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RESEARCH ARTICLE

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PRECLINICAL EVALUATION OF ASPARAGUS RACEMOSUS SEED OIL EXTRACT'S WOUND HEALING EFFICACY

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ABSTRACT: Background: Medicinal plants are important for pharmacological research and drug development. **Aim and Objective**: The aim objectives of present study was to evaluate the wound healing activity of seed oil of *Asparagus racem*osus in Excision and Incision wound models in rats. **Result Discussion**: The study thus demonstrated the as wound healing activity of *Asparagus racemosus* seed oil and found to be effective in the functional recovery of the wound. It promotes wound contraction of excision wound as compared to control group.

Keywords: Medicinal plants, *Asparagus racemosus*, wound healing, Drug development

INTRODUCTION

Herbal medicines which formed the basis of health care throughout the world since the earliest days of mankind are still widely used and have considerable importance in international trade. Recognition of their clinical, pharmaceutical and economic value is still growing, although this varies broadly between countries [1]. Medicinal plants are important for pharmacological research and drug development, not only when plant constituents are used directly as remedial agents, but also as starting materials for the synthesis of drugs or as models for pharmacologically active compounds. Regulation of development and exportation is therefore essential, together with international cooperation and coordination for their conservation so as to ensure their availability for the future. The United Nations Convention on Biological Diversity states that the conservation and sustainable use of biological diversity is of critical importance for meeting the food, health and other needs of the growing world population, for which purpose access to and sharing of both genetic resources and technologies are essential [2, 3]. *Asparagus racemosus*, often known as shatavari, is a key plant in Ayurveda since it has the potential to cure or prevent hundreds of different diseases. It reigns supreme among herbs and earns the title "herb's queen." Steroidal glycosides, saponins (most notably Shatavarins I, II, III, and IV), polyphenols, flavonoids, alkaloids (racemosol), and vitamins are some of its bioactive components. Sapogenin, found in shatavari, is a precursor to numerous pharmacologically active steroids, making this plant widely used in folk and Ayurvedic medicine. Roots, stems, and leaves are the most important parts although the plant as a whole has therapeutic properties. The "Rasayanas" made from shatavari are excellent for warding off illness. Many ailments are treated with it because of the phytochemicals it contains. The phytochemicals in it are used to treat a wide range of conditions. Antispasmodic, anti-oxidant, anti-diabetic, anti-allergic, anti-malarial, protective, anti-neoplastic, immune response enhancing, anti-arthritic, anti-inflammatory, anti-periodic, anti-ulcerogenic action, immune modulatory, antistress, anti-diarrheal, antidepressant, infections, tuberculosis, and so on are just some of the many medicinal properties of shatavari. Medications made from Shatavari extract on the market have been shown to have beneficial effects against leprosy, abortion, infection, fever, and pain. Dyspepsia, mental disorders, cough, bronchitis, throat, and female reproductive system problems may all be alleviated by shatavari root, leaf, flower, and stem extracts [4-8]. A wound is a type of injury which happens relatively quickly in which skin is torn, cut, or punctured (an open wound), or where blunt force trauma causes a contusion (a closed wound). In pathology, it specifically refers to a sharp injury which damages the epidermis of the skin.

Fig. 1: Shatavari seed oil

MATERIAL AND METHODS

Extraction of Neem Seed Oil

Shatavari seed were purchased and authenticated by Janta Postgraduate College, A.P.S. University, Rewa (486001), M.P. India, is where the specimen was deposited at the university's herbarium house. J/Bot/2022APS-019.The raw materials were dried by using an oven with temperature of 60°C, ground to powder and then macerated and extracted with the use of water. The Aqueous method of Extraction was selected as It Is Economical and Environment Friendly.

Animal Selection

Albino rats of 6-8 weeks old and 160-180g body weight. All rats were kept at room temperature and allowed to accommodate in standard conditions at 12hr light and 12-hr dark cycle in the animal house. Animals were fed with commercial pellet diet and water ad libitum freely throughout the study The Experimental Procedure was approved by IAEC (Institutional Animal Ethical Committee.

Preparation of Ointment

10 g of blank petroleum jelly B.P (obtained from the Formulation Unit, Department of Pharmaceutics, MPCP) was weighed into a beaker and then melted in a in a thermostatic water bath. The required quantities of antibiotics (Tobramycin) were weighed, added to the molten ointment base and then homogenized by trituration and stored in a tight glass bottle.

Experimental Process

Rats were divided into 3 groups each containing 5 animals as follows markings.

Group	*Group Specification*	*Intervention*
Group I	Simple base ointment	Base Ointment
Group II	Standard	Tobramycin (1%)
Group III	Test drug	Satavari seed oil

Wound Induction

A full thickness of the excision wound of 177 mm^2 created along the markings using toothed forceps, a surgical blade and pointed scissors. The entire wound left open. All the surgical interventions were carried out under sterile condition. After 24 h of wound creation, the ointments were applied gently to cover the wounded area once daily until complete healing wound area and wound contraction, epithelialization period [9, 10].

Estimation Parameter

Measurement of Wound Contraction

The progression of wound healing was judged by the periodic assessment of the contraction of excision wounds. Wound contraction was monitored by tracing the outline of the wound on tracing sheet and then using graph sheet to calculate the area of the wound size. All animals in each group were monitored until complete healing of wounds occurred and the day at which each wound healed was recorded. Mean of all healed wounds was determined.

Percent wound contraction = Healed area / Total area × 100

Statistical Analysis

Data of all the parameters were analyzed using the Graph pad 5.0 software. Analysis of Variance (ANOVA); one way ANOVA followed by Dunnets comparison test was performed. The values were expressed as Mean ± SEM. P value<0.05 was considered as significant [11-12].

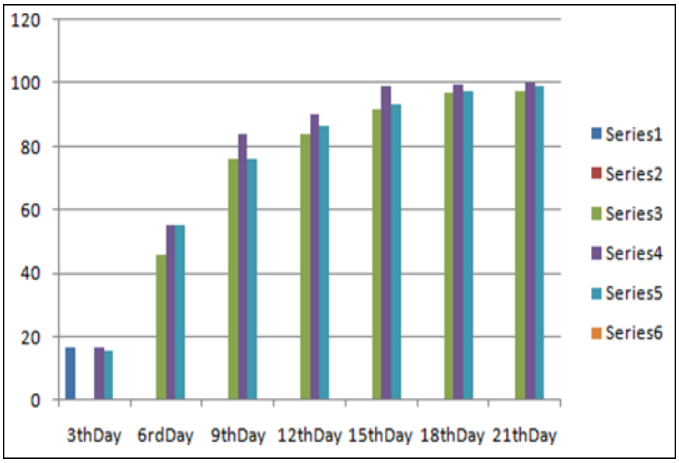

Fig. 2: Effect of Shatavari seed oil on % wound contraction in excision wound model

Table 2: Percentage wound contraction in excision wound model

Compounds	*3th Day*	*6rd Day*	*9th Day*	*12th Day*	*15th Day*	*18th Day*	*21th Day*
	% WC	*% WC*	*% WC*	*% WC*	*% WC*	*% WC*	*% WC*
Simple base ointment	147.43±0.2 (16.71)	94.04±0.28 (46.30)	42.86±0.28 (76.35)	29.28±0.13 (84.02)	13.52±0.07 (91.79)	5.32±0.07 (97)	3.90±0.28 (97.80)
Standard	147.43±0.2 (16.71)	79.55±0.28 (55.62)	29.28±1.33 (84.02)	18.35±1.13 (9020)	1.30±0.64 (99.25)	0.39±0.19 (99.78)	0.00±0.00 (100)
Shatavari seed oil	149. ±0.64 (15.46)	78.57±0.39 (55.61)	42.87±0.04 (76.34)	24.77±1.33 (86.57)	11.34±0.95 (93.59)	4.17±0.21 (97.65)	1.33±0.07 (99.25)

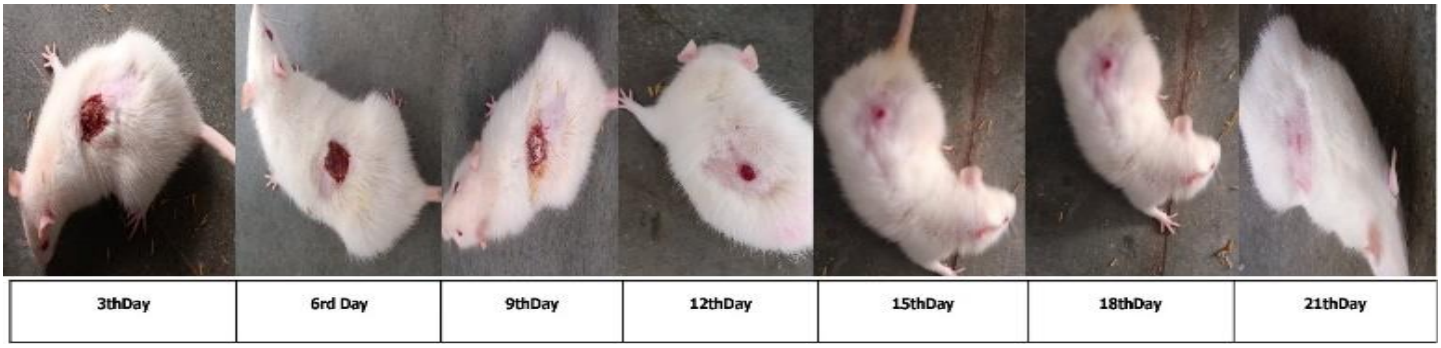

Fig. 3: Effect of Shatavari seed oil on different days

RESULT AND DISCUSSION

More than 99% healing at 21th days were observed in 97% of cases in Group I, 100% in Group II, 99% in Group III, which shows statistical insignificance of healing in Group II & III. Beneficial effects of therapy were obvious from 18th onwards. Among these animals' pus and discharge decreased and granulation tissue began to appear by 2nd week. Antimicrobial effects of Shatavari oil have been demonstrated against Streptococcus mutans and Streptococcus faecalis. It has shown faster wound closure of punch wounds by re-epithelialization of the epidermis and increased migration of various cells including myofibroblasts, fibroblasts, and macrophages in the wound bed. Multiple areas within the dermis showed extensive neo-vascularization as well**.**

CONCLUSION

The use of Shatavari seed oil in Indian traditional systems of medicine for wound healing has been justified by this work. The neem seed oil showed highly significant pro-healing effect almost equivalent to standard drug, which may be partly due to the anti-inflammatory activity, proliferation of fibro collagenous tissue and angiogenesis properties. Hence, it can be used as a wound healing agent if it is confirmed by clinical trials, which would be cost effective. As animal studies cannot be directly compared with effects on humans, there is a need for clinical evaluation in humans**.**

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DATA AVAILABILITY STATEMENT

All of the data supporting the findings of the presented study are available for corresponding author on request.

CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.is it under review.

SUPPLEMENTARY FILE

None.

CREDIT AUTHORSHIP CONTRIBUTION STATEMENT

All authors participate equally.

CONFLICT OF INTEREST: Nil

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