



Wound Healing Activity of Extract of *Emilia sonchifolia*

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Abstract In traditional medicine *Emilia sonchifolia* is widely used for the treatment of various ailments including ulcer and wound healing. The phytochemical screening of *Emilia sonchifolia* indicates the presence of biologically active ingredients in appreciable amounts. The aim of this study was to evaluate the wound healing potential of *Emilia sonchifolia* on excision wounds induced in experimental rats. Excision wounds were created in male Wistar rats and were treated with *Emilia sonchifolia* ointment. Topical application of *Emilia sonchifolia* for 14 days significantly improved the wound contraction when compared to the control group of rats. It appears that the ethanol extract of *Emilia sonchifolia* possesses significant prohealing activity by accelerating the healing process at various phases of tissue repair. *Emilia sonchifolia* may readily account for the observed prophylactic action of wound healing.

Keywords Wound Healing, *Emilia sonchifolia*, Extract

Introduction

Wound healing is frequently a therapeutic challenge. Although there have been some advances in the treatment of wound healing, the best method remains undecided. An ideal therapy should not only promote the rapid healing process but also act as an anti-scarring therapy. Scar formation and overproduction of extracellular matrix by connective tissue characterize a pathological process called “fibrosis” which occurs as a result of deranged healing in response to tissue damage [1]. Many of the synthetic drugs currently used for the treatment of wounds are not only expensive but also pose problems such as allergy and drug resistance, and this situation has forced scientists to seek alternative drugs [2]. Hence, efforts are being made all over the world to discover an efficacious healing agent that could obviate the prolonged treatment, cost and save the patient from severe secondary complications. A variety of natural products or their derivatives have been considered as potential candidates for wound healing as they provide a moist environment to encourage the establishment of suitable conditions for wound healing.

Emilia Sonchifolia is an annual herbaceous plant distributed mainly in tropical and subtropical countries, worldwide, including the south-south region of Nigeria, Bayelsa State. Various parts of this plant is used in folklore medicine for the treatment of diseases [3]. It is used against inflammation, rheumatism, cough, cuts, insect bites, eye sores and convulsion [4]. The methanolic extract of *Emilia Sonchifolia* has been reported to have antitumor property, anti-inflammatory and antioxidant activity [5].



Hence, the present work was aimed to evaluate the wound healing potential of *Emilia sonchifolia* on excision wound induced in Wistar rat models. The stem and leaf extract in the form of an ointment was topically applied and the efficacy was compared with a standard drug formulation.

Materials and Methods

Chemicals and Reagents

Methanol, Chloroform, Methylated spirit, Petroleum jelly, Cicatrin powder.

Plant Collection and Preparation

Emilia sonchifolia was harvested from a garden in Amassoma town, Bayelsa State. The plant sample was authenticated in the Department of Crop Science, Niger Delta University Wilberforce Island, Bayelsa State. The identified plant parts (leaves and stem) were separated, washed and shade dried for 28 days until fully dried. The leaves were oven dried at 45°C for 24 hours and were grounded to powder form using a grinding machine. These samples were sieved and stored in an airtight bottles till required for analysis.

Plant Extract

142.5g of *Emilia sonchifolia* leave (powder) was mixed with 600ml of 98% ethanol in an airtight bottle. The mixture was allowed to stand for 72 hours with constant agitations. The extract was now filtered using a muslin cloth, followed by filter paper to obtain a clear filtrate. The filtrate was allowed to evaporate in a hot water bath at 60°C leaving behind a paste of the extract.

Preparation of Topical Application

The extract was mixed with petroleum jelly (5.0g extract of leave to 10g of petroleum jelly cream 0.5 %), and the cicatrin powder was equally mixed with petroleum jelly (5.0g cicatrin powder to 10g of petroleum jelly 0.5%).

Experimental Animals

Healthy, male adult Wistar albino rats, weighing 180-200g procured from the Animal House of College of Health Sciences, Niger Delta University and maintained on standard pellet diet with water in the Departmental Laboratory for two weeks to acclimatize.

Burn Wound Model

Wistar albino rats were anesthetized with chloroform then shaved about 5cm-6cm of dorsolateral part neatly with scissors and razor blade and cleaned with cotton wool and methylated spirit. A 1.7cm × 1.7cm (2.89cm²) flat metal plate was heated and used to create the burn wound on the shaved part. The rats were divided randomly into 5 groups of 3 rats each. Square wound of about 1.7cm × 1.7cm (2.89cm²) diameter was made on depilated dorsal thoracic region of rats under aseptic conditions and were measured immediately by placing a transparent ruler over the wound and tracing the area of wound on it.

Application of Treatment

Following wound creation, as follows, the rats were treated once daily 7:00-8:00am.

Group A: control burn wound-induced rats were treated with petroleum jelly and exposed to standard rat feed and clean water.

Group B: Burn wound-induced rats were treated with 0.5 % cicatrin powder and exposed to standard rat feed and clean water.

Group C: Burn wound-induced rats were treated with 0.5 % stem extract of *Emilia sonchifolia* and exposed to standard rat feed and clean water.



The treatment schedule was twice daily with topical application of the formulated extracts as well as the standard drug ointment, while the control group was dressed with petroleum jelly containing same quantity.

Wound Measurement and Contraction

Wound contraction was measured using a transparent rule to record the wound size every three days. Wound contraction is expressed as;

$$\text{Wound contraction (\%)} = \frac{\text{initial wound size} - \text{specific day wound size}}{\text{Initial wound size}} \times 100$$

Results

Table 1: Percentage (%) Wound Contraction in cm²

Treatment	Day 3	Day 6	Day 9	Day 12	Day 15	Day 18	Day 21
Control P.J	14.88%	18.0%	46.37%	84.78%	91.35%	94.46%	95.85%
0.5 % Cicatrin powder	11.07%	14.88%	28.72%	55.36%	67.13%	93.08%	95.16%
0.5 % Leaf	7.27%	11.07%	24.91%	46.37%	56.40%	72.0%	87.89%

P.J-Petroleum jelly. *n* = 3 animals in each group

Discussion

Wound healing is the physiological response to the tissue injury that results in the replacement of destroyed tissue by living tissue and thus restoration of tissue integrity. It involves a highly coordinated cascade of cellular responses encompassing the interaction of many cell types over long periods of time. Wound contracture occurs throughout the healing process and it mainly depends on the extent of tissue damage, repairing ability and general state of the health of the tissue.

Although there have been some advances in the wound healing processes, the duration could not be shortened. The present study was aimed to evaluate the wound healing potential of ethanol extract of *Emilia sonchifolia* at the wound site of excision wounds in experimental rats. Alcoholic extracts of *Emilia sonchifolia* are assumed to contain almost all biologically active propolis constituents and for this reason are commonly used in practice [6-7]. The extract in the form of an ointment was topically applied and the efficacy was compared with a standard drug ointment. The parameter analyzed was percentage wound contraction.

Flavonoids and triterpenoids are also known to promote the wound healing process mainly due to their astringent and antimicrobial properties which seem to be responsible for wound contraction and increased rate of epithelization.

Wound contraction begins almost concurrently with collagen synthesis. The measurement of the progress of the wound healing induced by the burnt wound model are shown in Table 1. It was observed that the wound contracting abilities of 5% *Emilia sonchifolia* leaf (92.6%, 96.11%) were significantly ($P < 0.05$) greater than that of the control (59.65).

In conclusion, the present study provides a rational basis for the beneficial usage of Indian propolis as folk medicine since ancient times and also confirms that propolis or its constituents can be considered as suitable, powerful, natural wound healing medicine.

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