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EVALUATION OF PHYTOCHEMICALS IN LEAVES OF MANGO (MAGNIFERA INDICIA L) AND THEIR ANTIBACTERIAL EFFECT

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ABSTRACT

Plant Phytochemicals are naturally derived chemicals from plants and reported as a source of compounds for medicinal use of humans since time immortal. In this study we evaluated the content of secondary metabolites of leaves of mango against antimicrobial activity of Gram positive and Gram negative bacteria (*Staphylococcus aureus* and *Escherichia coli*) using the well diffusion method. The leaves contain noticeable amount of different secondary metabolites such as phytic acid, tannin, phenolics but greater amount of phenolics. All these secondary metabolites of leaves have shown considerable activity against all organisms tested. The inhibition zones ranged from 8 mm to 12 mm was found in leaves.

Key words: *Tannin, Phenolics, Anti-nutritional factors.*

I. INTRODUCTION

Bacteria have always been considered as major factors of disease causingorganisms inhumans [1].In present Scenario, so many allopathic drugs are drugs are available which works excellently in controlling the human pathogens with their specific action mechanisms, however the point of concern is that they make our body organs to over perform or in other words they over stresses our body. This creates lot of reported side effects.The multi-drug resistant (MDR) bacteria areincreasingly day by day which are resistant to drugs [2]. Resistant bacteria are a major threat to the public health concern [3] and may be caused by over-expression of MDR efflux pumps [4].In this study we evaluate the pharmacological activity of plant phytochemicals and their antibacterial activity.

II. MATERIALS AND METHODS

Plant material collection
The plants were collected from Malwa region. All chemicals were of analytical grade.

Phytochemicals extraction and estimation
The total phenolic content (TPC) of each sample was estimated using the Folin–Ciocalteu colorimetric method according to Mallick and Singh.[5] Phytic acid was estimated following Wilcox et al.[6] Tannins were measured as tannic acid equivalents Swain and Hillis.[7].

Antibacterial activity
Test microorganisms
The test organisms were obtained from Department of Microbial Type Culture Collection, (Chandigarh, India) and include *Staphylococcus aureus*(S. *aureus*) and *Escherichia coli* (*E.coli*). A 24 h fresh culture of each was prepared in nutrient broth for use in the antimicrobial test.

Antimicrobial activity assay
Antibacterial activity of plant phytochemicals were determined by agar well diffusion method.[8] Each microorganisms were grown overnight at 37°C in Mueller-Hinton Broth. 100µl of standardized inoculum of each test bacterium were inoculated on molten Mueller-Hinton agar, and poured into sterile Petri dishes. The Petri dishes were allowed to solidify inside the laminar hood. Standard cork borer of 5mm in diameter were used to make

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uniform wells into which 50µl of pulses extract in net, 1:2 and 1:4 dilutions were added using sterile PBS. The plates were then incubated at 37 ± 1°C for 24h. The zone of inhibition was measured with the help of standard scale.

Statistical analysis

All work was done in triplicates and the data presented are means ± S.D. of three independent determinations. Significance was accepted at $p \leq 0.05$.

III. RESULTS AND DISCUSSION

For the present study plant was collected from the Indore region M. P. It contain considerable amount of tannins, phytic acid and phenolics as shown in the (table1). They are reported as insect repellents or defense against predators but are harmful for human consumption in raw state.[9]. The highest concentration of phytochemicals were reported in plants was phenolics (1.28±0.02) and lowest amount of phytochemicals were reported in plants was phytic acid (0.96±0.05). Plant phenolics were recognized as an antioxidant molecules which the plant from predators. [10].

The results of the antimicrobial activity of phytochemicals are presented in (Table 2). We observe that the sensitivity tests of phenolics of the leaves show the positive effect of bacterial strains, giving varying diameters depending on the tested strains. The highest diameter of inhibitory zone was recorded by S. aureus of 12 mm at a concentration of 100mg/ml, 3.5 mm with the concentration of 50mg/ml and 1.8mm with the concentration of 25mg/ml but in case of E. *coli* 4.5 mm with neat, 1.2mm with 50 mg/gm 0.8mm with 25mg/ml concentration.There is interesting finding that phytic acid showed maximum inhibition zone with *E. coli*and it is 8mm with a concentration of 100mg/ml but no inhibition zone were obtained with the lower concentrations. The inhibition zone of phytic acid with*S. aureus*at a concentration of 100mg/ml is 2.8 mm and 1.8mm for 50 mg/ml and no activity were found at 25mg/ml. It was found that the effect of tannin on antibacterial activity is nil with both the strains.

Table1: Quantification of phytochemicals from plant

S.No	Tannin(mg/gm)	Phytic acid (mg/gm)	Phenolics (mg/gm)
***Magnifera indicia*L**	1.56±0.04	0.96±0.05	1.28±0.02

Table 2: Effect of antimicrobial activity of leaves phytochemicals.

Plant Phytochemicals	**Gram Positive (*S. aureus*)**			**Gram negative, (*E.coli*)**		
	Neat	**1:2**	**1:4**	**Neat**	**1:2**	**1:4**
Phenolics	12mm	3.5mm	1.8mm	4.5mm	1.2mm	……..
Phytic acid	2.8mm	1.8mm	……	8mm	……..	……
Tannin	…….	……..	……	……..	……	……

IV. CONCLUSION

Researchers are searching for plant metabolites which have antibacterial effect; to less dependent on allopathic medicines. Epidemiological and intervention studies indicate that phytochemicals are now considered as double edged sword. Besides their anti-nutritional properties, they also show antimicrobial activity and antioxidant properties. It is also suggested that further research will be conducted with more number of microbes with this family.

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