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Study of Wound Healing Activity of Seeds of Trigonella Foenum Graecum in Rats

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The aqeous suspension and extract of the seed of Trigonella foenum graceum was investigated for wound healing properties in excision, incision and dead space wound models in rats. Results indicate that the suspension and extract promoted significant wound healing activity. The histological studies also support the results.

THE medicinal attributes (1,2) of **T. foenum graceum** have been known since a long time. The seeds of the plant, are used as astringent, emollient, antidiarrhoeal and antidiabetic. A number of biological (3,4,5) and pharmacological (6,7,8) properties have been reported. It is reported to promote milk secretion in nursing mothers probably through increased prolactin secretion. The seeds also contain large quantity of folic acid and it is used as wound healing agent in households. This led us to study the wound healing properties by excision, incision and dead space wound models.

MATERIALS AND METHODS

Preparation of seed suspension and extract:-

Finely powdered seeds were soaked in distilled water (500 mg/ml) and kept for 12 hours at room temperature. The seed powder suspended in water, as such was used as seed suspension, whereas, the filtrate obtained from suspension is called seed extract.

Male albino rats (150-200 g) starved overnight but provided water **ad libitum** were used. There were nine groups of six rats in each group. Three groups served as control for each model of wound and received 1 ml/kg of normal saline p.o. Other groups received seed suspension or seed extract once daily at the dose of 1 ml/kg (500 mg/kg) for 10 days in incision and dead space wound models, while till the wounds healed in excision wounds.

Excision wounds :- It is inflicted in rats as described by Morton and Malone[9] under light ether anesthesia. The skin of the impressed area was excised to the full thickness to obtain a wound area of about 500 sq. mm. The parameters studied were wound closure, epithelization time and scar features.

The percentage wound closure was recorded day 1, day 4, day 8, day 12 and day 16 and on alternate days till complete epithelization. The scar shape and area were traced and measured planimetrically. Then the actual value was converted into percentage value taking the size of the wound at the time of wounding (2 cm^2) as 100%.[10]

Incision wound : The rats inflicted with incision wound as described by Ehrlich and Hunt[11] under light ether anaesthesia. The wounds closed with interrupted sutures which were removed on 8th post wound day. The tensile strength of 10 day old wound was measured by the methods of Lee.[12]

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Table : 1: Influence of T. foenum gracecum seed extract and Suspension on wound healing models

DRUG	Percentage of closure of excision wound area After days.						Incision wound			Dead space wound	
							Epithelisation	scar	tensile	Granuloma	Tensile
	4	8	12	16	18	20	Time in days	area sq.mm	strength g	Dry wight mg/100 g	Strength g
Normal Saline	29.8 ± 1.34	54.7 ± 1.90	68.2 ± 2.10	84.7 ± 1.89	91.0 ± 0.91	92.2 ± 0.88	23.3 ± 0.49	55.6 ± 8.34	283.3 ± 22.3	20.25 ± 2.14	305.8 ± 24.67
Seed extract	37.2* ± 0.75	60.5* ± 2.62	78.6* ± 2.25	91.3* ± 1.22	97.2* ± 1.60	99.1* ± 0.30	18.9* ± 0.48	42.8* ± 3.24	403.3* ± 12.9	32.88* ± 2.25	393.3* ± 22.68
Seed suspension	38.1* ± 0.82	65.5* ± 1.02	82.1* ± 1.46	93.1* ± 1.09	98.9* ± 0.28	99.9* ± 0.13	16.6* ± 0.66	33.6* ± 2.36	445.8* ± 17.6	40.97* ± 3.33	431.67* ± 21.24

't' test P<0.05 at all hours

Excision wound; ANOVA F (11,60) = 1976 P<0.05

Dead space wound : In rats, subcutaneous implantation of strelised cotton pellets (10 mg each) and plastic rods (2.5 cm x 0.3 cm) was done in the axilla and groin respectively by the method of D'Arcy as described by Turner.[13] The 10 day old granuloma after overnight drying at 60° were weighed and the weight was expressed as mg/100 g. The granuloma was subjected to tensile strength test and histological study.

All results were analysed using students 't' test and one way ANOVA test for excision wound data.

RESULTS AND DISCUSSION

As shown in the **Table** the percent closure of excision wound area was significantly increased in both seed extract and suspension treated groups as compared to control (P<0.05). The time required for complete epithelization and scar area on complete epithelization were significantly decreased by either the suspension or the extract of the seeds.

In incision wound studies, there was a significant increase in tensile strength of ten days old wound due to treatment with either the seed suspension or the extract. In dead space wounds, there was a significant increase in granuloma weight and tensile strength in both the seed suspension and extract treated groups. The histological study of granuloma tissue revealed that in extract treated group, there was moderate amount of collagen with less amount of Lymphocytes and cell necrosis. Collagen maturity was better than control. In suspension treated group, increased amount of collagen with negligible amount of Lymphocytes was observed. Collagen maturity and orientation was excellent.

Both the extract and suspension of seeds of **T. foenum graecum** were found to have significant wound healing activity in all wound models. The suspension was more effective than the extract in all models. [F (11,60) = 1976 P<0.05) for excision wound] incision wound (P<0.05) dead space wound granuloma weight (P<0.05) and tensile strength (P<0.05).

Wound healing involves different phases such as contraction, epithelization, granulation, collagenation and so on. The wound healing property of the seeds may be probably due to the presence of high amount of water soluble amino acids, vitamins especially high content of folic acids,[1] which is essential for cell proliferation. These finding indicate the wound healing potential of these seeds in clinical practice.

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