DOI: 10.56511/JIPBS.2019.v6.i01.pp12-14

Journal of Innovations in Pharmaceutical and Biological Sciences (JIPBS)
ISSN: 2349-2759
Available online at www.jipbs.com

Research article

Wound healing activity of ointment *Artocarpus lakoocha* Roxb. ethanol leaves extract evaluation on excision wound

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Key words: Exicion wound, *Artocarpus lakoocha*, ointment treatment.

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Vol. 6(1), 12-14, Jan-Mar, 2019.

Abstract

Objectives: To investigate wound healing activity of ointment *Artocarpus lakoocha* Roxb ethanol leaves extract. **Material and methods:** The leaves of *Artocarpus lakoocha* Roxb. were dried and extracted with ethanol, followed by evaporation and freeze-drying. Phytochemicals screening was conducted to determining secondary metabolite. The male rats used were 24 for 6 treatments (betadine as a positive control, base ointment as negative control, ointment of 1%; 3%; 5%; 7%) of *Artocarpus lakoocha* Roxb leaf extract with each group of 4 male rats. **Results:** Phytochemicals screening were showed flavonoids, glycoside, saponin, tannin and steroids. The results of the ointment wound healing activity test, a good concentration in healing wounds is a 5% ointment with a percent reduction in wounds on day 3 of 28.43%; the 6th is 45.31%; the 9th is 60.31%; the 12th is 75.62% and the 15th is 88.75%. **Conclusion:** Finding of the present study provides a baseline data for excision wound healing and potential of *Artocarpus lakoocha* Roxb. leaves and support their traditional claim.

Introduction

Wounds are part of a loss or damage of body tissue and are also defined as physical damage resulting from the opening or destruction of the skin which causes an imbalance of function and anatomy of normal skin [1]. The process of wound healing is a biological process starting from the trauma and ending with the formation of scarring. The goal of wound management is to heal wounds in the shortest possible time, with minimal pain, discomfort, and scarring in the patient. Wounds must be dealt with immediately so there are no other problems. However, there are still many people who often ignore injuries that occur in organs. Wounds that are not handled properly can cause injury-related illnesses [2]. One way to cure wounds is by treating the wound using topical preparations. Proper and effective administration of topical preparations is expected to reduce and prevent infection in the wound. The preferred topical dosage form is ointment because it is easily even if applied to the skin without emphasis.

Artocarpus lakoocha, including the Moraceae family, which is known as a medicinal plant in the Southeast Asian region is commonly called jack Monkey. The leaves of the mobe are traditionally used as wound healing drugs [3]. Mobe plants are used in traditional Thai medicine to treat wound healing and premature aging [4]. Mobe leaf extract shows its ability to protect against liver damage, reduce high blood pressure and regulate blood sugar levels in previous studies. The main components of the leaves of the genus Artocarpus are found in flavonoids with isoprene 3-6 side chains that have antioxidant, anti-inflammatory, anti-diabetic, tyrosinase and melanin inhibiting properties [5]. Other study reported that *Artocarpus lakoocha* leaves have a cytotoxic, anti-inflammatory, analgesic, CNS depressant, antidiarrhoeal activities [6]

This was explained which states that the genus Artocarpus has flavonoids such as Artonin A, Artonin b, Artocarpanone which can be inhibitors of chemical mediators released from mast cells, neutrophils, and macrophages [7]. Ethanol was selected as extraction solvent in present study because the solvent are very suitable for the extraction of polar and some non polar metabolites.

Materials and methods

Materials

Artocarpus lakoocha Roxb leaves was obtain from Laguboti Subdistrict, Toba Samosir, North Sumatera Province. The plant samples authenticated by Research Center of Biology, Indonesian Institute of Science, Bogor, Indonesia No. 2027/IPH.01/lf.07/VIII/2017.

The experimental animals used were male rats weighing 200-250 grams and aged 2-3 months, obtained from the Pharmacology Laboratory of the University of North Sumatra. The studies were carried out in accordance with

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Animal Research Ethics Committees/AREC) No. 0051/KEPH-FMIPA/2018.

Preparation extract of *Artocarpus lakoocha* Roxb. leaves

Artocarpus lakoocha Roxb. leaves weighed as much 200 grams and then put in dark bottle, 200 ml of solvent added ethanol 96%. Soaked for 6 hours first while occasionally shuffled, then stand for 18 hours next. Filtered using cloth sterile gauze and filter paper sterilized. The later batches were obtained squeezed. Filtrate then evaporated with the rotary evaporator to obtain the viscous extract ethanol from the leaves *Artocarpus lakoocha* Roxb.

Determination of phytochemical constituents

Phytochemical screening extract of *Artocarpus lakoocha* Roxb. leaves includes examining the chemical secondary metabolites of alkaloids, flavonoids, glycosides, tannins, saponins.

Formulations of ointment

Formulations of ointment preparations were made using an ointment base consisting of hydrocarbon types and absorbent bases namely:

R / Adeps lanae 15 g

Vaselin Album 85 g [8].

In this study, ointment preparations with extract concentration variants were made: 1%, 3%, 5% and 7% for 2 times a day for 14 days of observation.

Test animal wounds

The male rats used were 24 for 6 treatments (betadine as a positive control, base ointment as negative control, ointment of 1%; 3%; 5%; 7%) of *Artocarpus lakoocha* Roxb leaf extract with each group of 4 male rats .

The back of the rat is wound using 2 cm punch biopsy. Punch biopsy is pressed on the skin then rotated while pressed and pulled up until the tissue is cut off [9].

Statistics

The data produced in this study will be analyzed using SPSS version 21.0 software with a one way analysis of variance (ANOVA) method to determine the average difference between samples. Price P <0.05 indicates a significant difference ($\alpha = 0.05$)

Results and discussion

Phytochemicals screening

The results of phytochemicals screening from extract ethanol of *Artocarpus lakoocha* Roxb. contains flavonoids, tannins, saponins and glycosides.

Ointment of *Artocarpus lakoocha* leaves extract

Ointment of *Artocarpus lakoocha* leaves ethanol extract has a half-solid organoleptic form, dark green and has good homogeneity. The homogeneity of ointment is characterized by no coarse grains and does not clot [10].

Effect of ointment of *Artocarpus lakoocha* leaves extract on wound healing

Excision wound healing in mice undergoes a phase of hemostasis, inflammation, proliferation, and remodeling. Compared with negative controls, the base of the ointment has the slowest healing compared to other treatments, ointments containing leaf ethanol extract, *Artocarpus lakoocha* provide wound healing compared to negative controls because of the presence of secondary metabolites. The role of secondary metabolites is flavonoids because they have the function of anti-inflammatory and anti-oxidant effects and can reduce edema in the process of wound healing [11].

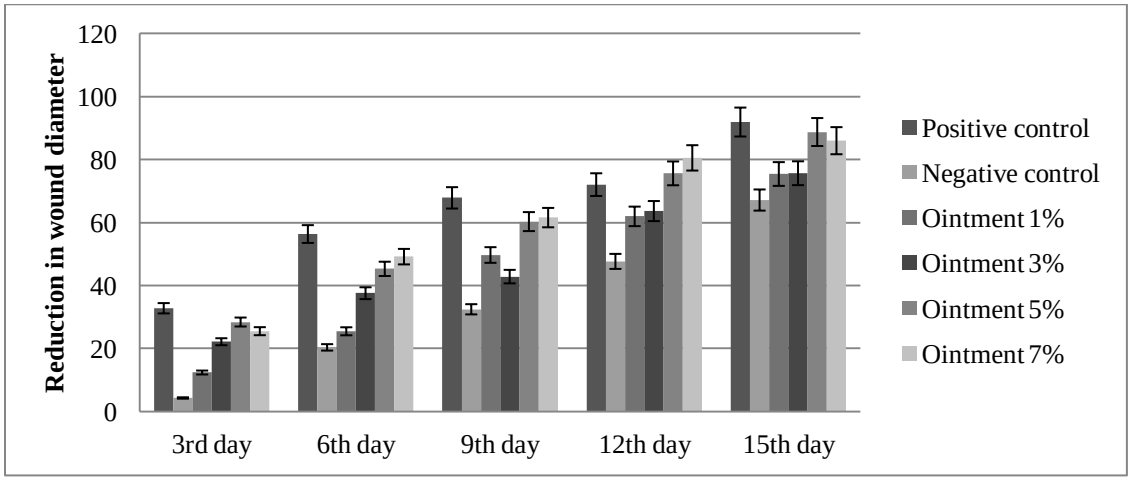


Figure 1. Effect of ointment of *Artocarpus lakoocha* leaves extract on wound healing In rats (n=4). P<0.05 compared to control rats reduction of wound diameter.

The percentage of reduction in excision wounds in rats given treatment using *Artocarpus lakoocha* leaf ethanol extract ointment with a concentration of 1%; 3%; 5% and 7%, the base of the ointment and ointment povidone iodine from the beginning to the 15th day results that the highest reduction in wounds is positive control, namely povidone iodine and the lowest is the negative control, the base of the ointment. Among the concentrations of ointment of *Artocarpus lakoocha* leaf ethanol extract reduction in wound diameter that was not significantly different from positive control was 5% extract ointment because from the results of the statistical data from the 15th day the results were not significantly different from positive controls, the concentration of ointment was good for wound healing is a concentration of 5%. *Artocarpus lakoocha* leaf ethanol extract have antibacterial properties which can accelerate wound healing. Flavonoids and tannins are antiseptic which play an important role in protecting wounds from bacterial growth in the inflammatory phase and can help accelerate wound healing and increase the number of capillary blood vessel formation and fibroblast cell [12]. This is related to the phytochemical content of *Artocarpus lakoocha* Roxb. Ethanol Leaves Extract, based on the results phytochemical screening shows that *Artocarpus lakoocha* Roxb. Ethanol Leaves Extract has secondary metabolites such as flavonoids, tannins, saponins, and glycosides.

Conclusion

Finding of present study provides a baseline data on excision wound healing of *Artocarpus lakoocha* Roxb. leaves in rats and support their traditional claim.

Acknowledgement

The authors are grateful to Faculty of Pharmacy University of Sumatera Utara for providing technical facilities.

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