



ANTIMICROBIAL AND ANTIFUNGAL EFFECT OF GINGER (ZINGIBER OFFICINALE), GREEN TEA (CAMELLIA SINENSIS) AND NEEM (AZADIRACHTA INDICA) ON PLANT PATHOGENS

¹ Rajvee Raut ² Avani Desai

¹ M.Sc. Microbiology Student ² Teaching Assistant

^{1,2} Department of Microbiology, Bhagwan Mahavir College of Basics and Applied Sciences, Bhagwan Mahavir University, Surat-395007

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ABSTRACT

(Scientist Salman Shahid Et al., 2021) discovered on this examine Plants were the supply of food, drug treatments and lots of different day by day existence merchandise considering the fact that primitive times. Bacterial and fungal pathogenic assault reduces crop yield. Phytochemicals as biocides have cappotential to kill microbes. In this examine, extract of Zingiber officinale rhizomes (Ginger), leaves of Azadirachta indica (Neem) and Camellia sinensis (Green tea) have been implemented on bacterial (*Xanthomonas campestris*) and fungal (*Alternaria alternata*) pathogens to test their antibacterial and antifungal activity, respectively. Ethanolic and aqueous extracts have been organized which confirmed exceptional efficiency.

1. INTRODUCTION

Before the generation of medical studies withinside the subject of plant pathology, there has been not anything to manipulate plant illnesses. Plants have been developing in near proximity and defend every different from dangerous pathogens. Ancient people dwelling in wild surroundings had used vegetation and plant extracts as a supply of medicine, food, fragrant products. When medical studies began out withinside the subject of plant sciences, the conventional agriculture device changed into changed through current one. In current agricultural device artificial agrochemicals are getting used to save you crop illnesses. No doubt this brings revolution in agriculture subject through controlling illnesses and growing crop yield vice versa those chemical compounds aren't eco-friendly, so results pathogens advanced immunity in opposition to agrochemicals and hence there's much less manipulate of illnesses even through the usage of excessive attention of chemicals. There is a want to prevent use of agrochemicals and conventional agriculture gadget should be used to keep environment from cancer causing agents found in agrochemicals. Recently a brand new concept has developed wherein plant extracts are getting used as biocides [1,2]. Extract of a few flora display inhibitory impact in opposition to pathogenic microbes because of presence of positive bio-chemicals. Now agriculture scientists are thinking about the usage of those Phytochemicals in opposition to microbial pathogens. Pathogenic microbes might also additionally purpose illnesses in flora or animal and can belong to bacterial pathogenic institution of microbes or fungal pathogens. Plants use the ones Phytochemicals as protection in opposition to plant pathogens for themselves or for different flora as well.

Every 12 months principal loss in crop yield is because of bacterial or fungal assault on industrial crops. Not all however a few vegetation have the traits to supply secondary metabolites. These metabolites might also additionally have unique taste and scent which might also additionally not be favorable for bacterial or fungal growth. These secondary metabolites are referred to as Phytochemicals. These Phytochemicals assist plant for self-protection towards attacking microbes and bugs or those Phytochemicals might also additionally entice bugs or microbes for pollination or for different benefits [3]. Use of vegetation and their products as biocides is getting interest of scientists because of their eco-friendly nature and herbal removal supply of poisonous meals from human meals chain. Now scientists are transferring from artificial to herbal manner of crop safety from bacterial and fungal pathogens [4]. from herbs, the phytochemicals are received in better quantity than different plant households i.e. coriander, basil, thyme, onion, ginger, turmeric, garlic, etc. yield phytochemicals with robust antibacterial, antifungal, anti-allergic, antioxidant and chemo-preventive residences [5]. Worldwide there are greater than 400,000 species of vegetation having Phytochemicals with antibacterial, antifungal and antiviral residences [6]. Around 20% of recognized plant species are getting used withinside the pharmaceutical fields [7]. ginger (*Zingiber officinale*) is a perennial, herbaceous, monocotyledonous plant, cultivated in tropical and sub-tropical region worldwide. Rhizome of ginger has stinky flavor and smell, it is basically used as meals additive [6]. It's antibacterial and antifungal residences are because of the Phytochemicals located withinside the rhizome. the chemical ingredients of ginger extract and critical oil are the poly-phenolic ketones known as gingerols or Oleoresin [8]. The antifungal impact of ginger is because of gingerone, dihydrogingerone and dehydroshogaol [9]. There also are a few different alkaloids, terpenes and terpenoid derivatives having antimicrobial activities on distinctive bacterial pathogens.

2. MATERIALS AND METHODS

Sample collection and pathogenic testing:

Disease loose ginger rhizome powder and Green tree leaves have been bought from neighborhood market. Neem leaves have been amassed from a tree found in Bahauddin Zakariya University, Multan. Bacterial and fungal cultures used on this studies have been *Xanthomonas Campestris* and *Alternaria alternata*, respectively which have been received from “Faculty of Agricultural Sciences and Technology, Bahauddin Zakariya University, Multan”. Nutrient agar become used to get natural way of life of *Xanthomonas campestris* whilst Potato dextrose agar become used to get natural way of life of *Alternaria alternata*.

Extract Preparation:

For the evaluation of antibacterial and antifungal impact of decided on plant samples ethanolic and aqueous extract of every plant become prepared.

Ethanol Extracts instruction:

For the instruction of ethanolic extract of ginger rhizome, 40g of absolutely dried ginger powder become weighed and 120ml of 96% ethanol become delivered in it. To keep away from ethanol evaporation beaker become protected with aluminum foil. Beaker become positioned on the warmth plate with magnetic stirrer for 20 min at 30°C to get a uniform aggregate of Ginger powder with ethanol. After stirring, the aggregate become filtered. Obtained filtrate had extra ethanol which become evaporated by growing the floor region of filtrate in a single day and afterward rotary vacuum evaporator changed into used to get greater focused extract. same protocol changed into carried out for the training of ethanolic extract of different plant life this is neem and inexperienced tea. Crude extracts have been preserved withinside the fridge at 0°C temperature for subsequent experimental work.

Aqueous Extract Preparation:

For the training of aqueous extract of all of the plant life, the 40g of all plant life have been taken withinside the 3 separate beakers and stuffed with 120ml of distilled water. The beaker changed into then located on the warmness plate via way of means of setting the magnetic stirrer in it. Stirring changed into performed for 20min at 30°C for homogeneous blending after that natural filtrate changed into acquired the use of paper filter. Excess water changed into evaporated via way of means of setting pattern tubes in warm air oven for twenty-four hours at 80°C to get crude extract. After finishing the extraction, the share yield of all of the crude extracts changed into calculated via way of means of the use of following formula.

Percentage yield of plant extracts = $\text{Weight of crude extract acquired in g} \times 100 / \text{general weight of plant sampling}$

Media Preparation and Inoculation:

For inoculation of bacterial and fungal pathogen 4 large length petri plates have been used for pouring media. For training of media, 28 g of Nutrient Agar and 39 g of Potato Dextrose Agar changed into jumbled together 1 liter of distilled water, every in a separate jar. The jar changed into shaken lightly to combine agar in water to get uniform mixture. Two petri plates have been stuffed with “Nutrient Agar media” and different have been stuffed with “Potato Dextrose Agar media” and permit the media to set for 1 hour. Each petri plate changed into divided into six equal sections for ethanolic and aqueous extract of every plant. All this technique changed into performed withinside the UV laminar air waft chamber to keep away from any contamination.

Antibacterial and Antifungal pastime assay:

Antibacterial and antifungal ability of plant extracts have been examined at special ranges of inoculum boom via way of means of making use of the extract on the time of inoculation and after the boom of pathogenon media. Suspension of *Xanthomonas campestris* tradition changed into organized via way of means of the use of inoculum loop and suspension changed into mixed homogeneously. After that 2µl of bacterial suspension for every nutrient agar plate turned into unfold over the floor of nutrient media through the usage of sterilized glass spreader. In the identical manner suspension of fungal way of life turned into made and unfold over the floor of every potato dextrose agar media plates. Agar Well Diffusion approach [14] turned into used to evaluate inhibition.

Minimum Inhibitory Concentration (MIC):

MIC is the minimal awareness at which the boom of microbe is inhibited through antimicrobial compound. For measurement of MIC of all of the plant extracts, micro broth dilution approach turned into applied [14].

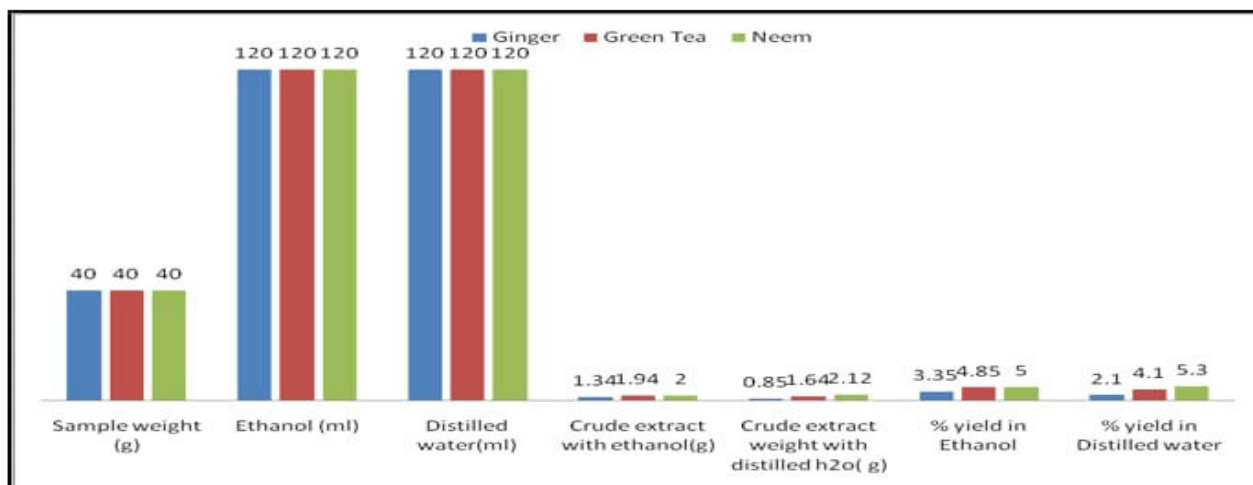


Figure 1: Percentage yield of all Ethanolic and Aqueous extract of Ginger

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4. CONCLUSION

In this take a look at offer statistics approximately Results of gift take a look at furnished statistics approximately percent yield, antimicrobial and antifungal pastime size and minimal inhibitory awareness in each aqueous and ethanolic extracts.

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