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COMPARATIVE STUDY OF POTENTIAL ANTIMICROBIAL ACTIVITY OF ROOT AND LEAVES OF GINGER AGAINST SELECTED BACTERIA

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ABSTRACT

The main objective of present study was to evaluate compartive potential anti microbial activity of aqueous extract, ethanol extract and n hexane extract obtained from root and leaves of Ginger(Zingiber officinale) against selected bacteria S.aureues and C.tetani. Different ginger extracts were prepared. 6 extracts of roots & leaves of Ginger were prepared with three solvents Aqueous, Ethanol & n-Hexane and antimicrobial activity checked by agar disc disc diffusion method. Generally, all extracts obtained by Ginger showed antimicrobial activity against all selected microorganisms. The study showed that aqueous, ethanol & n-Hexane extracts shows near about same properties but leaves of ginger more effective properties than root.

Concluded that Ginger root and leaves both may be a potential source for the curing of various diseases caused to animals

Keywords*: Zingiber officinale, Ginger extract, Antimicrobial, disc diffusion*

1. INTRODUCTION

Spices used in foods are generally antimicrobial and antioxidant agents. Spices have been used in the traditional medicines from thousands of years. The scientific name of Ginger is ZIngiber officinale which belongs to the Zingiberaceae family.

A number of medicinal properties can be shown by various parts of the Ginger tree. Almost all the parts of this plant: root, leaf, flowers etc. have been used for various ailments in the indigenous medicine of various countries [1]. Antimicrobial agents is very important for the control of pathogenic microbes, especially for the treatment of infections caused by resistant microbes Medicinal herbs with antimicrobial activities are considered a potent source of novel antimicrobial functions. Zingiber officinale is widely used as a vegetable, functional food and medicinal plant that has rich nutritional composition with diverse pharmacological activities [2-4].In recent times, focus on plant research has increased all over the world and a large body of evidence has collected to show immense potential of medicinal plants used in various traditional systems.[5]. Ginger is a natural antioxident, antidiabetic, antiulcer, antiobessity, antibiotic, outstanding immune builder used in many countries from ancient times Ginger not only adds flavor to food but also it provides nutritious values also..A few researchers have investigated the antimicrobial activity of GINGER (Lam) extracts against some pathogenic bacteria .[7-8] In this present study focuses on the Antimicrobial action of Zinc nanoparticles prepared from Ginger extract. The present work also focuses on discovering new techniques for green synthesis of metal nanoparticles of ginger water extract extract.

Nanoparticles contains antimicrobial and antioxidant substance could be considered as new trend of antimicrobial therapeutic agents for prevention and reduction of deterioration of food and pathogrnic microorganisms.

Nanosized metals have been shown to have a good antimicrobial effect and they can be introduced as a solution for the resistance problem. Moreover ,Nanometals have diverse applications which can be explained by attaining a high surface area to volume ratio.

The main advantage of green metods was the presence of naturally occurring biomolecules, such as proteins, enzymes, tannins,phenols, sugars etc. that can be used safely as reducing agents to form stable nanometals.

2. MATERIALS AND METHODS

Collection of Plant Material:

Fresh Ginger root and leaves were obtained from campus of Siddhartha College, Jafrabad, Jalna (Maharashtra). The leaves and roots were identified and confirmed by the Botanist at the Botany Department of the present institution. All materials were washed with tap water to remove impurities. It were dried under shade for 1 week, all dried materials were ground in a mixer grinder separately, which were easily grinded into the powder form. Same processes repeated 4 to 5 times and it stored in an air tight container for further use.

Preparation of Extracts:

From each 30 gm of the powdered sample of roots and leaves were separately extracted in 500ml conical flasks with 100 ml of deionised distilled water (aqueous extraction) while 100ml each of n-Hexane, and ethanol, (solvent extraction). The conical flasks were plugged with rubber corks, then shaken at 120 rpm for 30 min and allowed to stand at room temperature for 6 day. The extracts were separately filtered using Whatman filter paper no. 1. The resulting filtrates were centrifuged. After centrifugation, supernatants were labeled as "Extract AQUL" and "Extract AQUR" for the aqueous extracts of leaves and roots respectively. Similarly labeled for solvent extraction as "Extract NHX" and "Extract ETH" for n-Hexane and ethanol respectively. Totally six extract of Ginger were prepared with different solvent and different part. All extracts were properly labeled and kept at 4oC until use.

Antimicrobial properties of Moringa extracts:

The antimicrobial activity of the various extracts was tested using the disc diffusion method and minimum inhibitory concentration (MIC) determination.

The pathogenic microorganism:

The three selected common pathogenic microorganism were used in the study, among those one was gram negative S.Aureus and gram positive C.Tetani.

Preparation of microbial cultures :

Both these bacterias were cultured on the Muller Hinton Agar. On this agar a loop full of each bacterial strain was inoculated in 6 ml of nutrients both. These plate agars were incubated in incubator for 24 hours at room temperature. And these were used for incolumns.

Inoculum preparation:

To prepared bacterial inoculums , pure culture of micro-organisms was inoculated into 5 ml of sterile nutrient broth followed by incubation at 37˚C. Till moderate turbidity developed.

The density of suspension inoculated onto the media for susceptibility test was determined by comparison with 0.5 McFarland standard of Barium sulphate solution. [10]

Antimicrobial activity by Kirby-Bauer agar disc diffusion method:

The antimicrobial activity of each plant extracts was determined by disc agar diffusion technique described by Kirby Bauer et al (1966)[9] . The nutrient broth cultures of test bacteria were spreaded on the Muller Hinton Agar media in petriplates and microbes broth culture were applied on media by swabbing. The Whatmann filter paper discs 6mm were dipped in the 3 different concentrations of the plant extracts and were placed on to 3 different spots surface of agar plat. The diameter of zone of inhibition was measured in mm using a ruler and results were recorded.

3. RESULTS AND DISCUSSION

Table.1 Antibacterial activity of different Ginger extracts against E.Coli, S.Typhi, Shingella SP

Type of extract	Zone of Inhibition	
	S.Aureus	*C.tetani*
AQUL	8	14
AQUR	11	12
NHXL	6	6
NHXR	12	11
ETHL	10	15
ETHR	13	13

4. CONCLUSION

The result of this research has demonstrated that Z. Officinale could become promising natural antimicrobial agents with potential application in therapeutic drugs for controlling the pathogenic bacteria. Inhibition of both Gram-positive and Gram-negative organisms by this plant extract depicts that it can serve as a source of broad spectrum antibiotics, which justified the traditional use of this plant for therapeutic purposes.

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