

Test The Wound Healing Activity Of Nephelium Lappaceium Fructus Cortex Extract Ointment On New Zealand Rabbits

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Test The Wound Healing Activity Of *Nephelium Lappaceium* Fructus Cortex Extract Ointment On New Zealand Rabbits

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ABSTRACT

Nephelium lappaceium Binn. (Rambutan) is a natural ingredient rich in active substances that are beneficial to human health. In this study, the use of *Nephelium lappaceium* fructus cortex was used for the healing of open wounds where *Nephelium lappaceium* fructus cortex contains tannins which are expected to help heal open wounds. The content test was carried out using the phytochemical screening method of *Nephelium lappaceium* fructus cortex extract which showed the presence of alkaloids, flavonoids, saponins, and tannins, then a wound healing test was carried out with *Nephelium lappaceium* fructus cortex extract which was divided into 5 groups randomly, namely normal, negative control (Vaseline album), positive control (Betadine salp® each gram contains 10% Povidone Iodine), presented topically 7.5% and 15% *Nephelium lappaceium* fructus cortex extract ointment. The back skin of New Zealand rabbits is 3-5 months old, weighs 1500-2000grams, has normal and healthy activities and has agile activities, is normal and in healthy condition, then was injured with a punch biopsy with a diameter of 5 mm, a depth of ± 0.5 mm, then treatment according to the test group for 21 days. Parameters measured included wound diameter in rabbits. The results showed that the ointment extract of *Nephelium lappaceium* fructus cortex 15% had an open wound healing activity which was comparable to a positive control with an open wound healing activity of 0.2mm.

Keywords: Healing, *Nephelium lappaceium* fructus cortex,

INTRODUCTION

Rambutan fruit is the fruit of the Rambutan plant which is very popular with the community and contains many nutritious substances to maintain health, but it is necessary to utilize the waste produced by the Rambutan fruit in the form of skin and seeds. Traditionally, rambutan, apart from being used as food and drink, is also used as an anti-cancer and anti-diarrhea in its leaves. According to previous research, the phytochemical compounds it contains include alkaloids, tannins, saponins, and flavonoids (Kusumaningrum, 2012). In this study, the use of *Nephelium lappaceium* fructus cortex base Vaseline album extract was used for the healing of open wounds in New Zealand rabbits.

METHODS

A. Materials

The materials used in this study were *Nephelium lappaceium* fructus cortex, 70% ethanol, 9% ethanol, 2N HCl, concentrated HCl, Betadine salp®, Magnesium powder, Dragendorff reagent, Liebermann-Bouchard reagent (acetic anhydrous acid-H₂SO₄), distilled water, Chloroform, silica plate, Methanol, Butanol, Acetic Acid, Vaseline album,

B. Setup Simplicity

Nephelium lappaceium fructus cortex was washed with clean running water to remove any contaminants present, then dried in an oven at 60°C, mashed using a grinding machine to fine powders.

Wong Article Making Extract



1000 grams of *Nephelium lappaceium* fructus cortex simplicia powder macerated 3000 ml of 70% ethanol for 72 hours, then the resulting extract was evaporated using a vacuum rotary evaporator at 60°C and the viscous extract produced was tested for ethanol free and the yield was calculated.

D. Formulation of *Nephelium lappaceium* fructus cortex extract salp

In this study, Vaseline album ointment base was used as a topical carrier base for *Nephelium lappaceium* fructus cortex extract, the composition of the formulation can be seen in table 1st.

Table 1st. Formulation of *Nephelium lappaceium* fructus cortex extract ointments

No.	Materials	Formulation 1 st	Formulation 2 nd
1.	<i>Nephelium lappaceium</i> fructus cortex xtract	0.75	1.5
2.	Vaselin album	Ad 10	Ad 10

E. Wound healing activity test

In this study, the test rabbits used were divided into five test groups by being treated with wounds with a diameter of 5mm. The test rabbits were given identification marks to facilitate observations during the study, the details can be seen in the table 2nd.

Table 2nd. Wound healing activity test

Groups (Test animal)	Amounts (Tail)	Treatments
I Normal	1	Test rabbit with six wounds, without treatment with Betadine salp® and <i>Nephelium lappaceium</i> fructus cortex extract ointment extract.
II Control negative (-)	1	Test rabbit with six wounds with only Vaseline album as ointment base.
III Control positive (+)	1	Test rabbit with six wounds, 100mg Betadine salp® topical which each gram contains 10% Povidone Iodine).
IV Formulation 1 st	1	Test rabbit with six wounds, each wound was given 100mg extract of <i>Nephelium lappaceium</i> fructus cortex extract 7.5% ointment per topical.
V Formulation 2 nd	1	Test rabbit with six wounds, each wound was given 100mg extract of <i>Nephelium lappaceium</i> fructus cortex extract 15% ointment per topical.

F. Data Analysis

Data analysis using SPSS, namely normality and homogeneity tests were observed because they were required for the One Way ANOVA test with a confidence level of $\alpha = 95\%$ with three repetitions of the antibacterial activity test at each concentration. This analysis aims to see a significant difference in each concentration of the preparation. H_0 is accepted. When the value of $\text{sig} > 0.05$, it means that there is no difference in the concentration of each extract. Meanwhile, if H_0 is rejected if the value of $\text{sig} < 0.05$ which means there is a significant difference, the difference that occurs in each extract concentration, a post hoc Tukey HSD test is carried out.

RESULTS AND DISCUSSION

A. The results wound healing activity test

Table 3rd. The results of the Wound healing activity test (mm)

Group (Test animal)	wound diameters (mm)			
	7 th day	11 th day	17 th day	21 st day
Normal	6,2 ± 0,7 ^a	5,8 ± 0,6 ^a	5,1 ± 0,4 ^a	4,9 ± 0,4 ^a
Control negative (-)	6,3 ± 0,5 ^a	6,2 ± 0,4 ^a	5,7 ± 0,4 ^a	4,6 ± 0,3 ^a
Control positive (+)	3,8 ± 0,5 ^{ab}	2,9 ± 0,6 ^{ab}	0,9 ± 0,2 ^{ab}	0,2 ± 0,1 ^{ab}
Formulation 1 st	4,2 ± 0,5 ^{ab}	3,6 ± 0,3 ^{ab}	1,7 ± 0,2 ^{ab}	0,9 ± 0,2 ^{ab}
Formulation 2 nd	4,0 ± 0,3 ^a	3,3 ± 0,3 ^{ab}	1,1 ± 0,2 ^{ab}	0,2 ± 0,1 ^{ab}

Information:

a: significant difference with the normal group ($p < 0.05$),

b: significant difference with the negative group ($p < 0.05$),

c: significant difference with the positive group ($p < 0.05$).

On the 7th day of the test groups, relatively little wound closure occurred, especially in the normal and negative control groups, the wound diameter was still wide enough and the wound was wide so that there was no wound closure. It is suspected that an infection will cause the wound healing process to slow down and even stop, so the wound does not get smaller even though the wound base already looks red, moist and healthy, so the wound can develop into a chronic wound so that the wound healing process does not progress (Ariani et al, 2013). In the test group on day 11th, administration of 7.5% concentration of Nephelium lappaceium fructus cortex extract ointment showed less activity compared to the positive control until day 21st even though the wound diameter was closed. On the 11th day of the test group, administration of 15% concentration of Nephelium lappaceium fructus cortex extract ointment showed less activity comparable to the positive control but on the 17th to the 21st day the activity was comparable to the positive control. This might be influenced by the release of the active substance contained in the ointment preparation where the ointment is influenced by the drug concentration (dose of the drug) in the base, the type of ointment base, the solubility of the drug in the base, diffusion time and viscosity. If the solubility of the drug in the base is high, the diffusion time is short, which means the diffusion coefficient is low, so drug release is slow and vice versa. The concentration of drug in the base will affect the viscosity of the ointment preparation. The high viscosity causes the diffusion coefficient of the drug in a low base so that the drug release becomes small. The faster the diffusion time, the greater the drug release, on the other hand, if the diffusion time is slow, the drug release will be smaller (Murti A.D et al, 2017).

CONCLUSION

The 15% concentration of Nephelium lappaceium fructus cortex extract ointment had wound healing activity in New Zealand rabbits based on the wound diameter on day 17th until 21st 0.2 ± 0.1mm which was comparable to the positive control Betadine salp® with wound diameter of 0.2 ± 0.1mm.

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