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INVESTIGATION OF PLANT EXTRACTS FOR WOUND HEALING ACTIVITY

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ABSTRACT

The plants provided food, clothing, shelter, and medicine. Much of the medicinal use of plants seems to have been developed through observations of wild animals and by trial and error. As time went on, each tribe added the medicinal power of herbs in their area to its knowledge base. A wound is a type of damage in which in the skin is ragged, cut or punctured (an open wound), or where blunt force trauma causes a contusion (a closed wound) in pathology, it exclusively refers to a sharp injury, which injure the dermis of the skin. Wound may be defined as loss or breaking of cellular & anatomical or functional activity of living tissues. Based on traditional literature, it revealed that there are few phytochemicals are reported such as flavonoids, polyphenols are responsible for wound healing activity, so it was hypothesized that *Gentiana diffusa* may have wound healing activity.

Keywords: Wound, Literature, Excision, *Gentiana*.

INTRODUCTION

Today, herbal drugs are coming back into prominence. Side effects of the conventional medicines such as antibiotics, antimicrobial agents are the major problems. Over the years, some of the infectious organisms have developed resistance to synthetic drugs too. Medicinal chemist is taking for more potent and effective drugs hence more complications. Herbals are used in the art of healing since the time immemorial. The primitive man through trial and error gained knowledge of herbal and passed it on to the next progeny. It is reasonable to assume that for ten thousands of year herbs were perhaps used for the magical power as well as for their medicinal values. Despite the development in modern medicines, the use of herbs is still increasing. For thousands of year herbs and other products from the natural source have been used in treating various diseases. Some of those in current use have been an ancient heritage, whereas other has arisen from discoveries and cultural trend in more recent centuries. All therapy referred to as alternative or complementary came from outside the main stream [1-2]. Moreover, many types of alternative therapies are a formal approach to healthcare in various societies and culture around the world. If a particular therapeutic approach has not originated by American health care it does not render it worthless, quackery or fad. Most alternative therapies have evolved from ancient healing system in various cultures around the world and are based on reasonable scientific background. There must

be some truth in it. As science catches up with human behavior some types of alternative therapies are being found useful [3]. A wound is a type of injury in which in the 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 damage the dermis of the skin. OR wound may be defined as loss or breaking of cellular & anatomical or functional activity of living tissues [4]. A wound is a type of injury in which in the 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 damage the dermis of the skin. Wound may be defined as loss or breaking of cellular & anatomical or functional activity of living tissues. Based on traditional literature, it revealed that there are few phytochemicals are reported such as flavonoids, polyphenols are responsible for wound healing activity, so it was hypothesized that *Gentiana diffusa* may have wound healing activity.

Experimental work

Collection and Preparation of extracts

The fresh leaves of *Gentiana diffusa* were collected from the available sources. The species for the proposed study was identified as *Gentiana diffusa* by department of Pharmacognosy, RKDF College of Pharmacy, Bhopal (M.P.).

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The powdered plant material (about 200 gm) was defatted with petroleum ether (60-80 °C) and then extracted with methanol in a soxhlet apparatus. The solvent was removed under reduced pressure, which obtained a dark brown and brownish black sticky residue with respect to dried plant material. The dried extract was stored in a desiccator till further study.

Experimental animals

Male albino rats of wistar strain (150-250g) were used. Animals were housed under standard conditions of temperature (23±1°C), 12 hrs light/dark cycle and fed with standard pellet diet and water *ad libitum*. Animals were acclimatized to laboratory conditions at least 24 hours before conducting the experiments. The animal studies were approved by Institutional ethical committee of RKDF College of Pharmacy, Bhopal (M.P.).

Excision wound model

Animals were anaesthetized prior to and during creation of the wounds. The rats were inflicted with excision wounds as described by Morton and Malon. The dorsal fur of the animals was shaved with an electric clipper and the anticipated area of the wound to be created was outlined on the back of the animals with methylene blue using a circular stainless steel stencil. A full thickness of the excision wound of 2.5 cm (circular area = 300mm²) in length and 0.2 cm depth was created along the markings using toothed forceps, a surgical blade and pointed scissors. The entire wound was left open. The wound closure rate was assessed by tracing the wound on days 4, 8, 12, 16 post-wounding using transparency paper and a permanent marker. The wound areas recorded were measured using a graph paper [5-6].

Grouping of experimental animals

- Rats were divided into four groups, of six animals in each group.
- First group (Group I) remain untreated which acted as control
- Second group (Group II) was topically treated with framycetin sulphate cream
- Third group (Group III) was treated with 5% ointment of petroleum ether extract
- Fourth group (Group IV) was treated with 5% ointment of methanol extract

Preparation of formulation

A 5% (w/w) simple ointment containing the petroleum ether and methanolic extract of *Gentiana diffusa* was prepared by trituration method in a ceramic mortar and pestle using white soft paraffin base [7]. For this, 5 g of extract was incorporated in 100 g of the base. Framycetin sulphate was used as standard drug for comparing the wound healing activity of extract in different animal models.

Results and Discussion

In preliminary wound healing activity 5% ointment prepared with pet ether and methanol extract was evaluated for wound healing potential in excision and incision wound models. The results revealed that group treated with aqueous extract ointment shows better wound closure and increased tensile strength, thus methanolic extract was further explored with different dose to assess more significant results. The findings were reported in table 1.

Table 1: Wound contraction studies Findings of wound contraction studies.

→ GROUPS ↓ DAYS	Control (Group I)	Standard (Group II)	Pet ether Extract (Group III)	Methanol extract (Group IV)
0	272.6 ± 2.08 ^a	291.3 ± 2.21 ^b	284.8 ± 3.53 ^a	290.7 ± 3.34
4	221.3 ± 2.34 ^b	186.4 ± 3.22 ^a	208.6 ± 2.61 ^b	202.4 ± 3.79 ^a
8	180.9 ± 3.60 ^c	118.2 ± 4.55 ^a	143.6 ± 4.02 ^a	132.4 ± 5.54 ^a
12	122.2 ± 2.67 ^c	65.6 ± 3.02 ^a	98.3 ± 3.07 ^a	75.6 ± 3.37 ^a

a = P > 0.001,

b = P > 0.01, c = P > 0.05.

CONCLUSION

Methanolic extract with concentration of 5% showed better activity than petroleum ether and was found to be most significant in all the models. Such dose dependent performance may be due to phytoconstituents like tannins and flavonoids. Wound healing is a complex process due to various risk factors such as infection and delay in healing

and healing may also delay due to inflammation, oxidative stress causing cell damage etc. To solve such clinical pharmacological problem, the present study revealed an option for remedy of wound healing *Gentiana diffusa* which has significantly exerted wound healing potential in rat model.

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