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Research Article

**A STUDY ON SYNERGESTIC WOUND HEALING ACTIVITY
OF CAPSICUM AND PIGEON PEA****Geetha Rani Valaparla*, Tejaswini K, Divya Vani P, Sirisha K, Srikanth K,
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Abstract:

*A study to investigate the use of aqueous extracts of poly herbs in promoting wound healing on experimentally induced open wound in albino rats was conducted. The wound healing activity of aqueous extract of the leaves from *Cajanus cajan* (AECc) and *Capsicum annum* (AECa), was evaluated by the rats of healing by wound concentration and period of epithelization at different days post- wound using the wound excision model. On day 9th, the mixture of AECc and AECa –treated animals exhibited significant reduction in the wound area than individual plant extracts when compared with standard drug silver sulphadiazine.*

Key Wards: *Wound healing activity, plant extract, Excision wound model, *Cajanus cajan*, *Capsicum annum****Corresponding author:**

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INTRODUCTION:

Plant derived substances have recently become of 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 diseases.³The 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 disease [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 annum* contain vitamin A, B., C, and E. with minerals like molybdenum, manganese, folate, potassium, thiamin, and copper.



Fig. 2: Capsicum annum

Capsicum annum is the excellent source of vitamin A, B, C with minerals like molybdenum, manganese; folate, potassium, thiamin, and copper. Chilli contains 7 times more vitamin 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, desiccants, pain killer, and antibiotic. Beta- carotene and folic acid found in chili reduces the risk of colon cancer. Chillies such as red pepper have carotenoid 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 characteristics.

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 separately soaked in 200ml of distilled water. Then heat for 45 min. at room temperature (28 ± 2) with occasional shaking [7]. Each portion was filtered using whatman filter paper no: 1. The filtrates were collected in different beakers. The filtrates 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 extracts were stored in clean sterile containers for further use.

Phytochemical screening

The extracts of the plant were screened for tannins, alkaloids, saponins, glycosides, steroids, flavanoids, proteins, amino acids, and carbohydrates.

Animals

Albino rats of either sets weighing 150 to 200 gm were obtained from sainadh agencies Hyderabad. The animals were maintained with free access to food and water and kept at 22- 28°C with a controlled 12 hours light/ dark cycle at animal house of A.M. Reddy memorial collage of pharmacy. The animals were allowed to adapt to the laboratory for at least 2hours before testing and were used only once. All experiments were carried out in accordance with institutional guidelines and ethics.

Excision wound model

Excision wound was created by according to the method [8] with some modification and animals were categorized as according to selected evaluation parameters. The animals were anesthetized with thiopental sodium and shaved at the predetermined site before wounding. A circular wound was inflicted by cutting away approximately 1.6cm of diameter of the predetermined area on the anterior – Dorsal side of each rat using sterile surgical blade. The animals were then placed in separate cages to avoid any disturbance. The bedding was changed daily. After

skin excision the wound was left open to the environment.

All animals' recieved topical application of solutions containing group-1-mixture of AECc and AECa, group-2-AECc, group-3-AECa, group-4-standard silver sulphadiazene, group-5-saline water on wound. Groups were topically treated once a day with plant extracts of respective groups. Wound contraction was calculated as percentage reduction in wound area. The progressive changes in wound area were monitored by a camera from wounding day to 9th day.

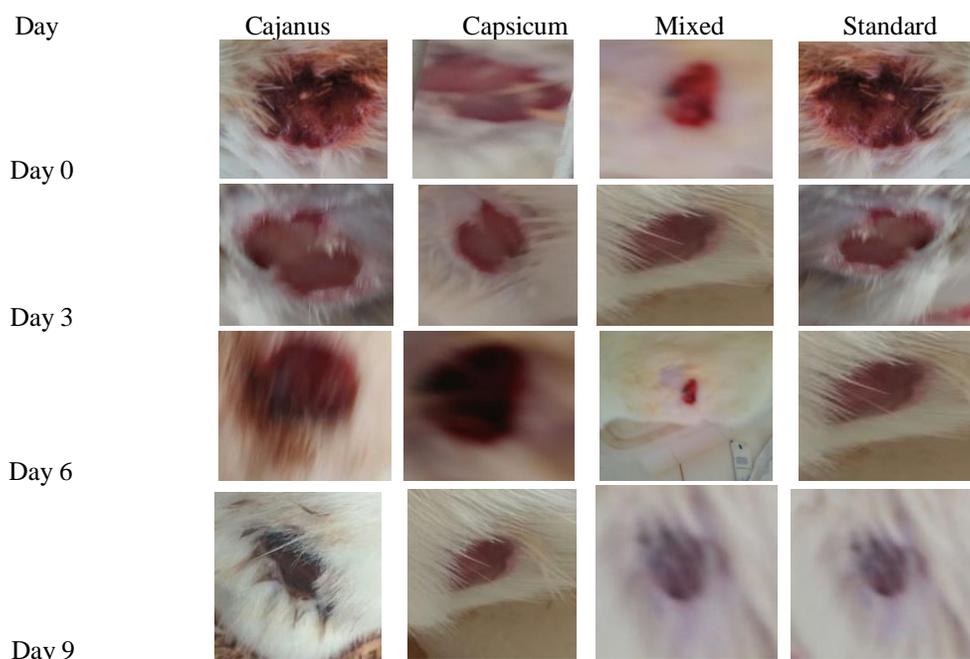


Fig. 3: Wound healing activity of crude plant extracts

% wound contraction and epithelization period

The progressive changes in excision wound area were measured on cm by tracing the wound boundaries on a transparent paper on each 3 days interval until complete wound healing. The wound areas in all groups were mentioned in the table 2.

Wound contraction was expressed as a reduction in the percentage of the original wound size. The percentage wound contraction was determined using the following formula

$$\% \text{ wound contraction} = \frac{\text{healed area}}{\text{total wound area}} \times 100$$

Epithelization time refers to the number of days taken by the wounds to appear completely closed with no moist granulation tissue, and the wound were covered with new epithelium.

RESULTS AND DISCUSSIONS:

The phytochemical characteristics of *Cajanus cajan* showed the presence of saponins, flavanoids, and proteins. The phytochemical characteristics of *Capsicum annum* showed the presence of saponins, alkaloids, flavanoids and carbohydrates. Table 1 shows the results of phytochemical investigation.

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

Table 2: Excision wound studies showing percentage reduction in wound size when treated with different extracts in rats

Treatment	Day 3	Day 6	Day 9	Day 12	Day 15	Day 18	Day 21	Day 24
Group 1 C.cajan	40.8±0.5	48.3±0.5	58.5±0.5	68.3±0.5	79.6±0.5	82.5±0.5	87.3±0.5	90.7±0.5
Group 2 C.annum	47.2±0.5	59.7±0.5	67.8±0.5	73.6±0.5	80.0±0.5	84.9±0.5	88.3±0.5	91.5±0.5
Group 3 Mixture	53.8±0.5	64.8±0.5	71.6±0.5	78.9±0.5	82.7±0.5	87.3±0.5	91.7±0.5	97.6±0.5
Group 4 Standard	58.6±0.5	69.5±0.5	75.9±0.5	81.5±0.5	84.7±0.5	89.5±0.5	92.8±0.5	98.4±0.5

The wound healing activity of the plant extracts were evaluated on rats in excision wound model. They are of the wound was measured on the day 3, 6 and 9days post surgery in all groups. The measurement of the progress of wound healing induced by the extracts mixture, individual extracts, standard drug are shown in Table 2.

CONCLUSION:

Wound healing activity of aqueous extracts of C.cajan, C. annum and the mixture of both was investigated. The phytochemical characteristics of Cajanus cajan and Capsicum annum were evaluated. The wound healing capacity of Capsicum annum was more compared to the wound healing capacity of Cajanus. The wound healing capacity of the mixture of both plant extracts similar to the standard that is silver sulphadiazene. Finally the combinational use of aqueous extracts of the leaves of Cajanus cajan and Capsicum annum showed good results when compared with individual and as well as with Standard drug silver sulphadiazene.

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