Burn Wound Healing Activity of Ethanolic Extract of Acalypha indica in Oinment Formulated against Rabbits (Ocyctagus caniculus)

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Burn Wound Healing Activity of Ethanolic Extract of *Acalypha indica* in Oinment Formulated against Rabbits (*Ocyctagus caniculus*)

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ABSTRACT

Objectives: The purpose of this study was to determine burn wound healing activity of *Acalypha indica* L. in oinment formulated.
Design: This study uses an experimental laboratory design. This study used rabbits as test animals induced by burns with hot iron plates on the back. Extract ointment applied to the wound then observed the development of healing.
Interventions: The extract was formulated in ointments with concentrations of 3, 5 and 7%. positive control used was ointment containing sesame oil and negative control used is an ointment base.
Main outcome measure: The results showed a concentration of 3% had a slow and low effect, at a concentration of 5% it had a moderate healing phase, and a concentration of 7% had a good healing phase.
Conclusion: The ointments containing *Acalypha indica* leaf extracts have good activity in healing burns in rabbits.

Keywords: *Acalypha indica* L., ethanolic extract, oinment, wound healing.

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INTRODUCTION

The *Acalypha indica* L. plant is a plant that has benefits in traditional medicine. The leaves can treat nosebleeds, coughs, dysentery, diarrhea, vomiting of blood, bleeding, and external wounds.[1,2,3] This is corroborated by the phytochemical test of earring plants which shows the presence of flavonoid, triterpenoid, steroid, and saponin compounds.[4,5]

The use of *Acalypha* as a traditional medicinal plant has been carried out. *Acalypha* boiled water can treat toothaches and ear infections, the pulp can be used to treat burns and rheumatism. *Acalypha* plant extract can also play a role as a natural contraceptive, analgesic and anti-inflammatory, the effects of neurotherapy and neuroprotectants, reduce blood glucose, reduce uric acid. Some studies report that the extract of *Acalypha* can inhibit the growth of some pathogenic bacteria.[1,2,6]

Based on the flavonoid compounds owned by the leaves of *Acalypha indica* as an anti-inflammatory, it needs to be developed into a pharmaceutical preparation to increase its use.[1,4,5] One of the ointment preparations was chosen because it is the most suitable pharmaceutical preparation for medicinal purposes for the skin because of the longer contact between the drug and the skin.[7] In this study, the ethanol extract of *Acalypha indica* was formulated into an ointment and tested its activity in healing burns in rabbits.

MATERIALS AND METHODS

Plant and Chemical Materials

The *Acalypha indica* used in this study was obtained from Medan, North Sumatra, Indonesia. The part of the plant used is leaf. *Acalypha indica* have been determined by the Herbarium Medanense (MEDA), Universitas Sumatera Utara, Indonesian and it is known that the species is *Acalypha indica* L.

Tools used include rabbit cages, shavers, iron plates 2.5 x 2.5 cm with a thickness of 1 mm for burns, rotary evaporators, maceration vessels, blenders, wood stirrers, mortars and stamper, water baths, digital scales, beaker glass, measuring cups, glassware, and universal pH sticks.

The material used in this study was a thick extract from the leaves *Acalypha indica*, 70% ethanol, cholesterol, stearylalkohol, cerae albi and vaselin album.

Plant Extraction

Tha *Acalypha indica* extracted by maceration method which is a number of sample soaked in 96% ethanol solvent for 3 days while stirring occasionally. Maserate and residue are separated and filtered, then the pulp is washed using the same solvent until a total of 10 times the weight of the simplicia is obtained. Maserates are collected and allowed to stand for 24 hours without stirring, then separate the clear solution with the precipitate. Clear solution was thickened using a rotary evaporator until a thick extract was obtained.[8,9,10]

Ointment Formulation

The burn ointment formula from the ethanol extract of Acalhypa indica leaves can be seen in table 1 below.

Table: 1. Ointment Formulation

Materials (g)		Concentration	
	Formula 3%	Formula 5%	Formula 7%
Crude Extract (g)	3,00	5,00	7,00
cholesterol (g)	3	3	3
stearyalkohol (g)	3	3	3
cera alba	8	8	8
Vaselin album add (g)	100	100	100

Procedure for making ointment burns, weighed extracts and ingredients needed. Cholesterol, stearyalkohol and cera alba were inserted into a porcelain cup and then melted on a water bath and then inserted into a mortar crushed until cold and homogeneous, then this is called an ointment base. Leaf extract was added to the base mixture as much as 3%, 5% and 7% then add white vaselin and crush until homogeneous.[11,12] A leaf extract ointment preparation with a concentration variation of 3%, 5% and 7% was put into an ointment pot. Each ointment formula was tested for homogeneity, adhesion, pH and skin irritation.

Induction of minor burns on the back of rabbits

he back of the rabbit was cleaned using a razor, then the animal was anesthetized using chloroform. The area of the skin to be burnt is disinfected using 70% alcohol. Heat the metal for 30 seconds then put it on the skin of the test animal for 5 seconds.[13,14]

Animal Test of Ointment

A total of 15 rabbits were divided into 5 groups, each using 3 rabbits. Groups 1,2 and 3 were given ointment extract of leaf extract ethanol concentrations of 3, 5, and 7%. Group 4 was given the MEBO® burn wound ointment from Combiphar, and group 5 was given an ointment base as a negative control.

Animals that have been injured using a hot plate smeared with ointment according to the test group that has been divided, this is done twice a day for 14 consecutive days and observed the development of wound healing.

RESULT AND DISCUSSION

Formula Evaluation Results

The results of the formula test in the form of homogeneity, adhesion, pH and skin irritation can be seen in tables 1-4.

Table: 1 Homogeneity Formula Salve Test Results

No.	Formula	Result
1.	Negative control	Homogen
2.	F. 3 %	Homogen
3.	F. 5%	Homogen
4.	F. 7%	Homogen

Table: 2 Ointment Adhesion Test Results

Formula	Result (second)
Negative Control	31,08
F. 3%	20,78
F. 5%	15,59
F. 7%	20,05

Table: 3 pH measurement results

No.	Formula	pH
1.	Negative Control	5,64
2.	F. 3%	5,46
3.	F. 5%	5,17
4.	F. 7%	5,04

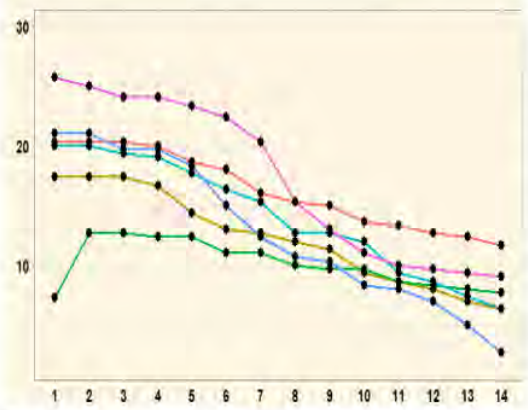
Table: 4 Irritation Test Results

No.	The Symptoms	Result			
		Negative Control	F.3%	F.5%	F.7%
1.	Reddish	----	----	----	----
2.	Swollen	----	----	----	----
3.	Itchy	----	----	----	----

Based on the results obtained from the formulation test, each formula has good characteristics, meets the requirements, and is safe to apply on the skin because it does not cause irritation. The average pH of the ointment has a range of 4.5 - 6.5. A pH value that is too low can cause irritation, while a pH that is too high can cause scaly skin. Based on the Indonesian National Standard the pH range of topical preparations is 4.5 - 8.[15] This shows that the pH value of ointment preparations is still in the range that is allowed to be used topically. Increasing the pH of each ointment preparation is influenced by the addition of active substances.

Test Results on Animals

The results of the testing of the ethanol extract of the leaves of the *Acalypha indica* leaf can be seen in Figure 1.



Explanation: Negative control, Positive control, F 3%, F 5% F 7% Crude Extract

Figure: 1 Development of Burn Wounds

The burns observed in this study were minor burns that did not appear to have blisters or did not damage skin tissue. First-degree burns that are damage to the outer skin only that occurs edema in the dermis, skin appendices (integument, skin adnexa) such as hair follicles, sweat glands and acute sebaceous glands. In skin damage in the case of first-degree burns, the healing process can occur spontaneously, generally requiring a period of 1-14 days.[13,14]

From this study it was found that the earring leaves of ethanol extract ointment is one of the therapies that has a better effectiveness against the healing of burns in rabbits. This is because some of the compounds contained in the ethanol extract of earring leaves have the ability to accelerate tissue regeneration, repitelization, stimulate fibroblasts and the formation of collagen in burns affected skin and have antimicrobial effects that will suppress microorganisms that can slow wound healing.[11,13,14]

CONCLUSSION

Ethanol extract of *Acalypha indica* which is formulated in the form of ointment to treat burns effectively heals burns in rabbits within 14 days.

CONFLICT OF INTEREST

All author have no to declare.

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