, while in different circumstances, various things like a clinical veil and gloves are adequate. Other normal difficulties saw in the utilization of PPE were the determination of fitting PPE while managing Coronavirus patients or managing a speculated contaminated individual. The circumstance is further compounded by the elements identified with the accessibility of PPE, utilization rules, abilities of wellbeing laborers as to utilization of PPE and practices of safe removal.

Usage guidelines

The CDC and WHO guidelines on Covid-19 for emergency service providers mention that healthcare providers must adhere to the guidelines for the use of PPE (CDC, 2016; WHO, 2020b), whereas the MoHFW guidelines focus on appropriate selection and use of PPE based on the risk of infection to an individual. The MoHFW-GoI guidelines on PPE use recommend health desk persons and temperature recording station officers to use triple-layer medical masks and gloves in low-risk situations. In moderate- 162 Journal of Health Management 22(2) risk situations, they recommend isolation area workers who are not attending to patients or suspects and sanitary staff to use N95 masks and gloves. In high-risk situations, those directly attending to the patients/ suspects and ICU and laboratory workers are recommended to use the full complement of PPE (MoHFW, 2020b).

Nevertheless, efficient use of PPE by health workers and other functionaries requires intense skill- based training and experience. Indian HCWs have a limited experience of using PPE for the containment and treatment of airborne infections such as SARS in 2003 and isolated incidents like the outbreak of the Nipah virus encephalitis in Kerala (WHO, 2018a). Health workers should be skilled in the selection of appropriate PPE based on risk assessment, and correct and consistent use of PPE is essential for the effectiveness of PPE in preventing

infections. The health workforce is also required to follow the universal precaution of infection control. The rapid transmission of Covid-19 warrants organizing an education programme for training health workers on the correct and consistent use of PPE and on adherence to national guidelines on PPE use. Social media platforms like WhatsApp, Zoom app and other institutional online platforms are used for providing such education programs. Similar programs have been organized by Infection Control and Prevention (IPC) to generate awareness on healthcare associate infections on Covid-19 and its prevention (IPC, 2020) and by the WHO on water, sanitation, hygiene and waste management regarding Covid-19 (WHO, 2020h).

Still, more capacity building efforts for the donning and doffing of PPE and for following infection control protocols of PPE are required, and additional efforts at different levels by the health department might be necessary.

Safe Disposal of used PPE items

Indian HCWs have a restricted encounter of utilizing PPE for the control and treatment of airborne contaminations, for example, SARS in 2003 and confined occurrences like the flare-up of the Nipah infection encephalitisin Kerala (WHO, 2018a). Wellbeing laborers ought to be talented in the determination of fitting PPE dependent on hazard appraisal, and right and steady utilization of PPE is fundamental for the viability of PPE in forestalling contaminations. The wellbeing labor force is additionally needed to follow the widespread precautionary measure of disease control. The fast transmission of Covid-19 warrants putting together a schooling program for preparing wellbeing laborers on the right and steady utilization of PPE and on adherence to public rules on PPE use. Web- based media stages like WhatsApp, Zoom application and other institutional online stages are utilized for giving such schooling programs. Comparable projects have been coordinated by Contamination Control and Prevention (IPC) to create mindfulness on medical care partner diseases on Coronavirus and its avoidance (IPC, 2020) and by the WHO on water, disinfection, cleanliness and waste the board with respect to COVID-19 (WHO, 2020h). In any case, greater limit building endeavors for the wearing also, doffing of PPE and for following disease control conventions of PPE are required, and extra endeavors at various levels by the wellbeing office may be vital.

Strategies for Ensuring Adequate Supply and Rational Use of PPE

'Necessity is the mother of invention'. The rapid spread of the Covid-19 infection resulted in the increased demand for and utilization of PPE by HCWs in discharging different duties while caring for the community at risk of Covid-19. However, lack of technical

troubleshooting capacity and tolerance Sharma et al. 163of PPE in a stressed environment for long hours are a couple of the known contributory factors leading to the faltering in adhering to the guidelines of appropriate PPE use. Fortunately, GoI and institutions have taken quick steps towards correcting the unmet demand- and supply-side issues. We should still be open for other possible options to mitigate this challenge and seek help at the individual or organizational level. While everyone was looking for new ways, we came across a few useful strategies during our literature review. Table 1 summarizes the strategies for enhancing the supplies of PPE and promoting rational use (CDC, 2020a, 2020b; Koehler & Rule, 2020; The Joint Commission, 2020; WHO, 2020g). Beyond increasing the supply, a crucial role of the government is to coordinate efforts to ensure that the areas hardest hit at any given time receive the required PPE supplies on time and in adequate quantity. The state governments and healthcare managers are currently competing for resources, and those resources are not necessarily being distributed based on an actual assessment of need.

Increasing the manufacturing

Call private sector industries and government unites to increase manufacturing to meet rising global demand. Increasing the lifeline of available PPE Extending the lifeline of N95 mask. Permit reuse of respirators by one staff member for multiple encounters with different patients. Reuse of intact PPE that performs adequately for healthcare delivery beyond the manufacturer's shelf life.

Rational use of PPEs

Selection of appropriate PPE based on service delivery activities and assessment of risk of infection. Including reserving sterile gowns and gloves for urgent sterile patient procedures, such as surgery, and reserving respirators for aerosol-generating procedures and patient care with airborne transmitted disease risks, like tuberculosis, measles and varicella.

Alternative approaches

Use respirators that are similar to NIOSH-approved respirators but approved under standards used in other countries. Redesigning of PPE, that is, homemade cotton mouth masks for the general population.

Dealing with negative information

Enhanced monitoring for negative impact (e.g., increased reports of exposure or infection) should be instituted. They may lead to unnecessary stock out from the market and may create anxiety among the population.

Appropriate training

Appropriate training of healthcare workers in donning and doffing of PPE as it has been seen that risk of getting infected increases while removal of PPE.

Burn rate calculation

Institution/facility level burn rate for PPEs should be calculated to deal with unnecessary stock out situation. Burn rate calculator facilitated by the CDC could be very useful. Expanding the assembling.

Recommendation on the Reuse of PPE

Call private area ventures and government joins to expand assembling to satisfy rising worldwide need. Expanding the life saver of accessible PPE Expanding the life saver of N95 veil. License reuse of respirators by one staff part for various experiences with various patients. Reuse of unblemished PPE that performs sufficiently for medical services conveyance past the maker's time span of usability.

Normal utilization of PPEs .Determination of proper PPE dependent on assistance conveyance exercises and appraisal of hazard of disease. Counting holding clean outfits and gloves for earnest clean persistent methods, like a medical procedure, and saving respirators for spray producing systems and patient consideration with airborne sent sickness chances, as tuberculosis, measles and varicella.

Elective methodologies Use respirators that are like NIOSH-supported respirators yet endorsed under guidelines utilized in other nations. Upgrading of PPE, that is, Natively constructed cotton mouth covers for everybody. Managing negative data Upgraded checking for adverse consequence (e.g., expanded reports of openness or contamination) ought to be established. They might prompt pointless stockout from the market and may make nervousness among the populace.

Suitable preparing of medical care laborers in wearing and doffing of PPE as it has been seen that danger of getting contaminated increments while expulsion of PPE. Consume rate estimation Foundation/office level consume rate for PPEs ought to be determined to manage superfluous stockout circumstance. A copy rate adding machine worked with by the CDC could be extremely helpful.

Conclusion

In India, we are today lucky that the lack of PPE has not turned into an emergency. All things considered, we must be prepared with all accessible choices to conquer this difficult

circumstance of expanded interest for PPE prompting the abrupt intense lack, by embracing new ways and developments to battle this unexpected circumstance. We can set up our labor force for various degrees of general wellbeing crises through progressing limit building preparing programs.

Additionally, learnings while defeating these difficulties should cause us to contemplate over setting up our medical services foundation for future pandemics by utilizing the qualities of general society and private areas and initiating a normal review by a perceived, quality body like the Public Accreditation Board for Emergency clinics and Medical care Suppliers (NABH) on upgrading the utilization of value PPE for our medical care experts.

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9. Biodiversity of Dragonfly (Odonata) and Butterfly (Lepidoptera) Surrounding Areas of Wainganga River of Gose Khurd Dam, District Bhandara (M.S.)

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Abstract

Butterflies are very good pollinators in natural environment. The present study on the diversity of dragonflies and butterflies were conducted in the Gose khurd dam surrounding areas of Wainganga river District Bhandara, Maharashtra, India. The study was conducted in January, 2020 to March, 2020. In the study, 26 species of butterflies in different 05 families - Hespirdae (2 species); Lycaenidae (4 species); Nymphalidae (14 species); Papilionidae (1 species); Pieridae (5 species) and Drangonfly has 2 different families Libellulidae (16 species); Gomphidae (1 species) were observed and recorded. The study indicates that there is a good diversity of these insect species due to the dense vegetation and it needs to maintain, preserve and conserve the diversity of such potential pollinator's butterflies.

Keywords: Gose khurd dam, Dragonflies, Butterflies, Diversity, Conservation

Introduction

Gose Khurd Dam is bank of Wainganga river (20°52′25′′N and 79° 36′ 44′′E) is located in a Bhandara District. Gosikhurd Project, was established with an aim of offering irrigation facilities to the villages of Nagpur, Bhandara and Chandrapur districts. The foundation of the dam was laid by Smt. Indira Gandhi, former Prime Minister of India on 23rd October 1984. The dam surrounding area areas are fulfilled with lush green vegetation having large trees, bushy shrubs and long grasses that provide shelter to the butterflies. The good

source of nectar, food plants suitable for egg laying, open sunny space and reduced use of pesticides has resulted in varied species diversity of butterflies in the area.

Of late, we are rapidly losing greenery in the name of development. There has also been an alarming rise in industrial and automobile pollution in Indian River. With the shrinking of greenery and increase in pollution, butterflies, birds and all our wildlife are fast disappearing. The net result is a complete imbalance of the ecosystem and extinction of many species. In spite of the fast growth, Indian cities still have diverse serene habitats such as the traffic island gardens in the middle of busy roads, parks or urban forest areas with mixed deciduous and non-deciduous trees and scrubland serving as ideal habitats for various types of insects, especially butterflies. Institutional campuses with undisturbed natural vegetation and seasonal flowering plantation provide potential habitat for butterfly population as they are devoid of any developmental activities and pollution.

Butterflies are generally regarded as one of the best taxonomically studied group of insects. Worldwide there are more than 28,000 species of butterflies, with about 80 percent found in tropical regions. The Indian subcontinent bearing a diverse terrain, climate and vegetation hosts about 1,501 species of butterflies (Gaonkar, 1996). Butterflies enable sustenance of ecosystem services through their role in pollination and serving as important food chain components. Being potential pollinating agents of their nectar plants as well as indicators of the health and quality of their host plants and the ecosystem as a whole, exploration of butterfly fauna thus becomes important in identifying and preserving potential habitats under threat.

Although much attention in conservation biology is directed towards large scale coastal and inland ecosystem, the smaller ecosystems have contributed disproportionately to regional diversity, largely because of their high beta diversity (compositional dissimilarity among sites). They not only offer a powerful potential for studies in ecology, evolutionary- and conservation biology, but also are good model systems for large scale surveys (Meester et al., 2005). In addition, they provide migration corridors and stepping stones for biota (Mitchels & Merriam, 1991). Ponds and lakes are vital for providing new opportunities for irrigation farming, fisheries development, transport and recreation.

Many lakes and reservoir have been impounded in India to provide a continuous water supply and provide an opportunity to investigate the seasonal variation in physiochemical and biological factors. The use of invertebrates to determine the level of diversity of indicator

groups of an ecosystem and for prediction for the presence of other taxa is now being well recognized (Olive and Baettie, 1993; Das et al., 2012). Odonates being voracious predators both as larva and adult play a significant role in a wetland ecosystem. They feed on various vectors of medical and veterinary importance and also help in control of agricultural pest. Their value as indicators of quality of the biotope is now being increasingly recognized.

Materials and Methods

Study Area

Fig: Study area Gose khurd dam

Gose khurd dam area tropical wet and dry climate with dry conditions prevailing for most of the year. It receives an annual rainfall of 1,205 mm (47.44 inches) from monsoon rain during June to September. Summers are extremely hot, lasting from March to June, with May being the hottest month. Winter lasts from November to January, during which temperature drops below 10°C (50°F)' The Gose khurd Dam, located in Maharashtra, India, is a 168.91m (554 ft) tall arch dam.

In the present investigation an attempt has been made to carry put the documentration of Dragonflies and butterflies diversity in Gose Dam District Bhandara (MS).

The findings presented here are based on random surveys carried out from July, 2019-April, 2020. The survey was conducted from morning 10 am. till 4 p.m. in the afternoon with the help of a binocular. Dragonflies and butterflies were photographed from different angles as often as possible to obtain sufficient photographs to enable positive identification of species.

Photographs were taken with a digital camera canon camera. Dragonflies and butterflies were primarily identified directly in the field with the help of field guides followed by photography, and rarely by capture.

Collection was restricted to those specimens that could not be identified directly. In such cases, specimens were collected with handheld aerial sweep nets, placed in an envelope

and carried to the laboratory for further identification with the help of a field guide. All scientific names followed in the present study are in accordance with Varshney (1983) and common English names follow Wynter-Blyth (1957). The observed Dragonflies and butterflies were categorized according to their family.

Result and Discussion

Total 16 species of dragonflies belonging to 2 families (Libellulide and Gomphidae) and 14 genera were reported in represent study. Libellulidae consists of maximum number of genera and species while family Gomphidae is represented by single species Ictinoghomphus rapax.

Dragonflies are a predaceous, hemimetabolous and amphibiotic insect which inhabits all kinds of freshwater habitatat (Silsby, 2001). Allover world 11 dragonfly families of which Libellulidae (972) and Gomphidae (958) are major family were reported ((Subramnian, 2009). In Indian peninsula, major species are studied under family Libellulidae (50) followed by Gomphidae (27), Macroomiidae (17) and Aeshnidae (8) (Shende and Patil, 2013). 45, 9, 8 and 3 species of family Libellulidae, gomphidae, Aeshnidae and Cordulegasteridae were recorded from Orissa and Eastern India (Nair, 2011). In Chatri lake region, in Pohara- Malkhed Reserve Forest, Amravati, Maharashtra (India) 22 species of dragonflies and damselflies of 4 families and 17 genera were reported (Manwar et al, 2012). In Gorewada International Biopark, 34 species of dragonflies of 24 genera and 4 families (Gomphidae, Aeshnidae, Libelllulidae and Macromiidae) were recorded (Shende and Patil, 2013). Present study also elaborated the point that Family Libellulidae is most dominant group of dragonflies in Indian peninsula.

In Indian Agricultural Research Institute, New Delhi India, 125 species of damselflies of 10 families were recorded (Sharma et al., 2009). In western ghat, 67 species of damselflies of 8 families and 29 genera were reported of which 25 were endemic (Subramanian et al., 2011) Maximum number of species were reported in Family Coenagrionidae (25 species) followed by protoneuridae (15 species), Platystictidae and Lestidae (8 species), Euphaeidae (4 species), Chlorocyphidae and Calopterygidae (3 species) and only two species were reported in Family-Platycnemididae of damselflies in the Western Ghats (Subramanian et al., 2011). In Chatri Lake Region of Pohara-Malkhed Reserve Forest, Amravati, Maharashtra (India), total 9 species of damselflies of which 8 species were belonging to the family Coenagrionidae and single species from family Platycnemididae were reported (Manwar et al., 2012).

During the months July 2010 to June 2011, Tijare and Patil (2012) were observed 8 species of damselflies in and around Gorewada International Biopark, Nagpur; of which 5

species belonging to Family Coenagrionidae, 2 species from Lestidae and 1 species from Platycnemididae. However, in the same study area later on 21 species of damselflies of 9 genera and 3 families (Coenagrionidae, Platycnemididae and Lestidae) were reported (Patil et al., 2014).

Among observed butterflies, family Nymphalidae are dominant family (53.8 %) followed by Peridae (19.23 %), Lycaenidae (15.38%), Hesperidae (7.69 %) and Papilionidae (3.85 %). Same type of dominance by Nymphallidae were reported in butterfly diversity in University Campus of SGB Amravati University, Amravati (Tiple et al., 2006), in and around Nagpur (Tiple and Khurad, 2009) and in Ankua Forest of Jharkhand (Singh, 2010). Total 48 species of butterflies of 5 families were recorded in University campus of SGB Amravati University, Amravati (Tiple et al., 2006). 145 butterflies species were recorded in Nagpur region (Tiple and Khrad, 2009). Overall 71 species of butterflies representing 5 families and 56 genera were reported in Ankua Reserve Forest (Singh, 2010).

On and side of Gose Dam area of Wainganga river basin. These basin help the breeding activities of Dragonflies and Butterflies which in turn support the diversity and abundance of dragonfly in river area. Greenery and recently planted trees surrounding river area also support the sustenance of dragonflies, and butterflies.

The findings of the present study underline the importance of biodiversity among as a preferred habitat for Dragonflies and butterflies. If the maintenance of river basin areas are carefully planned, then the diversity of Dragonflies and butterflies may increase in river basin areas providing a rich ground for butterfly conservation as well as for research. This study will also add to our future attempts in understanding the complex nature of mutualistic interaction between butterflies and flowering plants that is essential for continuity of ecosystem services. This is the first effort in exploring the Dragonflies and Butterflies wealth of Gose khurd Dam river basin area. The present list of Dragonflies and butterfly species is not conclusive and exhaustive and future exploration will be continued to update this checklist.

Sr. No	Family	Common Name	Scientific Name
1	Libellulidae	Ditch jewel	Brachythemis contaminata
		Granite ghost	Bradinaopyga geminata
		Yellow Patched Lieutenant	Brchydiplax chalybea
		Ruddy marsh skimmer	Crocothemis servilia
		Ground skimmer	Diplacodes trivialis
		paddy skimmer	Neurothemis tullia

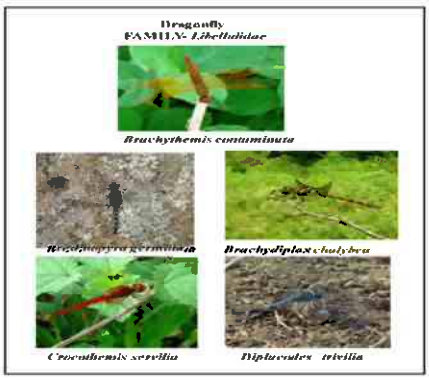
		Crimson Tailed Marsh Hawk	Orthetrum pruinosum
		Wandering Glider	Pantala flavescens
		Yellow Tailed Ashy Skimmer	Potamarcha congener
		Common Picture Wing	Rhyothemis variegata
		Coral Tailed Cloud Wing	Tholymis tillarga
		Coral Marsh Trotter	Tramea virginia
		Violet Dropwinng	Trithemis annulata
		Crimson Marsh Simmer	Trithemis aurora
		Long Legged Marsh Skimmer	Trithemis pallidinervis
2	**Gomphidae**	Common Clubtail	Ictinogomphus rapax

Table 1: Familywise distribution of Dragonfly

Sr. No.	Family	Common Name	Scientific Name
1	**Hespiridae**	Skipper	Hespiridae comma
		Indian skipper	Spialala galba
2	**Lycaenidae**	Common pierrot	Castalius rosimom
		Grass jewel	Chilodes trochylus
		Gram blue	Enchyrosops cnejus
		Common cerulean	Jamides celeno
3	**Nymphalidae**	Plain tiger	Danaus chrysipus
		Stripped tiger	Danaus genitia
		Common crow	Euploea core
		Baronet	Euthalia nais
		Great eggfly	Hypolimnus bollina
		Danaid eggfly	Hypolimnus nusippus
		Peacock pansy	Junonia almona
		Chocolate pansy	Junonia iphata
		Lemon pansy	Junonia lemonias
		Blue pansy	Junonia orithya
		Common brushbows	Mycalesis persesus
		Common sailor	Neptis hylas
		Common leopard	Phalanta phalanta
		Blue tiger	Tirumala limniace
4	**Papilionidae**	Papillo hectar	Pachliota hectar
5	**Pieridae**	Indian pioneer	Belenois aurota
		Common emmigrant	Catopsilia pomona
		Mottled emigrant	Catopsilia pyranthe
		Common gull	Cepora nerisa
		Common jejebel	Delius eucharius

Table 2 : Familywise disrtribution of Butterflies

Photographs




Family Hesperiidae
Hesperia comma
Spialuta gutha


FAMILY –Lycaenidae
Castalius rosimon
Chilades trochylus
Enchyrosops enejus
Jamedescelena


FAMILY-Nymphalidae
Danaus chrysipus
Danaus genitia
Euploea core
Euthalia nais


FAMILY-Nymphalidae
Hypolimnus bolina
Hypolimnus nusippus
Junonia almona
Junonia iphata


FAMILY-Nymphalidae
Junonia lemonias
Junonia orithya
Mycalesis perses
Neptis hylas
Phalata phaluntа
Tirumala limniace


FAMILY-Papilionidae
Pachliopta hector

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10. Spices and Ayurvedic Plant - Ashwagandha and Tulsi

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Abstract

The outbreak of corona virus disease Covid-19 at the end of 2019 caused by SARS-CoV-2 has become global pandemic in a very short time span. Ayurvedic Rasayana therapy was traditionally used in India for its immunomodulatory i.e. ayurveda is an ancient practice which can help to boost one's immunity during pandemic situation.

The important role in ayurvedic rasayana therapy is played by Withania Somnifera (Ashwagandha), Asparagus racemosus (Shatavari) and Ocimum tenuiflorum (Tulsi). Several treatment options are available in ayurveda for enhancing the immunity against many serious illness like respiratory illness, heart problem, etc. include certain immunomodulatory also known as Rasayana.

Keywords:- COVID, SARS-CoV-19, Pandemic, Ayurveda, Immunity

Introduction

An outbreak of Pneumonia in Wuhan, China on December 2019 has later been determined to be caused by a novel coronavirus. It was basically named as Severe Acute Respiratory Syndrome Coronavirus 2 (SARS - CoV- 2). The disease was spread to 185 countries with more than 2.06 million confirmed million cases and more than 1,34,354 deaths up till April 16, 2020. By July 2020, India became fourth worst hit country worldwide due to Covid-19 after US, Brazil and Russia. Ayurveda is consider to be traditional medicine system as it have a holistic approach of considering mind and body. [Elsevier Public Health Emergency Publications].

Ayurveda known as 'The Science of life' is based on the holistic principle of life, health and healing system which is practiced in Indian Subcontinent since ancient times. While there were no specific treatments of Covid-19, the AYUSH government of India suggested to boost up the immunity. The Ayurvedic text describes the group of rejuvenate methods that impart biological nourishments to the body tissues. The Apollo Hospital nutritionist recommended many Ayurvedic products to be consumed for boosting the immunity. Ayurvedic text describes many medicinal plants and their wide range of therapeutic potentiality in curing many diseases. [Apollo Cardiologist, Apollo Hospital].

Taxonomical Classification

1. **Tulsi**

KINGDOM - Plantae
DIVISION - Magnoliophyta
PHYLUM - Spermatophyte
CLASS - Magnoliopsida
SUBCLASS - Rosidae
ORDER - Lamiales
FAMILY -Lamiaceae
GENUS - Ocimum
SPECIES - Ocimum Tenuiflorum
BINOMIAL NAME - Ocimum Tenuiflorum

2. Ashwagandha

KINGDOM - Plantae
SUB KINGDOM - Tracheobionta
DIVISION - Magnoliophyta
CLASS - Magnoliopsida
SUBCLASS - Asteridae
ORDER - Solanales
FAMILY - Solanaceae
GENUS - Withania
SPECIES - Withania Somnifera
BINOMIAL NAME - Withania Somnifera

Uses of Tulsi

Due to Covid - 19 pandemic, everyone got a late realization over the role of immunity to fight against COVID - 19. Tulsi has a very special place in ayurveda and is considered sacred as it has a wide range of healing properties.

With the antimicrobial properties Tulsi is very much useful for treating bacterial and fungal infection as well as immunological disorders which can be allergies and asthma. Tulsi is basically rich in Vitamin C and in Zinc and tulsi also acts as a natural immune booster that keeps almost all types of infections at bay. [Journal of research in ayurvedic science Vol 4(3)]

The principle constituent present in Tulsi is Methyl Chavicol, Eugenol and Linalool. Tulsi is also rich in antioxidant and in antimicrobial properties as well as immunomodulatory activity due to the presence of Eugenol. During the defence mechanism against Covid-19 Tulsi enhances immune response to boost against the infection.

Hence tulsi is considered as a best source to boost immunity and gain health. Several studies done by the experts suggests that tulsi not only improves the vital capacity but also act as immune-modulator and regulator as it enhances immune response by increasing the quality of T-helper cells and NK cells. [DSB Campus, Department of Chemistry].

Uses of Ashwagandha

Ashwagandha is also known as Winter Cherry and in Latin it is known as Withania Somnifera. Many studies have found that naturals compounds present in Ashwagandha and Propolis can be effective anti COVID-19 drug. These studies also warned that although these compounds are found easily and are its affordable but one has to be cautious about the content of bioactive ingredient. In a colaborative study by DAILAB, Japan has discovered that Ashwagandha may hold an efficient anti - COVID - 19 drug.

Ashwagandha has the power that helps in healing the body infections and symptoms of viral cold and cough. Hence it is considered to be a modern superfood. [International Journal of Botany Studies Vol 5(6)].

Ashwagandha has naturally immune boosting properties that helps to deal with Chronic Stress and Fatigue which comes with viral infections. It is also known as an ayurvedic vitalizer as it is good for heart and the body. It is also used against inflammation. The vedic texts describes a lot about Ashwagandha having benefits over the nervous and the endocrine system as it is used to calm Anxiety. [Journal of Ayurveda and Integrative medicine Vol 12(3), AYUSH Ministry and Dabur India Ltd].

Search Strategy

This study was conducted by analizing the available news reports, case studies and different government and nongovernment organizational information from reports and websites. Scientific data were collected through electronic means from the DSB Campus, Times of India, Journal of research in ayurvedic science, PLOS ONE, AYUSH Ministry, Dabur India Ltd, India

today web desk, Organic India, Apollo Cardiologist. After analyzing the available data from different sources, this article contains information relevant to the topic of review.

Conclusion

Covid-19 has turned into a global pandemic and it is an evolving disease triggered by SARS-Co-2. In this paper we have focused over the Covid-19 from the perspective of Ayurveda. The mild, moderate or severe and critical stages of COVID - 19 can be analysed on the basis of ayurvedic text.

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11. Study of Effect of Magnetized Water on Physico - Chemical Parameters of Soil

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Abstract

Water is considered to be the foremost necessary physiological and organic chemistry parameter in growth and development of any plant. it's the dissolver and forms nearly seventy to ninetieth a part of the cell sap in any cell at given purpose of your time. it's been seen that the water is simply magnetic thanks to its dipole structure and may enhance bound activities of the plants relating morphological, organic chemistry, physiological and cytologic aspects. What we'd like could be a magnet of identified power and handiness of water. By merely immersing magnet of identified power within the water, the water is magnetic in twenty-four hours. Bharat being Agricultural Country, still regarding sixty fifth of population depends upon the sphere of agriculture for its food and daily commodities. If we will use magnetic water for qualitative furthermore as quantitative improvement of the agricultural crop while not use of varied manures, fertilizers and pesticides; it is a remarkable revolution not solely within the country however field of agriculture everywhere the planet. to review the impact of magnetic water on the crops, we'd like to initial take a look at its impact on the physico-chemical parameters of the soil. Hence, within the gift studies we've got studied the result of magnetic water on physico - chemical parameters of the soil.

Key Words: Magnetic Water, Hardness of water, Physico - Chemical Parameters,

Introduction

Water Associate in Nursing dissolver, fashioned largely thanks to its 3D network of bond within the molecular type. Water is additionally identified to act as a solvent, as a chemical, as a molecule with a cohesive property, as Associate in Nursing atmosphere and a temperature stabilizer (Ibrahim, 2006). No different liquid will replace water. In recent years, analysis is completed within the field of magnetic microspheres, magnetic nanospheres and magnetic fluids and their interaction and applications within the biological systems.

Numerous techniques that relies on mistreatment magnetizable solid section support numerous biological fields like medical specialty, drug targeting, biological science, cell isolation and purification (Safarikova and Safarik, 2001). Studies on Mammilaria duwei cultivated in substance supplemented with magnetic fluids showed hyperbolic metabolic activities in living tissues (Corneanu et.al. 1995). Being, a region of the atmosphere and supply of energy, magnetic flux (MF) effects traditional metabolisms (Belyavskaya et al., 1992) and has impact on plant tissue cellular division (Aladjadjiyan, 2007). Additionally, radio frequency affects water absorption, preservation and ionization (Taia et. al., 2007). Forces generated by radio frequency could cause magnetophoresis in macromolecules of water (Paul et al., 2006). Metabolic substances like plants light-weight harvest home pigments may well be stricken by radio frequency. it's been found that a rise happens in physico-chemical reactions of plants beneath magnetic flux, that contains a positive impact on chemistry activity, respiration quantitative relation and biological activity (Phirke et. al., 1996; Martinez et. al., 2000; Carbonell et. al., 2000).

Fluid that changes its characters once comes up-to-date with magnetism referred to as Magnetic fluid, that stimulates the plant metabolism in graminaceous plants thanks to economical mechanism of iron acquisition (Crowley, 1991). Water and life are joined closely. Water is important to begin to finish of life on the planet because the key issue (Trevors and Pollack, 2005). It's been found that physical and chemical properties of water are modified once it's magnetized. N. Hirota et. al. (1999) studied the result of non-uniform magnetic flux on germination of plants and revealed a report on it. M. Mathur and autoimmune disease Zhang (2000) reportable result of static magnetic attraction field on the foundation hairs of radish. Exposure of the seeds in to the magnetic flux for a brief time was useful in and overall growth of early development the seedlings (Carbonell et. al., 2000). it's been additionally studied that once seeds are treated with magnetic flux it ends up in acceleration of plant growth, macromolecule synthesis and root development (Chao and Walker, 1967). Ran et. al. (2009) reportable that once water move through a magnetic flux, it will increase the quantity of water molecules within the cubic content unit and additionally will increase the flexibility of water molecules to soak up nutrients. numerous analysis and findings on magnetic water helps U.S.A. to grasp and believe that irrigation with the magnetic water will increase the absorption of minerals and nutrients by the plants and as a result will increase the expansion and yield. Hence, plant will absorb magnetic water a lot of simply once it compared with non-magnetic water and

causes overall growth and development of the plant by increasing and rising nutrient absorption and dissolve minerals within the soil and therefore the water (Xiao-Feng and Bo, 2008; Ran et al., 2009).

One among the harmless technologies that is considered in recent years by the researchers of the agricultural science to extend plant productivity and additionally increase the water productivity through a magnetic flux before irrigation (Maheshwari and Grewal, 2009; sculptor and Yotvat, 1990; Xiao-Feng and Bo, 2008; Panda et. al., 2004).

Considering the importance of result of magnetic water, we'd like to require up numerous analysis comes centered on the result of magnetic water on plants.

Regarding this matter, some work on result of magnetic water with variable temperature on growth of Penicillium chrysogenum (Vinit Vaidya et. al., 2016) had performed and thus, within the future studies, we've got centered on the study of result of magnetic water on physico - chemical parameters of the soil as extension of the sooner work our laboratory.

Materials and Methods

The experiments were carried out in two steps as Developing magnetization of water and Detection of physicochemical parameters.

Step 1: Magnetization of Water

1. Regular tap water taken and water was magnetized by using a round magnet of 0.50T for 24 hours.
2. Two pots of medium sized were filled with the garden soil.
3. One pot was watered with regular tap water while the other pot was watered with magnetized water. The process was continued for consecutive 14 days and then the results were recorded.

Step 2: Detection of various physico - chemical parameters of Soil after treating with Magnetized Water

i. Carbonate Content - A little amount of each of the different soil samples were taken in different test tubes. A few drops of dilute HCL were added to each tube and degree of difference were noted.

ii. Nitrate Content- Soil extract was prepared with different soil samples. A small amount of each solution was taken on a white spot plate. 2-3 drops of DPA (Diphenylamine) and 2-3 drops of Conc. H_2SO_4 (0.2%) was added in to each sample. The degree of intensity of blue colour was noted for each soil sample.

iii. Sulphate Content- A small amount of soil solution was taken in different test tubes and a few drops of $BaC1_2$ was added to each test tube. Formation of White ppt. indicates the presence of $S0_2$.

iv. Organic Matter- A little amount of each of the different soil samples was taken in different test tubes. A few drops of H_2O_2 was added to each test tubes and degree of difference in each was noted.

v. Base Deficiency- A little amount of soil sample of different types was taken in different test tubes. 1 ml of saturated alcoholic solution of ammonium thiocyanate was added in each test tube and shaken. Then the tubes were kept for some times and solids were kept allowed to settle down. A drop of H_2O_2 was added to the clear supernatant fluid and the degree of intensity of red color produced was noted.

vi. Cation Exchange Complex (CEC) -

CEC = (ml of $BaCl_2$ + 0.02 N x 100 x 7) / of soil (gm)

Placed 1, 2 and 5 gms of soil in separate test tubes and added 10 ml of water to each tube containing soil. It was shaken, filtered and 1 ml of sample extract was collected from each test tube. 0.1 ml of$BaC1_2$ solution was put in another test tube and to this, 0.9 ml of distilled water was added and a drop of K_2Cr2O_7 solution was added to each 1 ml sample and shaken. The amount of yellow Barium Chromate ppt. indicated the amount of Barium in filtrate. Compared the ppt. to the reference and estimated the ml of $BaC1_2$ solution necessary to make the filtrate give some amount of the ppt. as the reference. The procedure was repeated with different amounts of soil.

vii. Water holding capacity = $\left(\frac{\text{Water retained by soil}}{\text{Weight of soil}}\right) \times 100$

i. A dry, clean Whatman's filter paper was placed in Buchner's funnel fitted to a clamp stand.

ii. 1 ml of water was poured with a pipette to wet the filter paper. The excess of water was collected in a Petridis. The water absorbed by the filter paper was calculated.

iii. 100 g of soil was weighed and put in the funnel. Water was poured with a pipette, on the soil, uniformly till a few drops of water spill out.

iv. The volume of excess water was measured.

v. The water retained by the soil was calculated as: Water retained by the soil - Total amount of water added- water absorbed by filter paper & excess water collected in beaker.

vi. The water holding capacity was calculated.

viii. Hardness of Water by EDTA titrimetric method

- Buffer solutions (16.9g of Ammonium chloride, NH4Cl in 143ML. NH4OH raise the volume to 250 ml by adding distilled water).
- FBT- Frio chrome Black - I indicator. (0.5g of sodium salt of FBT + 100ml tri-ethanolamine, dissolve and store in brown bottle.
- EDTA 0.01 M (3.72g of disodium EDTA+ 50ml distilled water, mix well raise the volume to 150 ml store in a bottle).
- In 10 ml of water sample in conical flask, add 1mL of buffer solution and shake the contents well. Add a few specks of FBT powder & mix well.

Observations and Results

Table 1: Study of Physico - Chemical Parameters of the Soil

Sr. No.	Parameters	Normal Water	Magnetized Water
1	pH	6.00	6.00
2	Water Holding Capacity	56 ml	64 ml
3	Sulphate	0.17 mg	0.48 mg
4	Nitrate	0.30 mg	0.35 mg
5	Organic Matter	0.04 gm	0.04 gm
6	Base Deficiency	0.05	0.07
7	Cation Exchange Complex		
a)	1 gm	0.024	0.016
b)	2 gm	0.021	0.012
c)	5 gm	0.012	0.007
8	Hardness of water	260mg/l	260mg/l

According to Table No. 1 seven parameters of the soil and 1 parameter of water namely pH, water holding capacity, sulphate, nitrate, organic matter, base deficiency, cation exchange complex and Hardness of water respectively have shown significant differences in normal and magnetized water. The pH of soil in both cases is 6.00. The water holding capacity of the soil for normal water is 56 ml and it is 64 ml for the magnetized water. The soil treated with normal water shows presence of 0.17 mg of sulphates present in it while that of magnetized water it is

0.48 mg. The soil treated with normal water shows presence of 0.30 mg of nitrate and in case of magnetized water the value is 0.35 mg. As far as organic matter content of the soil is concerned, in both the cases the value remains unchanged i.e. 0.04 gm. Base deficiency of the soil treated with normal water is 0.05 while of the soil treated with magnetized water is 0.07. The values of cation exchange complex for normal water are 0.024, 0.021 and 0.012 for 1 gm, 2 gm and 5 gm resp. The values of cation exchange complex for magnetized water are 0.016, 0.012 and 0.007 for 1 gm, 2 gm and 5 gm resp. And at last the Hardness of water for both Normal and magnetized water were remain the same i..e 260mg/l. According to WHO, the hardness range of portable water is 70-300 mg/L. Hence the water sample is portable as it is in the range prescribed by WHO.

Conclusion

The observations and results clearly portrait that the soil treated with magnetized water is giving better results as compared to the soil treated with normal water. If the soil for the crop is showing enhanced results, it can definitely lead to the enhanced quality as well as quantity of the crop.

Chemical Tests for Various Parameters

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12. Study of Isolation and Antibiotic Spectrum of Microorganisms in Air at Different Railway Junction Suburbs in Mumbai

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Abstract

The presence of aeroallergens will be of nice significance in humans as they cause severe hypersensitivity and that they accommodate bacterium, plant spores, organic dirt or spore grains. Many people commute at completely different components of urban center town and western Railway is one in all the key mode of communication. Even supposing we tend to during this Covid Pandemic many of us use railway as a mode of communication. To understand regarding the microflora of those station and doing the antibiotic susceptibleness Antibiotic susceptibleness and understand the tendency of those organisms to cause illness. During this pandemic this deals with one in all essential finding that we must always understand and will take preventive steps.

Keywords: Aeroallergens, Antibiotic susceptibleness, microflora, pandemic.

Introduction

The general public ar exposed to some environmental factors (bioaerosol) that influence their health and wellbeing. so there has been a growing interest in air bug studies in recent years. The aim of these studies isn't solely estimation of the mobile microorganism however conjointly their identification and also the determination of things influencing bioaerosol composition. Biological contamination of air is usually caused by bacterium, moulds and yeast. They'll be dangerous as morbific living cells however they'll conjointly secrete some substances harmful for health. These are completely different styles of noxious metabolism product, for instance mycotoxins. Epidemiologic studies show that too high concentration of

microorganisms within the air will be allergenic; but typically, even terribly low concentration of some specific microorganisms will cause serious diseases. it's supposed that regarding half-hour of health issues relevant to the air quality is that the results of an individual's organism's reaction to moulds. plant flora will be dangerous for health, significantly in rooms with heating ventilation and air-conditioning (HVAC) systems and may breed allergies, unhealthy wellbeing, tiredness, headaches, vertigo, decrease of concentration, memory and intellectual work ability, dermatosis, metabolism diseases (including asthma) and cancers. the number of morbific microorganisms is higher in indoor than outside air.

Fungi are typically plant morbific. There are relatively few species that are morbific to animals, particularly mammals. In keeping with Hawksworth (1992), there are just about 1.5 million represented species of fungi. Quite four hundred species are celebrated to cause illness in animals, and much fewer of those species can specifically cause illness in kinsfolk. Several of them can cause solely superficial styles of diseases that are a lot of a cosmetic than a pathological state. Thus, there aren't several species of fungi that are morbific to human that may be fatal. The study of Fungi as animal and human pathogens is understood as medicinal botany. There's conjointly a branch known as veterinary botany however the kinds of diseases that are found within the pets are usually an equivalent as are found in in kinsfolk. Due to the rarity of human diseases caused by Fungi, there's less data of such diseases. Roman scholar, Marcus Terentius scholarly person (116BC-27BC) suspected that illness was caused by very little animals within the air.

In 1674, Anton Van microbiologist became the primary person to check and describe numerous microorganisms. He continuing to look at the microorganisms till his death in 1723. In 1841, David Gruby incontestable for the primary time that a plant infection of the scalp, known as fungal infection, was caused by a plant (in Rippon, 1988). In 1890 Sabouraud began commercial enterprise giant numbers of articles on plant disorders of the skin and eventually gave monumental contribution to the sphere of medical botany. It'd not be till 1934 that species ideas of dermatophytes would be redefined by Chester Emmons, in keeping with the foundations of biology word, and current mycological standards of reproductive structure morphology and also the structures on/in that they were borne.

The first case of mycosis was represented in Argentina shortly before 1890; the patient suffered for seven years before finally dying and by 1915, there have been forty identified cases of this illness, that was thought to be a rare and universally fatal.

However, by now it absolutely was already celebrated that there was an illness known as coccidiomycosis, that wasn't associated, at that point, with C. immitis. it'd not be till Dickson (1937) that it absolutely was accomplished that coccidiomycosis was simply a milder type of mycosis, that was conjointly represented by Fiese, M. J. 1958. Dickson & Gifford (1938) winding up coccidioidin diagnostic test of old residents of composer County incontestible that 50-70% have, at it slow been infected by this plant. Aspergillus fumigatus may be a species a species advanced instead of one species. it's truly composed of 10 species. These species are normally found in decaying vegetation, particularly once the latter is undergoing microbiological heating, as a result of this advanced is thermophilic, tailored to growing at high temperatures i.e. 55°C (120-130°F). In people, the illness will result in a chronic respiratory organ infection that is seemingly terribly contagious. The plant is believed to cause death, however that's not sure. In patients that have died, and A. fumigatus has been isolated, several have conjointly had underlying illness that presumably down their resistance to the plant. However, it's conjointly attainable that the plant had down their resistance to the opposite infective agents. it's tough to understand what came 1st.

There are many of us who commute at completely different components of those terminal and also the samples collected at these places. thence it absolutely was necessary to understand regarding the aeromicroflora and aeromicroflora of various suburbs of the stations at this covid pandemic. This conjointly tells North American nation regarding the air quality of the various station that is admittedly necessary at this pandemic time.

Materials and Methods

Isolation of air micro flora was done by using Gravity Settling method. For this Nutrient Agar plates and sabouraud dextrose plate was used.

For preparation of nutrient agar, 28gms of nutrient agar was added to 1lit distilled water and the medium was sterilized at 120°c and 15 lbs pressure. 20 ml of sterilized NA was poured into sterile petri plates and medium was allowed to cool till solidified.

For preparation of Sabouraud dextrose agar, 65gms of nutrient agar was added to 1l distilled water and the medium was sterilized at 120°c and 15 lbs pressure. 20 ml of sterilized NA was poured into sterile petri plates and medium was allowed to cool till solidified.

For preparation of Muller Hinton agar, 38gms of nutrient agar was added to 1l distilled water and the medium was sterilized at 120°c and 15 lbs pressure. 20 ml of sterilized NA was poured into sterile petri plates and medium was allowed to cool till solidified.

In this method we will take petri plates with growth media in it and will open the plates at different locations of railway station. One petri plate will contain Nutrient agar and another will contain Potato dextrose agar. These media are suitable for the growth of all microbial and fungal cultures to grow well.

Antibiotic susceptibility test was done on Muller Hinton agar with different antibiotic disk used and zone of inhibition was Measured. The Antibiotics used are: Ampicillin – AMP; Gentamicin – G10; Oxacillin – OX; Penicillin – P10; Nitrofurantoin – NIT; Vancomycin – VA; Carbenicillin – CB; Tetracycline – TE. Different Organisms were selected from the petri plates and specific naming were given to them.

Locations of Western Line Railway station

Sr. No.	Railway Station Name	Latitude	Longitude
1	Churchgate	18.9353^{0}N	72.8272^{0}E
2	Mumbai central	18.9696^{0}N	72.8194^{0}E
3	Dadar	19.0181^{0}N	72.8434^{0}E
4	Bandra	19.0625^{0}N	72.8413^{0}E
5	Andheri	19.1198^{0}N	72.8465^{0}E
6	Borivali	19.2291^{0}N	72.8574^{0}E
7	Virar	19.4550^{0}N	72.8119^{0}E

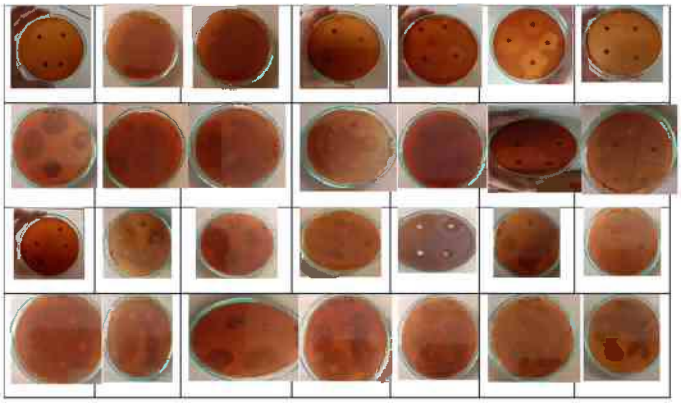
Photoplate.1: Collection of samples at different Railway Junction

Result and Discussion

1. Antibiotic Susceptibility test by kirby Bauer method

Sr. No	Antibiotic→ Station↓	AMP	G10	CB	TE	VA	P10	NIT	OX
1)	C-1	1cm	1.2cm	1cm	1.5cm	1.5cm	1.4cm	1.5cm	0.8cm
2)	C-2	1cm	1cm	R	1cm	1.5cm	1.1cm	1.3cm	0.5cm
3)	C-3	1cm	1.5cm	1.2cm	1.5cm	2cm	1.2cm	1cm	1.2cm
4)	C-4	1cm	2cm	1cm	1cm	1.2cm	1cm	1.5cm	0.4cm
5)	MC-1	R	1.2cm	R	1.3cm	2cm	R	1.5cm	R
6)	MC-2	1cm	1.8cm	2cm	1.5cm	1cm	2cm	1.5cm	0.5cm
7)	MC-3	1.5cm	1cm	R	1cm	1.2cm	1cm	1cm	R
8)	B-1	1.2cm	1.2cm	1cm	1.5cm	1.2cm	2cm	1cm	0.6cm
9)	B-2	1.2cm	1.3cm	1.5cm	2cm	1.4cm	R	1.5cm	0.6cm
10)	B-3	1cm	2.8cm	1cm	2.8cm	1.6cm	2cm	2.5cm	1cm
11)	B-4	1cm	1.5cm	1cm	0.8cm	0.5cm	2cm	2cm	0.8cm
12)	B-5	0.5cm	2cm	0.2cm	1.9cm	1.5cm	2.4cm	1.6cm	1.2cm
13)	A-1	1cm	1.5cm	1cm	1.2cm	0.9cm	1cm	1.3cm	1.1cm
14)	A-2	1.3cm	2.8cm	1.5cm	2.5cm	2cm	1.6cm	2.2cm	0.4cm
15)	V-1	2.1cm	2.5cm	1.2cm	1.8cm	2cm	1.8cm	2.2cm	1.5cm
16)	V-2	0.6cm	2cm	1cm	1cm	1.3cm	1.5cm	2.2cm	R
17)	V-3	2cm	1.5cm	1cm	1cm	1.2cm	1.2cm	1cm	1.5cm

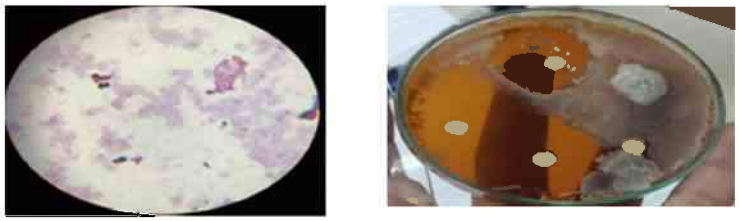
Table.1: Zone of Inhibition measured at different Antibiotic



Photoplate.2: Zone of inhibition on MH Agar plates

2. The resistant isolates were found to be after studying colony characteristics and biochemical tests

i. C-2 – Staphylococcus aureus
ii. MC-1 – Gram negative organism
iii. MC-3 - Staphylococcus aureus
iv. B-2 - Staphylococcus aureus
v. V-2 - Staphylococcus aureus

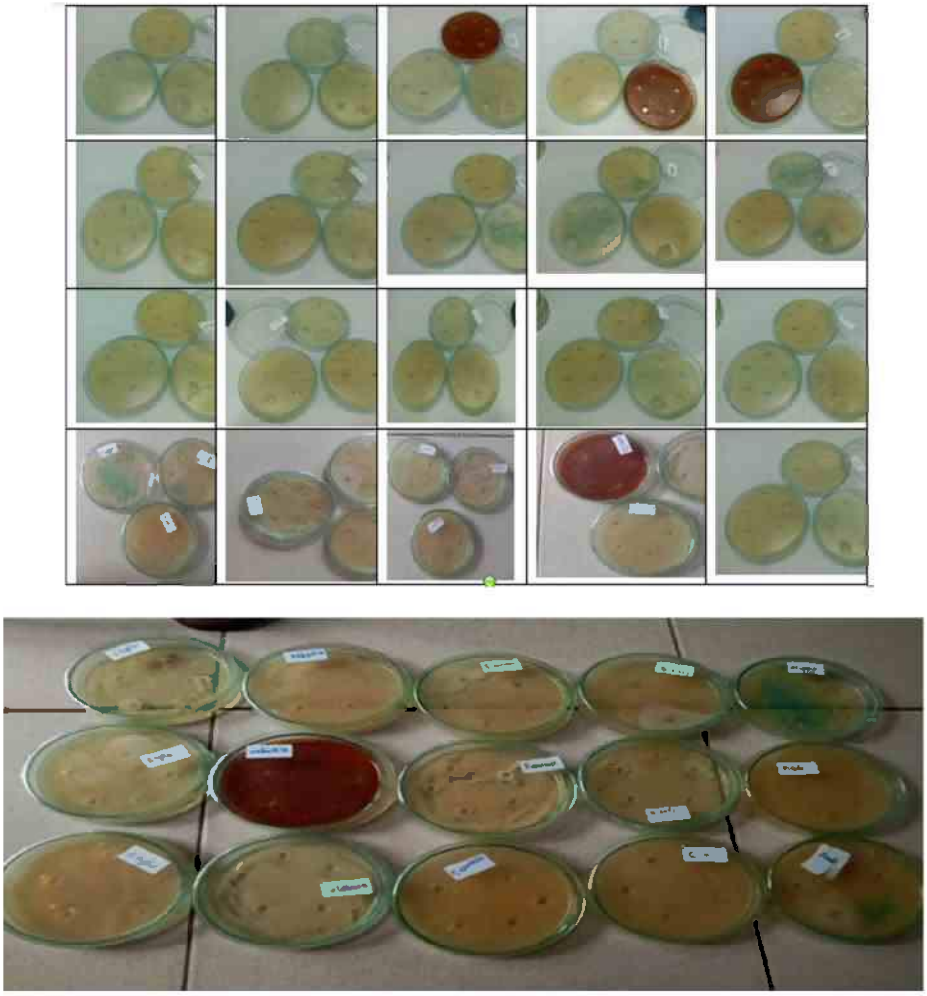


Photoplate.3: a. Microscopic Observation b. Test for Catalase (Effervescence)

3. Determination the Antibacterial of isolates against Pathogens by Agar well method:

Petri plates with Muller Hinton agar was prepared. Pathogens was spreaded and wells was made in which the isolates were added to it.

Pathogens Used are: Klebsiella pneumonia, Pseudomonas aeruginosa, Escherichia coli, Staphylococcus aureus, Salmonella typhi.



Photoplate.4: Antibacterial of isolates against Pathogens by Agar well method

Isolate collected from Bandra station showed zone of inhibition on Klebsiella pneumonia agar plate. After characteristic identification the isolate found to be Catalase positive Staphylococcus aureus.

Discussion

The Kirby-Bauer take a look at, called the disk-diffusion methodology, is that the most commonly antibiotic status takes a look at in decisive what selection of antibiotics ought to be used once treating an infection. This methodology depends on the inhibition of growth of microorganism which is measured beneath normal conditions. After long incubation live the zone sizes (area of no growth round the disk) in millimeters employing a ruler.

Interpreting the results as Resistant, Intermediate or Sensitive for every antimicrobial in keeping with the ranges listed on the log for Enteric gram-negative rods.

This system is barely created for Enteric gram-negative rods or a cocci aureus gram positive coccus. Non-enterics, streptococci/enterococci, gram positive rods and gram-negative cocci should be sent resolute quest if sensitivities are required. Isolate collected from Bandra station showed zone of inhibition on Klebsiella pneumonia agar plate and Staphylococcus aureus isolate found to be Catalase positive.

Conclusion

The Different organisms and their Antibiotic spectrum at different railway station in Mumbai were studied and the common microflora was found resistant to different antibiotics. At this pandemic time this research is done and data is formulated.

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13. To Isolate and to Study the Microbes Present in Biofilm from Raw Milk, Pasteurized Milk and full Cream Milk and to Determine the Activity of the Isolated Microbes Against Penicillin-G and Ampicillin

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Abstract

`The study is geared toward analytic of the microbial growth within the Biofilm layer formed on the surface of milk samples when keeping it open for three to four days. When analytic, associate degree antibiotic take a look at was performed by victimization Penicillin-G and penicillin against the microbes, that were isolated from milk samples. Bacterium in milk have the flexibility to stick and mixture on stainless-steel surfaces, leading to biofilm formation in milk storage tanks and milk method lines. Growth of biofilms in milk process environments results in exaggerated chance for microorganism contamination of the processed farm merchandise. These biofilms could contain spoilage and morbific microorganisms. This paper offers the concept to specialize in the organism employed in biofilm formation, with special attention to antibiotic study from milk.

Key Words: Biofilm, Milk, Antibiotic, Penicillin-G, Ampicillin.

Introduction

Bacteria is an imperative constituent of all natural and human-made ecosystems. The foremost enticing fractions of bacterium, is biofilms. Microorganism biofilms area unit advanced communities of bacterium, fungi, protozoa, microalgae, and micrometazoa that exist during a chemical compound matrix on submerged surfaces. Growth of biofilms in milk process environments results in exaggerated chance for microorganism contamination of the processed farm merchandise. milk is a perfect substance for microorganisms. as a result of the microorganism load of milk could hold spoilage and health risks, the manufacture of milk and milk merchandise is subject to terribly rigorous rules. Milk and full cream milk could contain less quantity of harmful microbes or it's going to be totally germ free. In these regards, Gram

staining is done, no any analysis is enclosed which is able to acknowledge that bacterium could also be gift. We tend to area unit assumptive that, in gram staining we must always get solely bacilli in milk yet as fully cream milk as eubacterium is that the main organism in milk. Raw milk is a perfect substance for microorganisms. as a result of the microorganism load of milk could hold spoilage of the milk. To prevent this some rules were made, these rules cowl the approach within which placental mammal is unbroken and milked, milk storage facilities, preparation ways, additives, process instrumentation, and therefore the transport tanks that move milk from the farm to the process plants. On its journey from the farm to the buyer, milk comes into contact with the walls of the instrumentation within which it's being processed and transported. Since the EU and American legislation has strict rules regarding materials coming back into contact with foods milk process necessitates hygienical instrumentation material immune to corrosion in base forming and acidic conditions (Boulangé-Petermann et al. 1997), the farm business has utilized stainless-steel for quite sixty years in the majority segments of the farm chain.

The event of stainless-steel within the farm business is explained by the very fact that it corresponds specifically to the wants expected of materials in touch with food: the fabric needs to be chemical, medical specialty, and organoleptical neutral with respect to the nutrient, the fabric ought to be simple to scrub so the hygiene and look of the nutrient area unit warranted, and it's to be sturdy, together with corrosion and aging (Anonymous 2004; Bremer et.al. 2009). Alternative factors additionally contribute to the preference of the farm business for stainless-steel. These embody its mechanical characteristics, growth constant, thermal conduction, and simple use (Bremer et al. 2009). Tt's tough to seek out different merchandise to contend with stainless-steel within the milk business, attributable to the process conditions. However, in some producing operations, different materials are often utilized, however their use continues to be restricted and restricted to sure applications. Samples of nonmetal materials used area unit elastomers (also called rubbers) and plastics. They're usually employed in conveyer belts, containers, seals, gaskets, or cutting boards. Rubbers, like olefin propene diene compound rubber (EPDM), cyanide synthetic rubber (NBR, called Buna-N®), semiconducting material rubber, or fluoroelastomer (Viton) area unit employed in each closed instrumentation (seals gaskets, membranes, fittings, and containers) and in open instrumentation like conveyer belts (Faille and Carpentier 2009). Among these materials, the foremost oftentimes used seal materials in milk process instrumentation area unit EPDM and NBR (Faille and Carpentier 2009). a good vary of plastics is additionally offered, however solely a couple of of them area unit food-approved, like polypropene (PP), polycarbonate (PC), high-density synthetic resin

(HDPE), unplasticized polyvinyl resin (PVC), and fluoropolymers like plastic (PTFE, Teflon®). The latter, used for gaskets within the food business, is porous and lacks resilience and should therefore be used with care (Faille and Carpentier 2009).

Surfaces of kit employed in food and nutrient (such as milk) process and handling area unit unremarkably contaminated by microorganisms, even following cleansing and medical care procedures (Gibson et al. 1999; Marouani-Gadri et al. 2010). These contaminating microorganisms seem as adherent microorganisms or as a lot of advanced structures referred to as biofilms.

Materials and Methods

Media Preparation

Take 100ml of distilled water in 4 glass flasks by measuring cylinder.

Weigh, 2.8g of Nutrient Agar for 100ml of distilled water, 4.75g of Rogosa Agar for 100ml of distilled water, 5.15, g of MacConkey Agar for 100ml of distilled water, 6.5g of Sabouraud Dextrose Agar for 100ml of distilled water. After weighing the Agar, transfer it into each glass flask, one by one. Stir it well with a glass Rod and cover the opening with a cotton plug Wrap each flask with newspaper or any kind of paper tightly with a thread and put all flask in Autoclave for sterilization After sterilization process remove the flask from autoclave. Take 4 sterile Petri plates and pour the agar in the Petri plates in aseptic conditions.

Preparation for Streaking

For making of culture solution, take 4 milk samples kept at room temperature for three to four days and saline suspension solution. Mix one loop full of each milk sample in one ml of saline suspension in each tube. In aseptic conditions streak one loop full of the culture on the Petrie plates accordingly as follows. Nutrient Agar- cow milk culture; MacConkey Agar - Buffalo milk culture; SDA Agar -pasteurize milk culture; Rogosa Agar -full cream milk culture, after streaking keep it for incubation at 37 °C for 24 hours.

Gram Test

After incubation, take one loop full of the microbial colonies grown on each plate, on four different slides. Make a smear and perform gram staining, make a smear heat fix it. Flood those mirrors with primary stain (methylene blue) for 1 min and wash the stain. Flood the smear with mordant (Gram's Iodine) for 1 min and wash it off. Add few drops of decolorizer (alcohol) for 45 sec and wash it off, flood it with counterstain (Carbol fuchsin) for 1 min and wash it off with water. Observe the slides under oil immersion for 100X magnification.

Antibiotics Sensitivity Test

Prepare 4 Nutrient Agar (NA) plates. Keep glass spreader in alcohol beaker. Take 1 loop full of the microbial colonies grown on each Petri plate and mix it with 1 ml of saline suspension in 4 tubes. Pour the culture into the NA plates and spread it well by the glass spreader. Take the antibiotic (Ampicillin) disc, and keep it in the center of each NA plate with the help of forceps.

Keep it for incubation (37°C for 24hrs) Observe the result, whether the microbes are resistant to Ampicillin or not. Do the same procedure as above, for Penicillin-G antibiotic, and observe the sensitivity.

Photoplate. 1.: A. Culturing the Microorganism B. Antibiotic Susceptibility Test

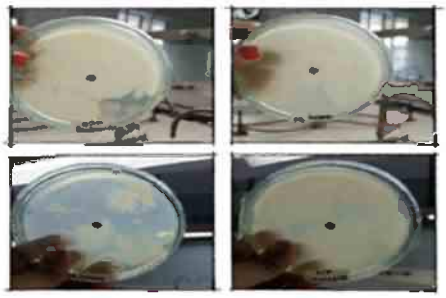
Result and Discussion

While Gran Staining we come to a result that the contaminant microorganism are Bacilli found in full cream Milk and pasteurized milk, whereas Bacilli and cocci both wer found in Raw Milk. In sensitivity Test Bacteria in biofilms have intrinsic mechanisms that defend them from even the foremost aggressive environmental conditions, together with the exposure to antibiotics, that forms matt growth of bacteria was observed. Therefore, the bacilli found in milk sample is resistant towards both Ampicillin and Penicillin-G.

Conclusion

The microorganism enumeration of biofilms helps in distinguishing the type of microorganism concerned in biofilm formation. the various strategies utilized for sampling and enumeration of biofilms in an exceedingly dairy farm plant are mopping, rinsing, agar flooding, and agar contact strategies. Biofilms are one among the most recontamination sources of milk. it's been established that for every being microorganism detected, there can be near to a thousand organisms present in biofilms. within the dairy farm trade, mono- still as multispecies biofilms will occur. Morbific bacterium will be at intervals a biofilm will alternative environment organisms; associate degree example of this can be monocytogenes extant in genus Pseudomonas biofilms. Biofilms are tough to get rid of from milk process environments because of the assembly of EPS materials and also the difficulties related to cleansing advanced process instrumentation and process environments.

Photoplate.2: Microscopic observations from Sample



Photoplate.3: Ant sensitivity test of Antibiotics

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14. Isolation of Mycoflora from Genus Trigonella Foenum-Graecum Treated with Potential Fungicides Like Turmeric Extract, Bordeaux Mixture and Chemical Fungicides by Coffee Filter- Towel Method

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Abstract

Plant pathology may be a one among several branches of biological science. This branch of biological science deals with the study of assorted varieties of diseases, their symptoms, effects and remedial measures. thanks to the invasion of microorganisms in plant's, terribly serious harm is caused to the plants in terms of morphology, anatomy, organic chemistry and physiology. The conditions of setting conjointly plays a significant role during this case. In plants, the seed is basic unit of life and it's the miniature style of plants that helps the plants to sustain subsequent generation. A healthy seed may be a key issue for assured healthy growth and vigour. Hence, maintenance of the standard of the seed is of important importance within the field of plant sciences. Seed invasion by plant life pathogens is of common incidence just in case of agriculture due to that the whole crop will be spoiled. a number of the plant life pathogens will be discovered terribly simply thanks to morphological characters however some might not be. In this case, we'd like to use numerous ways except the standard ways to isolate the plant life pathogens have to be compelled to be enforced to discover all the doable organisms germinates as seed borne pathogens. The authors have enforced coffee filter towel methodology to isolate the fungal pathogens from the grains of fenugreek which pretreated with the fungicides and conjointly to review the impact of assorted fungicides on their growth.

Keywords: Trigonella, Seed Borne Fungi, Coffee Filter-Towel Method, Fungicides.

Introductio

Seed pathology includes the study of diseases and deterioration caused by microorganisms like fungi, nematodes, viroids, and viruses, and physiological and mechanical disorders. Pathologists have found existence of seed borne fungi, and located out the management measures for the diseases by developing numerous ways. The foremost effective amongst them was seed dressing with the chemicals. Phyto pathologists urged seed dressing by exploitation cupric by exploitation cupric sulphate against smut or bunt of fenugreek. Use of organic mercurial compounds to treat smut of fenugreek was conjointly urged by a number of them. Von Schemeling and Kulka (1966) reportable use of carboxin to treat seed borne loose smut of barley caused by *Ustilago Nuda.* Seed may be a pioneering unit within the life cycle of any plant. The standard and amount of the seeds will decide the fate of the long run crop. In Vrukshyayurved (800 A.D.) there square measure references of seed treatment with milk, honey, cow dung, cow water and even ashes. Our ancestor ascertains numerous ways of malady management by their experiences. The seeds treated with milk, rubbed well in junk and once drying and once drying once more rubbed in honey and powder of Embelia genus. Ribes (Vavding) were found to grow while not fail. Manusmruti conjointly emphasized upon smart quality of seeds to stay subsequent generation healthy.

Helweg (1699) well-tried that some malady agents square measure carried inside the seeds of rye plant, that was fungus. Tillet (1755) well-tried it for the primary time that bunt of fenugreek is contagious and carried through the seeds. Frank (1833) worked upon seed borne nature of Colletotrichum lindemuthianum infecting anthracnose of bean. International Seed Testing Association (ISTA) revealed the International Rules for seed testing in 1966. Analysis papers revealed from the institute on the identification of a number of the common genera of the fungi like Curvularia (Benoit and Mathur, 1970), Fusarium (Ram Nath, Neergaard and Mathur, 1970), Drechslera (Chidambaram, Mathur and Neergaard, 1973) and Colletotrichum (Kulshreshtha, Mathur and Neergaard, 1977) helps to measure the infection and to cure them. In 1977, Neergaard revealed his book Seed Pathology in 2 Volumes, that well-tried to be a landmark within the field of seed pathology. Hence, identification of the fungi is a vital step whereas managing seed pathology is another important aspect. The diagnostic characteristics of the fungi in terms of colony growth and monogenesis square measure important. For several fungi, seeds give a superb natural substrate for growth and development to exhibit the diagnostic characters which might be used for fungal identification. The extent

of incidence of seed borne fungi depends upon isolation of mycoflora from grains of genus *Trigonella foenum-graecum* Treated with Potential Fungicides by towel methodology their capability to survive in very dry conditions also as tolerance to temperature variation (Mehrotra, 1967). Hence, study of result of temperature on the seed borne fungi is additionally essential to verify nature of the pathogens.

Materials and Methods

To test effectiveness of the fungicides against the fungal infection, Plant based Turmeric Extract, Bordeaux Mixture, and Chemically prepared potential fungicides were used in vivo.

Paper Towel Method

Take your 4" X 8" Coffee filter towel or as per required size. Moistness the towel by totally dipping the towel in water, then ring it out fully, being careful to not tear the delicate towel. Once most of the water is out, Lay the towel on a flat surface. Add seeds to the dampened towel. Place seeds on a middle of the towel. you'll add additional or less, betting on the dimensions of your planting space. simply keep the seeds towards the center of the towel. Fold the towel over the seeds to form positive the seeds keep in situ and don't slip out of the towel, fold the towel in 0.5 once and so fold it in thirds, keeping the seeds within the center panel of the tri-fold. Place the out of direct daylight. Check your baggies for moistness. Check your seeds daily to form positive they keep damp. If they dry out, simply add a small bit additional water to your bag. A daily checking of germination could also be required.

Method

In this case, the seeds were treated with respective fungicides at the rate of 2.5 gm of fungicide per one kilogram of seeds, 24 hours prior to testing. 25 grains were arranged in 5 rows and 5 columns in-between two moist paper towels. The towels were covered with a butter paper and were rolled together without displacing the seeds. The rolls were incubated at $28(\pm 2)^0$C for 14 days. The germination count was taken in terms of normal seedlings, abnormal seedlings, Seed rots and non-germinated grains. The associated fungi were detected.

Result and Discussion

Observation

Table No.1.: Isolation of Associated Fungal Pathogens from germinating Seeds

Sr. No.	Name of the Fungal Organism	Normal Water	Turmeric Extract	Chemical fungicide	Bordeaux Mixture
1	*Alternaria alternata*	+	--	--	+
2	*Alternaria brassicicola*	+	+	--	--
3	*Aspergillus fumigatus*	+	--	--	--
4	*Aspergillus nidulans*	+	--	--	--
5	*Aspergillus ustus*	+	--	--	--
6	*Bipolaris paperdorfii*	+	--	--	--
7	*Candida albicans*	+	--	+	+
8	*Chaetomium spp.*	+	--	--	--
9	*Curvularia geniculatus*	+	--	--	--
10	*Curvularia lunata*	+	--	--	+
11	*Drechslera spp.*	+	--	--	--
12	*Fusarium chlamydosporium*	+	--	--	--
13	*Fusarium poae*	+	+	-	+
14	*Helminthosporium spp.*	+	-	-	+
15	*Rhizopus stolonifer*	+	-	-	-

Photoplate.1: Identified Fungal Pathogens under Microscope

Alternaria alternate *A. brassicicola* *A. fumigatus* *A. nidulans* *A. ustus*

Bipolaris paperdorfii *C. albicans* *Chaetomium spp.* *Curvularia lunata* *C. geniculatus*

Drechslera spp. *F. chlamydosporium* *F. poae* *Helminthosporium spp.* *R. stolonifer*

Drechslera spp. F. chlamydosporium F. poae Helminthosporium spp. R. stolonifer

Discussion

Above tabulated results fungal organisms were isolated and identified from the fenugreek grains and the samples collected from the provisional stores were infected with the fungal pathogens. It was also seen that depending upon the type of fungicides, growth of the fungal organisms can be restricted. There were 15 fungal pathogens were isolated and identified from the samples which was not treated with fungicide i.e. simply grown on normal water (taken as control) but when they were treated with fungicides such as Turmeric Extract, Chemical fungicide and Bordeaux Mixture; there was a huge decrease in the number of fungal organisms. Still out of above mentioned 15 fungal species *Alternaria brassicicola* and *Fusarium poae* able to germinate in turmeric treated seeds; Candida albicans were able to germinate in Chemical fungicides and *Alternaria alternate, Candida albicans, Curvularia lunata, Fusarium poae, Rhizopus stolonifer* were able to grow in Bordeaux Mixture.

Conclusion

The fenugreek grains purchased from provisional stores or any kind of shops may appear healthy at their external morphology but may be infected internally or externally due to invasion of various fungal spores. This infection is not seen from outside but may deteriorate the biochemical or nutrient constituent from the grains for their own growth and development which leading to the nutritional loss of the grains. In many cases they also produce secondary metabolite in the form of mycotoxins, which not only harmful to the human beings but also prove to be fatal in many cases. When the grains are coated with the fungicides such as Turmeric Extract, Chemical fungicide and Bordeaux mixture; they act against these fungal organisms to prevent their growth and help us to protect the grains.

Hence, fungicide prepared from turmeric extract is almost equivalent beneficial as compare to market based chemical fungicide and we can call it to Organic Fungicide or Natural Fungicide.

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15. Synthesis of Silver Nanoparticles by using Fungal Biomass (Rhizopus Stolonifer)

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Abstract

Biosynthesis of nanoparticles by using fungi is not a very novel concept in the field of science and technology. Use of biological agents for the synthesis of nanoparticles has been encouraged by the researchers to test efficiency and efficacy of different systems to synthesize metallic nanoparticles. Fungi have been used recently synthesis of nanoparticles. The fungi grow in mycelial form and hence they can bear flow pressure, agitation and other conditions in a bioreactor. Myconanotechnology is an exciting new applied, interdisciplinary science that has considerable potential due to wide range and diversity of fungi. Physical and chemical processes of nanoparticles synthesis have some limitations for fabrication of nanoparticles. The nanoparticles synthesized by using fungi are considered to be clean, nontoxic, safe, biocompatible and environmentally acceptable. In the present study, an attempt is made to biosynthesize nanoparticles of silver by using *Rhizopus stolonifer*. Silver nanoparticles have various applications; especially in the field of medicine. Rhizopus stolonifer was used for nanoparticles fabrication as it is available easily and could be cultured readily. Synthesis of nanoparticles was indicated by colour change of the substrate detected by using spectrophotometer in the wavelength range of 200 to 700 nm.

Key Words: Nanoparticles, *Fungi, Rhizopus.*

Introduction

Nanotechnology is an emerging branch of science mainly focusing on the development of synthetic as well as natural systems for the production of structures and materials at nanoscale . Metal nanoparticles are the subject of interest due to their unique physical, chemical

and optical properties. They acquire these characteristic properties due to small size and large specific surface area. As a result, they have wide range of applications from electronics to medicines and from catalysis to photonics.

The term "Nanotechnology" was coined by Nario Taniguchi (1974) as the creation and exploitation of materials is in the size range of 1 to 100 nm. Numerous protocols have been developed to synthesize nanoparticles of different shapes and sizes by physical and chemical methods. One of the earliest reports of synthesis of metallic nanoparticles was on the formation of Cadmium Sulphide microcrystals in Yeasts. Recently synthesis of nanoparticles has been investigated in various biological agents, especially in fungi.

A plant pathogenic fungus, *Fusarium oxysporum* has been studied extensively. It was able to generate extracellular gold and silver nanoparticles rapidly. *Verticillium* spp. Was demonstrated to produce gold nanoparticles intracellularly which could be identified as mycelia mass attains a typical purple colour due to accumulation of gold nanoparticles in the mycelium. Till date, various species of *Aspergillus, Candida, Neurospora, Trichoderma, Cladopsorium, Phoma, Chrysosporium* etc. have been tested for biosynthesis of nanoparticles of Gold, Silver, Mercury, Selenium, Cadmium, Zinc, Magnesium etc. *(Jha et. al., 2009).* As per Agnihotri *et. al.* (2009) species of Enterobacter (A Bacterium) is implemented for biosynthesis of Mercury nanoparticles but there is hardly any report of implementation of any Fungus. Hence, in the present studies, attempt was made to implement species of Aspergillus for biosynthesis of nanoparticles of Mercury.

Materials and Methods

I. Collection and growth of fungal species

1. *Rhizopus stolonifer* was isolated by random air sampling technique by using exposed agar plate method.
2. Pure culture of *Rhizopus stolonifer* was obtained by sub culturing them on Potato Dextrose Agar (PDA) plates.
3. The organism was identified with the help of colony and morphological characters.
4. Pure culture of the organism was grown in Potato Dextrose Broth for biomass preparation by maintaining the flasks on rotating shaker at 120 rpm for 4 days at room temperature till they showed luxuriant growth.
5. Obtained culture was filtered by using Whatman No. 1 filter papers and washed with sterilized distilled water till traces of the medium were removed completely.

6. The cleaned biomass was harvested individually in flasks containing 100 ml double distilled water and incubated at 28 (±2) ° C for 72 hours.
7. The biomass was filtered by using Whatman No. 1 filter paper and the filtrate was collected.
8. The cell free filtrate was used for the biosynthesis of Silver nanoparticles.

II. Synthesis of Mercury Nanoparticles

1. 15 ml cell free filtrate and 15 ml 1 mM salt solution of Silver were mixed in 250 ml Erlenmeyer flask and the flasks were incubated at 28 (±2) ° C for 24 hours.
2. The solution was compared with pure 1 mM salt solution to compare and detect biosynthesis of Silver nanoparticles.

III. Detection of Silver Nanoparticles

1. Biosynthesis of Silver nanoparticles could be detected due to change in the colour of the solution by testing it on UV Spectrophotometer in a range of 200 to 700 nm to check the absorption pattern.
2. The Silver nanoparticles were collected by centrifugation at 15,000 rpm for 20 minutes.
3. They are to be subjected to TEM **(Transmission Electron Microscopy)** for their characterization.

Result and Discussion

Tem Analysis for Silver Nanoparticles

The shape of the Phytosynthesized nanoparticles can be conspicuously observed by TEM analysis. TEM samples of the aqueous suspension of AgNP's after sonication for 15 minutes were produced by placing a drop of the suspension on Carbon coated copper grids and allowing water to evaporate in vacuum. TEM observations were performs on Philips Electron Microscope operated at an accelerating voltage of 200Kv with the resolution of 0.22. The shape of the AgNP's (silver nanoparticle) in fungal biomass was spherical and Oval **(Photoplate-1)**. This morphology of silver ions is obtained by reduction of Ag++ to Ag^0. A large density of silver NP's was observed under low magnification. Thus, silver nanoparticles are quite poly-dispersed and ranged in size from 9-70nm. The SNP's **(Single nucleotide polymorphisms)** in Rhizopus showed spherical shape **(Photoplate-1)**. The Silver nanoparticles are quite poly-dispersed and ranged in the size from 9-22nm. These observations indicated the variations in the shape of nanoscale particles in Rhizopus stolonifer.

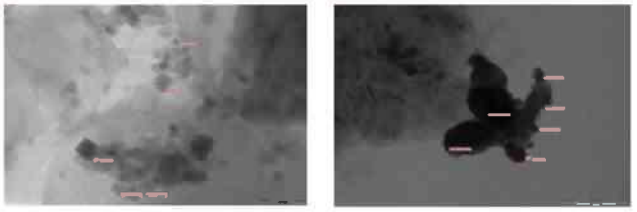


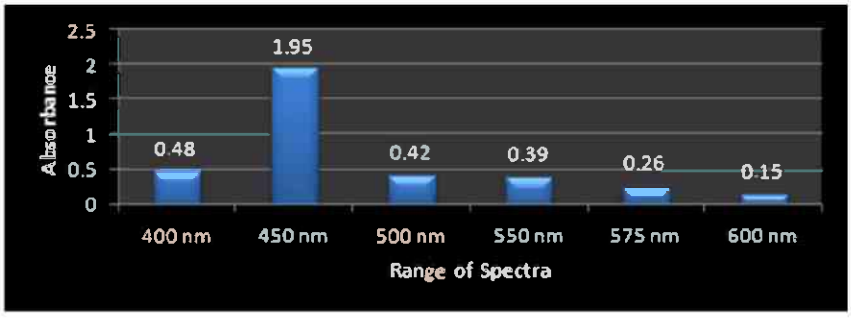
Photo plate 1: TEM images of Ag Nanoparticles showing spherical and oval shape nanoparticles in Rhizopus stolonifer biomass.

Table 1: Detection of Nanoparticles in Silver Nitrate

Sr. No.	Name of Organism	Original Colour of Metallic Solution	Changed Colour of Metallic Solution	Absorption Spectrum					
				400 nm	450 nm	500 nm	550 nm	575 nm	600 nm
1	*Rhizopus stolonifer*	Colourless	Blue	0.48	**1.95**	0.42	0.39	0.26	0.15

Fig.1. Isolation of Pure Cultures of ***Rhizopus stolonifer***

Fig.2. Change in colour of Silver Nitrate Solution due to ***Rhizopus stolonifer***



Graphical Representation of the Absorbance at Different Spectra

According to Table 1 and graphical representation, it was very much clear that there were distinct changes in the original colour of the solution of Silver Nitrate, which was colourless. *Rhizopus stolonifer* showed development of blue coloured solution. The solution

showed maximum absorbance at wavelength of 450 nm. The colour of the solution was changed due to change in the optical properties of the solution, which was due to change in the particle size of the metallic component of the solution. This proves that *Rhizopus stolonifer* used in the project had the potential to produce extracellular nanoparticles of silver at room temperature. The same has to be confirmed by their characterization with respect to shape and size by using appropriate method of analysis such as TEM.

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