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A STUDY OF SYNERGESTIC ANTIMICROBIAL ACTIVITY OF PIGEON PEA AND CAPSICUM

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ABSTRACT

Antimicrobial activity of aqueous extract of leaves of Cajanus cajan and capsicum annum on Staphylococcus aureus and Escherichia coli were investigated. C.cajan and C.annum contain alkaloids, tannins, saponins, Carbohydrates and proteins at varying levels. Antimicribial activity of C.cajan, C.annum and mixture of both was as follows. The kinetics of kill of individual cells by addition of extract of culture medium indicated decrease in the number of viable counts during the period of monitoring. Analysis of variance showed that there was no significant difference between the antimicrobial activity of standard antibiotic gentamicin and aqueous extract of C.cajan or or C.annum and the mixture of bith on the isolates. This results suggests that the aqueous extract C.cajan or or C.annum and the mixture of both have antimicrobial properties which can be pharmaceutically exploited.

KEYWORDS: Antimicrobial activity, plant extract, Phytochemicals.

INTRODUCTION

Plant derived substances have recently become off great interest owing to their versatile application.[1] medicinal plants are rich bioresources of drugs.[2] A number of interesting outcomes have been found with the use of a mixture of natural products or plant extracts to treat disesses.[3] The antimicrobial property of plants have been investigated by a number of researchers worldwide through thorough biological evaluation of plants extracts is vital to ensure their efficacy and safety. These factors are of important if plant extracts are to be accepted as valid medicinal agents for the treatment of infectious disesse.[4] Especially in light of the emergence of drug resistant microorganisms.

Fig. 1: Cajanus cajan.

Cajanus cajan[5] belongs to the family Fabaceae, commonly called pigeon pea and locally known as red grains in South India. It is an important grain legume crop. It is widely used in as food. They contain high level of proteins and the important amino acids methionine, lysine, and tryptophan. The green leaves of Cajanus cajan is usually used traditionally as medicine, in the treatment of stomach or intestinal disorders.

Capsicum annum[6] belong to the family Solanaceae, commonly called chilli plant, locally in south India. It is widely used in food. Capsicum annam contain vitain A, B., C, AND E.with minerals like molybdenum, manganese, folate, potassium, thiamin, and copper.

Fig. 2: Capsicu annum.

Capsicum annum is the excellent source of vitamine A, B, C with inerals like molybdenum, manganese, folate, potassium, thiamin, and copper. Chilli contain 7 times more vitamine C than orange. Chillies have antioxidants that can destroy cholesterol which could cause major disease like atherosclerosis and other heart diseases, rheumatoid arthritis, dilates airway of lungs, detoicants, pain killer, antibiotic. Beta- carotene and folic acid found in chili reduces the risk of colon cancer. Chilies such as red pepper have cartonoid lycopene, which prevents cancer disease. This study was designed to evaluate the extract of Cajanus cajan and Capsicum annum as antimicrobial agent as well as phytochemical charecteristics.

MATERIALS AND METHODS

Source of plant

Cajanus cajan and Capsicum annum were collected from the medicinal garden of A.M.Reddy memorial college of pharmacy.

Extraction of plant

Fresh leaves of Cajanus cajan and Capsicum annum were collected and dried under shade. 50gms of dried leaves of each of the plant species was sepsrately soaked in 200ml of distilled water. Then heat for 45 min. at room temperature (28±2^{o}) with occasional shaking.[7] Each portion was filtered using whatman filter paper no: 1.the filterates were collected in different beakers. The filterates were evaporated to dryness for about 24 hours in a previously weighed evaporation dishes. After evaporation the dishes were re-weighed and the difference in their weights before and after evaporation were calculated and recorded. The plant etracts were stored in a clean sterile containers for further use.

Phytochemical screening

The extracts of the plant were screened for tannins, alkaloids, saponins, glycosides, steroids, flavanoids, proteins, aminoacids, carbohydrates.[8]

Sources of micro organisms

Pure cultures of Escherichia coli, staphylococcus aureus were obtained from microbiology laboratory of A.M Reddy memorial college of pharmacy, petlurivaripalem, Narasaraopet, Guntur (dt), Andhra Pradesh.

Anti microbial assay[5]

The inoculums size of each isolate was standardized. Each isolate was inoculated into agar medium and incubated for 3—6 hours to obtain a suspension of 0.5 macfarland turbidity standards (1×10^{6}cfu/ml). Anti bacterial screening was by agar well diffusion method. A 1.0 ml volume of the standard suspension (1×10^{6}cfu/ml) was spread evenly on agar plates using sterile glass rod. Subsequently 6mm diameter wells were bored in the agar and a 100µl volume of easch plate extract reconstituted in 50% Distilled water to a concentration of 100 mg/ml was placed into triplicate wells. The plates were incubated at 37^{o}c for 24 hours and the inhibition of bacterial growth was measured to the nearest mm. Gentamycin was used as positive control.

Fig.3: Antimicrobial activity of plant extracts against S.aureus.

Fig.4: Antimicrobial activity of plant extracts against E.coli.

RESULTS AND DISCUSSIONS

Antimicrobial activity ofaqueous extracts of C.cajan, C. annum and the mixture of both was investigated. The phytochemical charecteristics of Cajaanus cajan showed the presence of saponins, flavanoids, and proteins. The phytochemical charecteristics of Capsicum annum showed the presence of saponins, alkaloids, flavanoids and carbohydrates.

Table 1: Phytochemical screening of crude plant extracts.

S.no	Test	Cajanus cajan	Capsicum annum
1	Saponins	+ve	+ve
2	Alkaloids	-ve	+ve
3	Flavanoids	+ve	+ve
4	Tannins	-ve	-ve
5	Proteins	-ve	-ve
6	Carbohydrates	+ve	+ve

The antimicrobial activity of the extracts on the bacteria revealed inhibition of growth. The zone of inhibition of Cajanus can was more compared to the zone of inhibition of Capsicum

annum. The zone of inhibition of the mixture of both plant extracts against S. aureus and E.coli was almost similar to the standard that is Gentamycin.

Table 2: Zone of inhibition(mm) of microorganisms by plant extracts.

Plant	S.aureus	E.coli
Cajanus cajan	1.7	1.6
Capsicum annum	1.3	1.5
Mixture of both plants	1.9	1.7
Gentamycin	2.0	1.8

CONCLUSION

Antimicrobial activity of aqueous extracts of C.cajan, C. annum and the mixture of both was investigated. The phytochemical charecteristics of Cajaanus cajan and Capsicum annum were evaluated. The antimicrobial activity of the extracts against S aureus and E.coli revealed inhibition of growth. The zone of inhibition of Cajanus can was more compared to the zone of inhibition of Capsicum annum. The zone of inhibition of the mixture of both plant extracts against S. aureus and E.coli was almost similar to the standard that is Gentamycin. Finally the combinational use of aqueous extracts of the leaves of Cajnus cajan and Capsicum annum showed good results when compared with individual and as well as with Standard drug Gentamycin against S.aureus and E.coli.

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