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Evaluation of in vivo Wound healing activity of *Jasminum angustifolium* linn on excision wound model in rats

Kukloria Sonam*., Singune Shantilal., Bele ,D.S., Kukloria Gagan
Department of Pharmacology,
Charak Institute Of Pharmacy Mandleswar, Madhya Pradesh ,India

Abstract
Objective: *To evaluate the wound healing effect of ethanolic and aqueous extract of dried roots of Jasminum angustifolium linn in rats.* ***Methods:*** *wound model excision wound were used in this study .The parameter studies were percentage of wound contraction and period of epithelialization in excision wound model.The ethanolic and aqueous extract of Jasminum angustifolium linn administered at 300mg/kg per day for 20 day.* ***Result :****In excision wound model ,the percentage of wound contraction was significantly (P<0.05) increased by doses of test extract on all the days .****Conclusion:*** *The results suggest that ethanol and aqueous extract of Jasminum angustifolium Linn was found to possess significant wound healing property.this was evident by decrease in the period of epithelialization ,increase in rate of wound contraction. Hence Jasminum angustifolium linn could be a good wound healer agent.*

Keywords: *jasminum angustifolium Linn, wound healing, excision, wound, % of wound contraction, Rats*

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I. INTRODUCTION

Wounds are physical injuries that result in an opening or breaking of the skin. Proper healing of wounds is essential for the restoration of disrupted anatomical stability and disturbed functional status of the skin. Repair of injured tissues occurs as a sequence of events, which includes inflammation, proliferation, and migration of different cell types . The inflammation stage begins immediately after injury, first with vasoconstriction that favors homeostasis and releases inflammation mediators The proliferative phase is characterized by granulation tissue proliferation formed mainly by fibroblast and the angiogenesis process. The remodeling stage is characterized by reformulations and improvement in the components of the collagen fibre that increases the tensile strength. Factors that contribute to causation and perpetuation of the chronicity of wounds include repeated trauma poor perfusion oxygenation excessive inflammation . Imbalance in free radical generations and antioxidants has been observed to induce oxidative stress and tissue damage and delayed wound healing. Therefore, elimination of ROS could be an important strategy in healing chronic wounds

Jasminum angustifolium Linn.belonging to the family Oleaceae2,3 is distributed in south India (kerala, Karnataka) on the hills lower elevation. *Jasminum angustifolium* Linn. wild. The traditional systems of Siddha and Ayurvedic medicine use this plant alone or in combination with other medicinal plants for the treatment of various diseases .It *Jasminum angustifolium* Linn. Hence I chosen this plant to screen the basic wound healing activity using animal model.

II. MATERIAL AND METHODS

2.1 Animals care and handling ,

This was done as per the guidelines set by the Indian National Science Academy New Delhi India .Adult wistar rats (100-150g), were employed for wound healing activity study used. They were housed under controlled condition of temperature of (25±2)°C, of humidity of 50% and 10-14 hr of light and dark cycles respectively .The animals were housed individually in polypropylene cages containing sterile paddy husk (procured locally) as bedding throughout the experiment and had free access to sterile food and water libitum. Animal were kept under fasting for overnight and weighted before experimental. Ethical clearance for the animal study was obtained from institutional animal Ethical Committee.

2.2 Collection and Preparation of extract of *jasminum angustifolium* linn:-

The whole Plant *Jasminum angustifolium* Linn.were collected from the Sitaram nursery Indore M.P.and was identified by Dr.S.K. MAHAJAN Department of botany P.G. college Khargone. M.P. India**.** The coarsely powdered sroots(100g) of *Jasminum angustifolium* were extracted to exhaustion in a soxhlet apparatus with 500ml of ethanol. Then the Extracted material was successively extracted with ethanol for 72hours

followed by maceration with water for aqueous extract. These extracts were dried by rotary vaccum dryer. Both the extracts were stored in air tight container for further study.The resulting extracts were dissolved in distilled water and used for animal study at the dose of 300mg/kg, 250mg/kg of Ethanol andaqueous extract of *Jasminum angustifolium*Linn

2.3 Acute toxicity studies

Healthy wistar rats of either sex were chosen and divided into six groups(n=6).they were starved overnight .They were orally fed with graded doses of ethanolic and aqueous extract of *Jasminum angustifolim* Following the administration ,the animals were closely observed during first 24 hours. Rats of either sex weighing 100-150 g were used for the study. The ethanolic and aqueous extracts were administered orally to overnight fasted animals at doses of 30 mg/kg, 100 mg/kg, 300 mg/kg, 1000 mg/kg and 3000 mg/kg of body weight. After administration of the extracts, the animals were observed continuously for the first three hours, for any toxic manifestation like increased motor activity, salivation, acute convulsion, coma and death. Thereafter, observations were made at regular intervals for 24 hours. Further the animals were under investigation up to a period of one week.

2.4 Study design

The animal were randomly allocated into six groups with six animals for wound model. Group 1 received 2ml of 0.5% CMC by oral through intragastric tube. Group 2 standard drug 400mg/kgGroup 3 and 4 300mg/kg, 250 mg/kg of *Jasminum angustifolim* ethanolic extract by oral route .Group 5 and 6 300mg/kg, 250mg/kg aqueous extract by oral route respectively.

Dosing schedule- *Jaminum angustifolium* extractand vitamin E were administered orally .once daily from 0 to 22 days in excision wound model .

2.5 Experimental Wound Model

Excision Wound Model:-. Rats were anesthetized with ketamine (30mg/kg,ip) and an area of about $5cm^2$ was marked on the back of the rat by a standard ring. Full thickness of the marked skin was then cut carefully. Wounds were traced on $1mm^2$ graph paper on the day of wounding and subsequently at a gap period of 4 days till 12th day, then on the alternate days until healing was complete. Changes in wound area were measured regularly and the rate of wound contraction calculated as given in the formula below. Significance in wound healing of the test group is derived by comparing healed wound area on respective days with healed wound area of control group. The healed area was calculated by using sub tracing wound area from the original wound area .the percentage of wound contraction was calculated using the formula :-

% of wound contraction = [Healed area - Total wound area] × 100,
(Healed area= original wound area − present wound area)

2.6 Statistical Analysis

Value are expressed in mean±SEM .Result were analysed by one way analysis of (ANOVA) followed by Dunnett's test for multiple comparisons" instead of "for multiple comparisons verses control group was done by Dunnett's test. P value <0.05was considerd significant.

III. RESULTS

the % of wound contraction was 22±1.1,40.54±0.77,60.54±0.77,71.3±0.88,74.01±0.53,79.22±2.2,82.13±11as measured on 4 day,to 22 day while complete epithelization and healing were observed on day 22. The percentage rate of wound contraction in rats treated orally with JAE (300mg/kg) was from 31.9% on day 4 to 73.64% on day 12 and 93.9% to 100% from day 14 to 22 day respectively ,while Vitamin E treated rats showed increase in wound contraction from 30.31% on day 4 to 71.30% on day 12 and 93.82 % to 100 from day 14 to 22, respectively.

The mean of % of wound contraction showed faster healing which was comparable with VTE treated group (table)

Table: Excision wound model induced in rats

Treatment	% of wound contraction						
	4th day	8th day	12th day	16th day	18th day	20th day	22nd day
Control	22±1.1	40.54±0.77	60.54±0.77	71.3±0.88	74.01±0.53	79.22±2.2	82.13±1.1
Vitamin E	30.31±0.65	44. 53±0.3*	71.30±0. 61*	93.82±1.03**	95.0±0.3**	100±0.0**	100±0.0**
EE(300mg/Kg	31.90±0.1*	41.53±0.48*	73.64±0.12*	93.90±0.7**	95.40±0.2*	98.33±0.5*	100±0.0**

EE(250mg/Kg)	32.50±0.4*	45.03±0.51*	70.73±1.0*	93.06±0.73**	95.40±0.2*	98.05±1.2*	100±0.0**
EA(300mg/Kg	32.03±0.2*	47.23±0.28*	73.01±0.58*	93.9±0.72**	95.0±0.3*	98.33±0.5*	100±0.0**
EA(250mg/Kg)	32.6±0.5*	47.79±0.4*	71.92±0.68*	93.7±0.73*	95.71±0.2*	98.2±1.1*	100±0.0**

IV. DISCUSSION

Plants have served as a good source of wound healing agents. Several studies have been conducted on herbs under a multitude of ethnobotanical grounds. A large number of plants possessing wound healing properties have been documented . Whole plant of *Jasminum angustifolium* Linn was traditionally used in the treatment of wound. The present investigation was carried out to evaluate the wound healing activity of the EEJA and AEJA in EAC wound bearing rats.

In excision wound, JAE showed faster healing compared with control group. Further, excision biopsy of skin wound at day 10 showed healed skin structures with normal epithelization, restoration of fibrosis within the dermis in JAE and VTE treated groups, while the control group lags behind treated group in formation of the amount of ground substance in the granulation tissue. The faster wound contraction by JAE may be due to stimulation of interleukin-8, an inflammatory α-chemokine which affects the function and recruitment of various inflammatory cells, fibroblasts and keratinocytes, and may increase the gap junctional intracellular communication in fibroblasts, and induces a more rapid maturation of granulation tissue .

The preliminary phytochemical analysis of *Jasminum angustifolium* revealed the presence of ethanolic extract showed presence of Carbohydrates, Alkaloids, Glycoside, Steroids, Phenols and saponins. And Aqueous extract showed presence of Carbohydrates, Alkaloids, Tanins, Quinones,Phenols Steroids. Different solvents were prepared by ethanol and aqueous extract using standardized procedure and also subjected to wound healing activity. *Jasminum angustifolium* exhibited significant wound healing activity

V. CONCLUSION

In conclusion, the ethanol extract of *Jasminum angustifolium* Linn was effective in wound contraction excision models. The biochemical and histological studies supported its antioxidant and hepatoprotective properties. The present work demonstrates that ethanolic and aqueous extract of roots of *Jasminum angustifoliium* has wound healing activity in rat. It is concluded from the study that in excision model (ethanolic extract) showed 100% wound healing in 20 days and (aqueous extract) of roots of *Jasminum angustifolium* shows 100% wound healing activity in 22 days

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