Research Paper

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Antibiotic Study of *Zingiber Officinale* Extract Against *Pseudomonas Aeruginosa* and Standardization with Some Commercial Antibiotics Co-Trimoxazole and Imperem

Fisheries

KEYWORDS : Zingeber officinale, Pseudomonas, antibiotic, co-trimoxazole and Imperem

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ABSTRACT

In the present investigation the zingiber officinale belonging to family zingiberacaeae has been used to determine its antimicrobial and antibiotic potential under laboratory condition. In the present study the antibiotic potential of Zingiber officinale have explored against the most causing organism pseudomonas. The ethanolic and methanolic 70% extract were used and the antimicrobial and antibiotic activity has been determined in both the control sets and experimental sets.

The ethanolic extract is showing the 12.33 mm zone of inhibition while methanolic extract is showing the 16.20 mm zone of inhibition against the causing microorganism. Thus the treatment of methanolic extract is found to be very effective to control the growth of causing micro-organisms indicating the presence of some secondary bioactive compound in the plant extract as found in the commercial antibiotic like co-timoxazole and Imperem.

Introduction:

India has a very great diversity of flora and fauna particularly there is a great biodiversity of plant along with many medical plants. From region to region and season to season there is a great change in the biodiversity of flora of India. The biodiversity of Indian flora has been well explored by the pharmaceutical and medicine companies. The importance and the utility of the medicinal plant have been well presents in our traditional Ayurvedas. This Ayurveda is the importent key of the medical pharmacology and we have given a name like the Naturo -therapy.

The herbs and spices are used for the treatment of various diseases since ancient time and found to be useful today also as therapeutic agent against many pathological infections (Gull et al., 2012). These medicinal plant and spices have a unique aroma and flavour which are derived from compounds known as Phytochemicals or secondary metabolites (Avato et al.,2002; Melvin et al., 2009) among that *Gingiber offcinale* commonly called as ginger belonging to family Zingiberaceae is one the important the medicinal plant having the grate medicinal potential . Badreldin et al. (2008) has observed and stated that it has many folds of pharmacological actions such as immuno-modulatory, anti-tumorigenic, anti-inflammatory, anti-apoptotic, anti-hyperglycemic, anti-lipidemic and anti-emetic actions and strong anti-oxidant preventing generation of free radicals.

The uncontrolled and excess usage of antibiotics has induced microorganisms to acquire resistance against number of medicinal drugs, which is the challenge of the present days (Abimbola et al., 1993). As a result there is an urgent need to find some eco-friendly alternative for these particularly those of plants origin which are easily available, cheap and considerably less side effects (Khulbe & Sati, 2009). Due to prevalent resistance of micro organism to drugs and other therapeutic agent this investigation may provide some alternative for the treatments of some pathogenic organism. Shirin and Prakash (2011) has analyzed the extract of ginger in different solvents and recorded the different antioxidant compounds such as Polyphenols, flavonoids, total tannin vitamin C, β carotene and ash minerals like iron, calcium, phosphorous, zinc, copper, chromium and manganese.

Several scientists have reported the medicinal potential of many plants and reported as antimicrobial agent, antitumour agent (Khalil et al., 2005, Akroum et al., 2009, Omoya and Akharaiyi, 2012), anti-inflammatory and anti-necrotic agent (Lin and Huang, 2000; Omoya and Akharaiyi, 2012) .

Material and methods:

Preparation of plant Extract:

For the extraction of Rhizome the method of Olayemi and Opaleye (1999) was adopted. This was carried out by measuring 20 gm of fine grounded powder of *Zingiber officinale* rhizome on an digital balance. This was dispensed into two beakers, each containing 50ml of ethanol and methanol separately. These were soaked for three days after which the solution was care filtered with muslin cloth into a sterilized conical flask of 100 ml and the filtrates obtained were stored in the refrigerator at a temperature of 4C° for experiment.

Preparation of bacterial suspension:

Bacterial suspension was prepared by taking a loop full pure culture from already identified slant. The culture was added in nutrient broth (Hi-media) at 37 °c for 24 hours (overnight) and an active culture of uniform suspension was obtained. Then this suspension was spread on nutrient Agar plate (Hi-media) for assay of antimicrobial activity.

Preparation of inoculums and plates:

The bacterial cultures were pre-cultured in nutrient broth in a rotary shaker at 37 °C at 120 rpm overnight. It was used as test culture inoculums for antimicrobial activity of plant extracts after incubation. The inoculums were flooded on the surface of Mueller-Hinton Agar (MHA) plates by spread plate technique and it was made ready to use for assay of antimicrobial activity.

Antimicrobial Screening Test:

The antimicrobial potential were determined by measuring the zone of inhibition of the extract against the test microorganism using the agar plate well method. The sterile cork borer of 6 mm in diameter was used to make bore well in the plate. The wells were filled with 0.20 ml of *Zingiber officinale* ethanolic and methanolic extract and left for incubation 24 hrs. at 37 c° and the zone of inhibition was measured by using high media scale in mm.

Result and discussion:

In the present investigation ethanolic extract is showing the 12.33 mm zone of inhibition while the control set is showing the 7.66 mm zone of inhibition. The methanolic extract is showing the 16.20 mm zone of inhibition while control has recorded 6.24 zone of inhibition against the causing microorganism. Thus the treatment of methanolic extract is found to be very effective to control the growth of causing microorganisms than the ethanol extract, indicating the presence of some secondary bioactive compound as found in the commercial antibiotic like co-timoxazole and Imperem. Similarly the commercial antibiotic Imperem

showing the 30.00 mm zone of inhibition while the co-timoxazole is showing 28 mm of zone of inhibition against the pseudomonas. The difference between zone of inhibition of control and experimental sets were anlysed statistically and found significant at 1% and 5% level of significance.The commercial antibiotic Imprem is found effective than the co-trimoxazole .Thus the above *Zingiber officinale* is also showing the antibiotic zone of inhibition in both the solvent are similar to the zone of inhibition shown by the commercial antibiotic and this confirms the presence of similar antibiotic compounds as good as present in the commercial antibiotic. Thus the present investigation reveals that there is wide scope to use the *Zingeber officinale* extract as an antibiotic agent for the treatment of pathogenic microorganism pseudomonas.

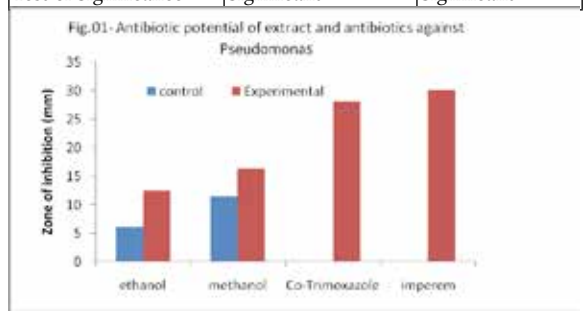
The phytochemical potential of the *Zingeber officinale* has been observed by many workers like Omoya and Akharaiyi. (2012) observed the effect of mixture of honey and ginger extract for antibacterial assessment on Some clinical isolates. Akintobi et al. (2013) has investigated the antimicrobial activity of ginger (*Zingiber officinale*) extracts on six pathogenic microorganisms using the agar well diffusion method. These bacteria include; *Pseudomonas aeruginosa, Staphylococcus aureus, Proteus mirabilis, Escherichia coli, Bacillus subtilis* and *Salmonella typhi.* and stated that these extracts of *Zingiber officinale* possess antimicrobial compounds which could be used as substitutes for the antibiotics.

Kamrul et al. (2014) has studied the food borne pathogens such as *Escherichia coli, Pseudomonas aruginosa, Staphylococcus aureus, Vibrio cholerae, Klebsiella* spp. and Salmonella spp. and found the potent antimicrobial activity against the above tested bacterial pathogens.Auta Ki et al. (2011) has determined Antimicrobial properties of the ethanolic extracts of *Zingiber officinale* (Ginger) on *Escherichia coli* and *Pseudomonas areuginosa.* The result obtained revealed that etharolic extract of ginger gave the widest zone of inhibition against one out of the two test organisms at the concentration of 20mg/ml. However, *Pseudomonas aeruginosa* was found to be more sensitive to the extract. Milos et al. (2014) has recorded the concentration of extract the range from 0.0024 to > 20 mg/ml. which is found most active against *Staphylococcus aureus* and *Staphylococcus aureus, Pseudomonas aeruginosa* , *Proteus mirabilis* and *Escherichia coli* .

The overall results obtained in the present investigation are found to be similar in direction of the earlier worker and literature reveals that there is a wide scope to utilize the *Zingiber officinale* plant extract as cheap source of bioactive secondary metabolites as an antibiotics in pharmaceuticals industries.

Table-01 Antibiotic activity of *Zingiber officinale* extract and commercial antibiotics against *Pseudomonas aeruginosa*

Extract/ Antibiotics	Control mean(mm)	Experimental mean(mm)
Ethanol	7.66	12.33
Methanol	6.24	16.20
Co-Trimoxazole	00	28.00
Imperem	00	30.00
Test of Significance	Significant	Significant



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