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The Effectiveness of Ethanol Extract Gel of Cumin Leaves (*Plectranthus Amboinicus)* toward White Male Rat (*Rattus Novergicus*)

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ABSTRACT

The leavers of white cumin (Plectranthus amboinicus) are a species of the family. Lamiaceae, previously known as Coleus amboinicus, contains quertesin compounds that are effective in healing wounds. The purpose of this study was to determine the extract of the leaves of white cumin (Plecranthus amboinicus) can be formulated for gel readiness and can affect the healing of cuts in white male rats (Rattus novergicus). The research method was laboratory experimental with the One Group Pretest-posttest research design. The leaves of white cumin (Plectranthus amboinicus) were extracted using 96% ethanol by maceration process and made into a gel form with a concentration of 3%, 5 %, and 7%. Evaluation of the physical and chemical stability of the gel before and after the cycling test for 6 cycles. This study used 15 male white rats divided into 5 groups, each group consisting of 3 and wounded with a depth of 2 cm and a length of 3 cm. the first male white rats were given a gel concentration of 3 %, the second 5%, the third 7 %, the fourth was given a gel without extract (negative control) and fifth was given 10 of octenilin gel (positive control). The incision length was measured on day 1,3,6,9,11,13 then data analysis used the ANOVA and SPSS 22 version. The results showed that leavers of white cumin (Plectranthus amboinicus) extract was $p< 0,05$, so there was a significant difference between each treatment. It can be concluded that gel readiness can be formulated and can affect wound healing in white male rats (Rattus novergicus).

1. INTRODUCTION

Indonesia is one of the countries with the greatest biological wealth which has more than 30,000 species of higher plants. Until now known 7000 plant species that have been in the know usefulness but less than 300 plants are used as raw materials for the pharmaceutical industry on a regular basis. The WHO in 2008 noted that 68% of the world population still relies on traditional systems of Medicine, most of which involve plants to cure disease, and over 80% of the world population uses herbal medicine to support their health [1], the use of plants as potential medicinal agents [2]; [3]. Traditional plants are one of the basic assets for national health development in Indonesia [4]; [5], in addition to formal treatment services in traditional ways [6], and the use of traditional medicines or herb [7] is still widely practiced by the community at large, both in rural and urban areas [8].

One of the plants that can be used as medicine is the cumin plant (Plectrantus amboinicus) is one of the species of the family lamiaceae previously known as Coleus ambonicus [3]. Torbangun (Plectranthus amboinicus) is an herbaceous plant that grows in tropical to subtropical regions. Torbangun belongs to the Labiatae family [9]. This plant is found almost in all regions in Indonesia with different names [10].Indonesian people use cumin leaves empirically as a medicine for asthma and cough flatulence and high fever. For external use in use as a wound medicine, made by way of pounded and affixed to the diseased skin [11]; [12].

A cut wound is a wound that occurs due to an incision made by a sharp instrument or tools [13], for example, it occurs as a result of surgery. Its characteristics are open wounds, pain, the length of the wound is greater than the depth of the wound [14] gels are an option for better healing because they allow a longer drug contact time and protect the wound from external contamination [15].

The cumin plant (Plectranthus amboinicus) has two types, namely black and white. From these two types, it can be seen from the differences, such as black cumin (Nigella sativa) which can be efficacious as a widely used drug, namely the seeds of black cumin (Nigella sativa) while cumin [16]. (Plectranthus amboinicus) which can be efficacious, namely the leaves are efficacious as a medicine to increase breast milk, fever, cough, asthma, and external parts such as ulcers, burns, cuts and the reason I chose cumin leaves and made it in gel form [11].

Some previous research found that cumin leaves (Plectranthus amboinicus) can be used as a wound medicine that by combining cumin leaves and gotu kola leaves or Centella asiatica on the healing of incision wounds in alloxan-induced hypercalcemic rats concluded that 5% cumin leaf extract can heal incision wounds [17]. Meanwhile, according to research by Izzayati, 2015, namely the effectiveness of healing burns ointment of the ethanol extract of cumin leaves (Plectranthus amboinicus L.) in male rats (Rattus novergicus) strain and the results obtained that cumin leaf extract (Plectranthus amboinicus) can be formulated for burns with concentrations of 5%, 7% and 9% and the most effective for burns is the concentration of 7%. The use of cumin leaves at all doses of use can reduce the level of fishy smell in duck meat and eggs. The higher the dose, the less the fishy smell [12].

Then the results of the phytochemical analysis showed that cumin leaves (Plectranthus amboinicus) contained polyphenolic compounds, saponins, flavonoid glycosides and a fairly high content of essential oils. Flavanol compounds, saponins and essential oils work as antimicrobials. Cumin leaves (Plectranthus amboinicus) are widely used in the treatment of skin disorders, especially in the healing process of ordinary wounds and burns. Antioxidant compounds such as flavonoids, quercetin, tannins, and polyphenols are thought to play a role in the wound healing process and the most important role in the wound healing process is quercetin, a type of flavonoid that can accelerate the wound healing process because it has anti-inflammatory and antioxidant properties [17].

Based on the description above, the researchers are interested in conducting research on the formulation and effectiveness test of the ethanol extract gel of cumin leaves (Plectranthus amboinicus) against cuts in male white rats (Rattus novergicus).

The urgency of this study to provide information to the public that one of the pharmaceutical preparations, namely the ethanol extract gel of cumin leaves, can be beneficial for health, especially for healing wounds.

This study aims to find out that cumin leaf extract (Plectranthus amboinicus) can be formulated into a gel preparation and can affect wound healing in male white rats (Rattus novergicus).

2. METHODS

The research conducted was a laboratory experimental research and research design *One groups pretest-posttes*t. Research design contained *pretest* before being treated and *posttest* after being treated. The purpose of this study was to determine the effect of to determine the extract of the leaves of white cumin (*Plecranthus amboinicus*) can be formulated for gel readiness and can affect the healing of cuts in white male rats (*Rattus novergicus*).

a. Sampling
   Taken cumin leaves (*Plectranthus amboinicus*) at 08.00 Wita in Pana District, Pana Village, Mamasa Regency, West Sulawesi Province.
b. Processing and manufacture of extracts

The leaves of white cumin (*Plectranthus amboinicus*) that have been harvested wet sorting is done to separate impurities or other foreign materials. The leaves of white cumin (*Plectranthus amboinicus*) a total of 500 grams were then put into a maceration container and soaked with 96% ethanol solvent as much as 5 liters until the simplicity was submerged and stirred, covered and allowed to stand for 3 (2) 24 hours while stirring occasionally. After 3 days, the resulting filtrate is

filtered using filter paper. A 2-step process is used to determine the chemical composition of the seed (*Plectranthus amboinicus*) Then the liquid extract is inserted into the rotary vacuum evaporation to produce a thick extract.

c. The formula design of white cumin extract ethanol extract (*Plectranthus amboinicus*)

White Cumin Leaf Ethanol Extract Gel Formulation
(*Plectranthus amboinicus)*
concentration (%)

Materials	Fl	F2	F3	F 4
Cumin Leaf Ethanol Extract	3	5	7	-
Na- CMC (basis)	2	2	2	2
Trietanolamin	1	1	1	1
Natrium benzoat	0,2	0,2	0,2	0,2
Gliserin	20	20	20	20
Aquadest	Ad 100	Ad 100	Ad 100	Ad 100

Description:
F1 : Ethanol extract of cumin leaves (*Plectranthus amboinicus*) 3%
F2 : Ethanol extract of cumin leaves (*Plectranthus amboinicus*) 5%
F3 : Ethanol extract of cumin leaves (*Plectranthus amboinicus*) 7%
F 4 : gel formula without containing extracts (negative control)
F 5 : formula gel positive control (Octenilin)

d. Gel making

The gel base is prepared tools and materials to be used then the materials to be used namely weighed such as Na-CMC and sodium benzoate and measured glycerin and triethanolamine in accordance with the calculation, then aquadest boil, after heated mortar, after hot mortar aquadest transferred to a beaker, then Na-CMC inserted into the mortar little by little and added a little aquadest little by little while crushed until formed mucilago. Glycerin, pre-dissolved nantrium benzoate and triethanolamine are added, stirring until homogeneous and placed in a container. Later There are 3 main types of hair extensions (Plectranthus amboinicus) as an active substance with different concentrations of 3%, 5%, 7%.

The use of ethanol extract of cumin leaves (Plectranthus amboinicus) with different concentrations of 3%, 5%, 7% and the same additives. First of all prepared tools and materials to be used, weighed materials to be used such as cumin leaf extract, Na-CMC and sodium benzoate and measured glycerin and triethanolamine in accordance with the calculation, then boil aquadest, after boiling put into the mortar until the mortar is hot after it was transferred to a measuring cup, and put Na-CMC into the mortar-1 Little By Little and added aquadest little by little while stirring until formed mucilago.

Then, in the 2nd mortar put ethanol extract of cumin leaves (Plectranthus amboinicus) dissolved with a little aquadest gerus until homogeneous, then inserted ethanol extract of cumin leaves into the base gel dilumpang to-1 added glycerin, sodium benzoate that has been dissolved with a little aquadest in another container and triethanolamine. Aquadest put into mortar 1 to 100 ml crushed until homogeneous and inserted into the container.

e. Animal preparation and effectiveness test

All animals were adapted to the experimental environment for seven days. The animal used is a white rat (Rattus novergicus) are male and healthy with an average body weight ranging from 200-300 grams. The White RatRattus novergicus) a total of 15 animals were divided into 5 groups randomly each group amounted to 3 white mice and given a sign and sequence number.

The wound healing test was carried out on experimental healthy male white rats. First of all, male white rats were anesthetized using ether, then held by male white rats (Rattus novergicus) with

their stomachs and shaved on the part to be injured, namely the back. The male white rat (Rattus novergicus) was then injured with a sharp object (scalpel) until it bleeds at the bottom of the epidermis, namely the dermis of the skin and is 3 cm long by measuring using a ruler. each group was given the treatment:

Group 1: The wound was smeared with a gel containing 3%
Group 2: The wound was smeared with a gel preparation containing 5%
Group 3: The wound was smeared with a gel containing 7%
Group 4: Wounds were applied with a non-containing gel preparation
Group 5: The wound was smeared with Octenilin® comparison gel.

The wound is applied every day 2 times with the same hour for 13 days in a thin way until evenly then make macroscopic observations about the condition of the wound and the length of the cut wound by measuring the cut wound on the first day of treatment then the 3rd, 6th, 9th, 11th and 13th days are written and photographed measurement results.

f. Data analysis

Data analysis was performed by statistical ANOVA (*Analisis of variant*) in the SPSS 22 program by measuring the average diameter of wound healing.

3. RESULTS AND DISCUSSION

Table 1. observation results of cut wounds the White Rat (*Rattus novergicus*)

Group	Wound length (cm)							
	H1	H3	H6	H9	H11	H13	%	Healing
F1	3	2,7	1,6	1,1	0.,8	0,4	86	Not yet
F2	3	2,7	1,9	0,7	0,6	0,3	90	Not yet
F3	3	2,7	1,6	0	0	0	100	Heal
F4	3	2,8	1,6	1,1	0,8	0,4	86	Not yet
F5	3	2,8	1,4	0	0	0	100	Heal

Description :
F1 : extract gel formulation 3 %
F2 : extract gel formulation 5 %
F3 : extract gel formulation 7 %
F4 : negative control (gel without extract)
F5: positive control
H1: first day of wound length measurement in experimental animals
H3: the third day of wound length measurement in experimental animals
H6: sixth day of wound length measurement in experimental animals
H9: day nine measurement of wound length in experimental animals
H11: day eleven measurement of wound length in experimental animals
H13: thirteenth day of wound length measurement in experimental animals

Based on the above, shows the average decrease in wound length ranging from the third, sixth, ninth, eleventh and thirteenth days. At concentrations of 7 formula 3 and Octenilin formula 5 healing occurs.

Based on the raw data table, it has a decrease in the length of the incision wound and in formula 3 with a concentration of 7% and formula 5 (positive control) it has a decrease in wound healing and healing.

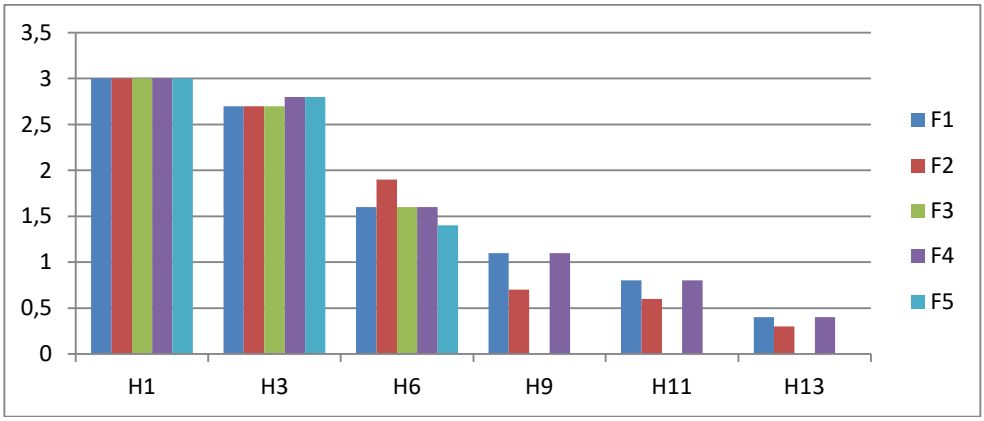

Figure 1. decrease in the length of the incision wound and in formula 3

Data graph description:
F1 : 3% extract gel formulation
F2 : 5% extract gel formulation
F3 : 7% extract gel formulation
F4 : negative control (gel without extract)
F5 : Octenilin positive control

Based on the graph above, it shows the average decrease in wound length from the third, sixth, ninth, eleventh and thirteenth day. At concentrations of 7 formula 3 and Octenilin formula 5 healing occurred.

The cumin plant (Plectrantus amboinicus) is a species of the lamiaceae family which was previously known as Coleus ambonicus [18]. One of the plants that is used as medicine in society empirically as a medicine for asthma and cough, flatulence, high fever and cough [11]. The purpose of this research was to find out the extract of cumin leaves (Plectranthus amboinicus) can be formulated into gel preparations and can affect wound healing in male white rats (Rattus novergicus).

This study used an experimental method, extracts were made by maceration method and 96% ethanol alloy. Cumin leaves (Plectranthus amboinicus) are picked. Then washed and cut into small pieces and then dried, weighed as much as 500 grams, maceration process was carried out for 3 × 24 hours using 5 liters of 96% ethanol then filtered using filter paper and evaporated using rotary time to obtain thick extract.

The reason for using the maceration method is because the tool and the procedure used is simple, natural materials do not experience decomposition, the use of the maceration method without heating, so that the results of the compounds extracted are large in number to attract the compounds contained in cumin leaves. While the use of 96% ethanol solvent to attract compounds contained in cumin leaves because it is universal, that is, it can attract all types of compounds such as semi-polar, polar and non-polar and is not easily overgrown by microbes [19]. This research is appropriate with the other research namely using the maceration method and 96% ethanol [17].

The reason for choosing gel preparations is because gel preparations are able to provide high speed in releasing drugs and absorption in skin treatments, easily spread evenly when applied to the skin giving a cold sensation and do not cause scars on the skin and easily penetrate the skin. While the reason for choosing a different concentration of 3%, 5% and 7% is to see whether low, medium and high concentrations are the most effective in healing cuts. In ointment preparations with concentrations of 5%, 7% and 9% and the most effective for burns is the concentration of 7%. Then the reason for choosing to make the formulation was to develop a gel preparation containing cumin leaves and to make it easier for the community to treat cuts from cumin leaves.

Caraway leaf ethanol extract (EEDJ) has analgesic effect, at doses of 200, 100, and to mice induced by acetic acid respectively were (22.98 ± 0.246)%, (10.86 ± 0.262)%, and (4.17 ± 0.227)% which were still less than the analgesic power of acetal [20]. The acute toxicity test of cumin leaf

extract did not cause 50% death (LD50) and did not cause toxic symptoms, neurological disorders and decreased activity in all treatment groups so that cumin leaf extract could be classified as a "practically non-toxic" material [8].

Tests that have been carried out by looking at the compounds contained in cumin leaves, namely flavonoid compounds, quercetin, tannins and polyphenols, obtained positive results. Flavonoids as anti-inflammatory, hypo-allergenic to prevent the oxidation process and inhibit toxic substances that can arise in the wound then quercetin as an anti-inflammatory and antioxidant to accelerate the wound healing process, tannins, namely as an astringent, which hardens the skin and stops light exudate and bleeding as well as antiseptic and polyphenols, namely to prevent free radicals from appearing in wounds [17].

A phytochemical screening test was carried out for the extract of cumin (Plectranthus amboinicus) leaves, namely by seeing whether there were compounds contained therein such as flavonoids, alkaloids, saponins, quercetin, tannins and lophenols. First of all, the preparation of alkaloids and that is 2 mL of extract solution added 5 mL of 2N HCL added 3 drops of dragendrof reagent and the second tube added 3 drops of Mayer's reagent. The formation of an orange precipitate in the first tube and a yellow precipitate in the second tube indicates the presence of alkaloids. Second, for the preparation of flavonoids and quercetin, a 2 mL extract solution was added with a few milligrams of 0.02 g Mg powder and 1 mL of concentrated HCl solution. The formation of orange red to purple red color indicates the presence of quercetin flavonoids. Preparation of Saponin extract 10 mL added 1 drop of 2N HCL, the foam did not disappear indicating the presence of saponins. Preparation of tannins and polyphenols 2 mL of extract solution added with 10% iron (III) chloride solution 3 drops of dark blue or greenish black color indicates the presence of tannins and polyphenols.

Examination of the incisions in experimental male white rats by injuring the back with a depth of 2 mm and 3 cm in length and using cumin leaf gel with concentrations of 3%, 5% and 7% and measuring the length of the incisions with intervals of 1, 3, 6, 9 days, 11 and 13, and the most effective for cuts is 7% with completely healed wounds.

4. CONCLUSION

Based on the results of research conducted showed that the leavers of white cumin (*Plectranthus amboinicus*) extract was p< 0,05, so there was a significant difference between each treatment. Furthermore, the extract of cumin leaves (*Plectranrhus amboinicus*) can be used as an adjuvant and can affect wound healing in white male rats (*Rattus novergicus*).

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