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Research Article

EVALUATION OF WOUND HEALING ACTIVE PRINCIPLES FROM *PRUNUS PERSICA*

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ABSTRACT

Wound healing processes are well organized biochemical and cellular events leading to the growth and regeneration of wounded tissue in a special manner. The peach (*Prunus persica*) is a deciduoustree belonging to family Rosaceae. The 50gm of the powdered material of the plant was loaded into soxhlet apparatus separately for extraction with the solvent of increasing order of polarity (n- Hexane, Chloroform and Methanol). The extract was filtered through Whatman's filter paper. It is observed that the wound contracting ability of the 10% (w/w) extract ointment treated groups showed significant wound healing from the sixth day onwards. The wound closure time was lesser, as well as the percentage of wound contraction was more with the 10% (w/w) extract ointment treated group.

Keywords: Wound healing, *Prunus persica*, Soxhlet and Contraction.

INTRODUCTION

To discover the secret uses of the plants, ethnobotany, has became an important part of our world. Recent ethnobotanical surveys among tribal have brought new information to the screen which can be utilized to improve the economy of the tribes by organizing systematic collection of forest product and locating cottage industries especially of herbal drugs.

The peach (*Prunus persica*) is a deciduoustree, nativeto North-West China, in the region between the Tarim basin and the north slopes of the Kunlun Shan mountains, where it was first domesticated and cultivated. It is as well cultivated in valley of Kashmir. It bears an edible juicy fruit also called a peach. The species name *persica* refers to its widespread cultivation in Persia, whence it was transplanted to Europe. It belongs to the genus*Prunus* which includes the cherry and plum, in the familyRosaceae. The peach is classified with the almond in the subgenus *Amygdalus*, distinguished from the other subgenera by the corrugated seed shell.

Wound healing processes are well organized biochemical and cellular events leading to the growth and regeneration of wounded tissue in a special manner. Healing of wounds is an important biological process involving tissue repairs and regeneration. It involves the activity of an intricate network of blood cells, cytokines, and growth factors which ultimately leads to the restoration to normal condition of the injured skin or tissue. The aim of wound care is to promote wound healing in the shortest time possible, with minimal pain, discomfort, and scarring to the patient and must occur in a physiologic environment conducive to tissue repair and regeneration.

The basic principles of optimal wound healing which include minimizing tissue damage, maximizing tissue perfusion andoxygenation, proper nutrition and moist wound healing environment have been recognized for many years. A number of drugs ranging from simple analgesics to complex and expensive chemotherapeutic agents administered in the management of wound affect healing either positively or negatively.

Many medicinal plants are claimed to be useful for wound healing in the traditional system of medicine. These plant remedies (both single plant and multiherbal reparations) are used since ancient times even if the mechanism of action and efficacy of very few of them have been evaluated scientifically (Nagappa *et al.,* 2001). There are several

reports stating that the extracts of several plants, used for wound healing properties (Diwan *et al.,* 1982; Udupa *et al.,* 1989; Suguna *et al.,* 1996; Saha *et al.,* 1997; Sunil kumar *et al.,* 1998; Govindarajan *et al.,* 2004; Stephen *et al.,* 2010; Rasik *et al.,* 1999; Mukherjee and Suresh, 2000; Park and Chun, 2001; Nagappa and Cheriyan, 2001; Perez Gutierrez and Vargas, 2006).

MATERIALS AND METHODS

The plant material of *Prunus persica* was collected from the field around Anantnag Kashmir. The plants was identified and authenticated by the taxonomist of botany department of S.S.L. Jain College Vidisha. A voucher specimen of the plant material was procured in the herbarium data sheet of the laboratory. The plant material was washed thoroughly with water and then air dried in shade at room temperature 25 ± 2°c for more than 15 days. The air dried plant material was grinded to powder about 40 – 60 mesh size. The 50gm of the powdered material of both the plants was loaded into soxhlet apparatus separately for extraction with the solvent of increasing order of polarity (n- Hexane, Chloroform and Methanol). The extract was filtered through Whatman's filter paper. Then the crude extract was concentrated in the vacuum rotary evaporator. The crude extract thus obtained was used for the experiments.

Animals

Wistar albino rats of either sex, weighing about 150–250 each, were used for the study. They were fed with standard chow (Pranav Agro Industries Ltd., Sangli, Maharashtra) and water ad libitum. They were housed in polypropylene cages maintained under standard conditions (12 hour light - dark cycle; 25 ± 3 °C; 35–60% humidity). The experimental protocol was subjected to the scrutiny of the Institutional Animal Ethics Committee, and was cleared by same before beginning the experiment.

Preparation of 10% ointment: 4 gm methanol extract of *Prunus persica*was added slowly to the above melted ingredients and stirred thoroughly until the mass cools down and a homogeneous product is formed. The ointment was then packed in a wide mouth container.

Treatment Protocols

The animals were numbered, weighed and then divided into four groups with five animals in each as follows:

Group I: Served as vehicle control and applied simple ointment.

Group II: 2%, w/w, Betadine ointment applied.

Group III: Normal ointment base

Group IV: 10%, w/w, plant extract ointment is applied.

Excision wound

The rats were inflicted with excision wounds as described by Morton and Malone (1972). The dorsal fur of the animal was shaved and the area of wound to be created was outlined on the back of animal with methylene blue. A full thickness of the excision wound was created along the markings using toothed forceps, a surgical blade and pointed scissors. The parameter studied was wound closure, epithelialization time and collagen content.

Statistical analysis

The values were calculated as mean ± S.E.M. The significance of the difference of the mean value with respect to control group was analyzed by one way ANOVA followed by Dunnet's t-test using Statistica 8.0. $P<0.05$ or above was considered to be significant.

RESULTS

The results of excision wound model are shown in table 10. The MPZ extract exhibited significant wound healing activity as compared to control in excision wound model. It is observed that the wound contracting ability of the 10% (w/w) extract ointment treated groups showed significant wound healing from the sixth day onwards. The wound closure time was lesser, as well as the percentage of wound contraction was more with the 10% (w/w) extract ointment treated group. The epithelization of wound with 10% (w/w) extract ointment treated group was found to be earlier as compared to control. In the 10% (w/w) extract ointment treated rat the wounds were completely healed (epithelization period) in 16 ± 2 days whereas in the control animals it took more than 20± 2 days.

Wound given to rat

Wound on the 14th day

Table: Evaluation of plant extract and betadine ointment on wound healing by exision wound method in rat

Post wounding days	Wound area (mm2) (mean ± SEM) and percentage of wound contraction			
	Control	Betadine	Base	Plant extract
0	511.91±0.46	510.00±1.48	515.5±10.7	512.5±8.40
3	482.7±18.08 (1.43)	443.5±6.45* (3)	485.5±13.7 (1.21)	448.01±6.7 (2.56)
6	420±19.1 (5.15)	403±6.3** (11.86)	432.5±51.6 (4.95)	410±7.2* (9.3)
8	350.2±24.5 (10.96)	311.0±5.01** (20.39)	362±40.4 (10.24)	318±6.2** (19.1)
10	263±15.895 (22.87)	259±2.9** (44.6)	280.5±33.9 (21.45)	269±6.6** (39.41)
12	189.5±26.5 (43.22)	130.25±5.5** (71.5)	198±12.5 (43.22)	145±5.8** (68.03)
14	109.7±30.0 (63.4)	73.75±5.1** (83.87)	111.5±3.69 (63.1)	75.50±5.2** (81.6)
16	43.5±18.4 (80.64)	00 (100)	65±5.8 (80.95)	00 (100)

Each value is the mean ± S.E.M. of five rats.
*P < 0.05, **p<0.01 vs. control, One way ANOVA followed by Dunnet's t-test.
% wound contraction is given within parentheses.

DISCUSSION

Plant products are potential wound healing agents, and largely preferred because of their widespread availability, non-toxicity, absence of unwanted side effects, and effectiveness as crude preparations. Earlier it was reported that *Centellaasciatia* and *Terminaliachebula* are effective in wound healing in rats. The present investigation describes some unique features of the extract from the plant *P.persica* with respect to its potential wound healing capacity in rats. The increased wound contraction in the treated group may be due to the enhanced activity of fibroblasts *P.persica* extract. A significant increase in collagen content due to enhanced migration of fibroblasts and epithelial cells to the wound site was observed during the wound healing process in the treated group. A close examination of granulation tissue sections revealed that tissue regeneration was much quicker in the treated group compared to that in control wounds.

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