



## MAKING AN ANTISEPTIC CREAM FROM RED BISH LEAF EXTRAK (PIPER CROCATUM RUIZ & PAV)

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### *Abstract*

*Red betel is a plant that has many benefits as a medicinal plant, red betel plant is a source of traditional medicinal ingredients that are widely used from generation to generation. some antiseptics inhibit growth against Escherichia coli and Staphylococcus aureus. The research stages used included the collection and processing of samples, the characteristics of simplicia, phytochemical screening, the manufacture of ethanol extracts by maceration using 96% ethanol solvent, and the antibacterial activity test using the agar diffusion method using a paper barrier against Escherichia coli and Staphylococcus aureus by measuring the zone diameter. inhibit bacterial growth. The results of the examination of the characteristics of the red betel leaf simplicia powder showed total ash content of 9.65%, acid insoluble ash content of 1.20%. The results of the phytochemical screening examination contained chemical compounds of the phlovanoid group, saponin tannins, and triterpenoid steroids. The ethanol extract of red betel leaf has antibacterial activity against Escherichia coli and Staphylococcus aereus. The results of the antibacterial activity test for the ethanol extract of red betel leaf against Escherichia coli bacteria obtained KHM 100 mg/ml with a diameter of 25 mm from Staphylococcus gereus and obtained KHM 100 mg/ml with a diameter of 28 mm.*

**Keywords:** Antibacterial Test, Red Betel Leaf Escherichia coli, Staphylococcus aureus

### INTRODUCTION

Medicinal plants are a source of traditional medicinal ingredients that are widely used for generations. One of them is red betel leaf, which is known as red betel, green betel, black betel, yellow betel, and silver betel (Ministry of Health, 1980). Red betel is a plant that has many benefits as a medicinal plant (Ministry of Health, 1980). There are various kinds of betel plants, in this study the red-stemmed betel plant with green leaves (*Piper crocatum Ruiz & Pav.*), belonging to the Piperaceae family, was used. This betel plant grows vines on other plants, red betel leaves have the characteristics of leaves that are round eggs or oval eggs, at the base they are shaped like a rather round heart.

Red betel leaf (*Piper crocatum Ruiz & Pav.*) contains essential oils, phenyl compounds, propanoids and tannins (Ministry of Health, 1989). The compounds in betel leaf have many beneficial effects. This plant has the ability of several antiseptics, antioxidants, and fungicides, inhibits the growth of several types of bacteria, including: *Escherichia coli*, *Salmonella sp*, *Staphylococcus aereus*, *Klabsiella*, *Pasteurella*, and can kill *Candida Albican*, red betel plant also has the properties to restrain bleeding and wound healing on the skin (Haryadi, 2010).

Yosi Research, (2019). An antiseptic is a chemical substance that has a work to destroy microorganisms or inhibit their work, so that they can prevent an infection from occurring. Antiseptics can be distinguished from disinfectants from their place of work, where antiseptics are used on living things and disinfectants are used for inanimate objects. Antiseptics can also be distinguished from antibiotics in that the action of antibiotics is specific to certain microorganisms, and antiseptics work more generally.

Research Mega A, Oktavianingtyas Y. 2013. Mentions red betel can be utilized in the form of cream preparations used as anti-acne cream with a comparison of album variations because the base has a function as an emulsion stabilizer in cream preparations and functions as a lubricant. Cream is a semi-solid preparation in the form of a viscous emulsion containing not less than 60% water, used for external use (National Formulary, 1978). Creams have the advantage of being easily washed off, non-sticky, providing a moisture effect on the skin and can spread well. Creams can be divided into two types, namely, oil-water type creams and water-oil type creams (Kuswahyuning and Sulaiman, 2008).

The World Health Organization (WHO) has advised countries to take advantage of the use of traditional medicine in the health sector. In addition, the Indonesian government also supports traditional medicinal plants as an alternative treatment because Indonesia is rich in plants that are efficacious as medicines for all diseases, including diseases caused by microbes (Anonymous, 2012).

## LITERATURE REVIEW

### Red Betel Leaf (*Piper crocatum* Ruiz & Pav)



Figure 1. Red Betel Plant

Red betel vines grow on fences or trees. The characteristic feature of this plant is its round, purplish green stems and no flowers. Research has been conducted that red betel extract contains flavonoids, tannins, alkaloids (Safithri et al., 2007), saponins and flavonoids (Anonymous, 2006 cit Sulistyani et al., 2007). Based on research by Sulistyani et al, (2007) chromatographically, red essential oil contains kavikol, phenol, eugenol, trans-selinen. Red betel has many benefits in traditional medicine, has the potential to cure various types of diseases. There is a lot of experience that using red betel can reduce uric acid, lower blood pressure, treat hepatitis and ulcers. In addition, red betel can be used as an antiseptic, and has a hypoglycemic effect (Anonymous, 2006 cit Sulistyani et al., 2007).

Red betel can also be used as a medicine for coughs, asthma, inflammation, throat and nose inflammation (Haryadi, 2010).

### **Antiseptic**

Antiseptics are chemical compounds used to inhibit or kill micro-organisms in living tissue, which has a limiting effect and prevents infections from getting worse. Antiseptic used on mucosal surfaces, forests and infected wounds. The ideal antiseptic is able to inhibit the growth and destroy bacterial cells, bacterial or fungal spores, viruses and protozoa, without damaging the host's or host's tissues. Antiseptics used in single preparations or in combination with other ingredients such as detergents, soaps, powders, deodorants, and toothpaste. (Djide, 2008;349-359).

### **Extraction**

Extraction is the activity of withdrawing soluble chemical substances so that they are separated from insoluble materials using a liquid solvent. Active compounds contained in essential oils, alkaloids, flavonoids, and others. Knowing the active compounds contained in simplicia will facilitate the selection of solvents by means of proper extraction, Directorate General of Food and Drug Administration, 2000. Extracts are extracting vegetable or animal simplicia according to a suitable method, outside the direct influence of sun damage, Directorate General of Drug and Food Control, 1979.

### **Cream**

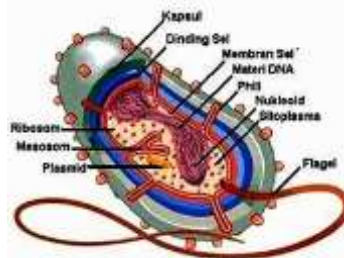
Cream is a semi-solid dosage form containing one or more drug ingredients dissolved or dispersed in suitable base ingredients. This term has traditionally been used for semi-solid preparations that have a relatively liquid consistency formulated as water-in-oil or oil-in-water emulsions (Anonymous, 2014). Cream contains not less than 60% water and is intended for external use (Anonymous, 1979). Cream is a semi-solid emulsion system with a not clear appearance. Its consistency and properties depend on the type of emulsion, whether it is water-in-oil or oil-in-water (Lachman et al., 1994).

### **Skin**

The skin is a layer or tissue that covers the whole body and protects the body from harm that comes from outside. The skin is a part of the body that needs special attention to beautify beauty, apart from this the skin can help find the disease that the patient is suffering from. The skin is also called the integument or cutis which grows from two types of tissue, namely epithelial tissue which grows the epidermis layer and connective tissue (support) which grows the dermis layer (deep skin). The skin has a subtly woven arrangement of nerve fibers that is useful for feeling the whole or as a touch tool and is an indicator for obtaining a general impression by seeing changes in the skin (Syarifuddin, 2009).

### **Bacteria**

Bacteria are typical prokaryotic cells and are unicellular. The cell contains a mass of cytoplasm. Bacterial cells are round, rod and spiral in shape. Reproduction mainly by simple binary fission i.e. asexual process. Among the bacteria there are those that can cause disease in humans and animals (Pelczar and Chan, 1988).



Picture 2. General Anatomy of Bacteria

### **Antibacterial Test Method**

Antibacterial testing method is carried out to determine the effectiveness of a substance against microorganisms. There are 2 kinds of antibacterial testing methods viz diffusion method and dilution method.

### **Cosmetics**

Cosmetics comes from the Greek word "kosmetikos" which means the skill to decorate, organize. The definition of cosmetics in the regulation of the Minister of Health of the Republic of Indonesia No.445/Menkes/Permenkes/1998 is a preparation or combination of materials that are ready for use on the outside), teeth and oral cavity to clean, add attractiveness, change appearance, protect them so that they remain in good condition. well, improves body odor but is not intended to treat or cure any disease.

### **Phytochemical Screening**

Phytochemical screening is a qualitative analysis of secondary metabolite compounds. An extract from natural materials consists of various kinds of secondary metabolites that play a role in its biological activity. These compounds can be identified with reagents that are able to provide characteristics of each group of secondary metabolites (Harborne, 1987). Various methods that can be used to identify secondary metabolites present in an extract include.

## **METHOD**

This research is an experimental laboratory study consisting of making red betel leaf extract using the maceration method with 96% ethanol solvent and testing of physical characteristics which consist of organoleptic, homogeneity, fast power stability, pH, and spreading power. The sample in this study was cream leaf extract of red betel leaves (*Piper crocatum* Ruiz. & Pav.). the testing stages with several stages, First Antibacterial activity test was carried out on a 10 ml base and red betel leaf extract cream against *Staphylococcus aureus* and *Eschericia coli* bacteria with the media used NA. The cream base was tested against *Staphylococcus aureus* and *Eschericia coli* then the cream was tested against *Staphylococcus aureus* and *Eschericia coli* using the disc diffusion method.

Petri dishes were incubated at 37°C for 24 hours. Second, a phytochemical screening was carried out to determine the class of compounds found in ketepeng leaves.

## RESULTS AND DISCUSSION

### Contents Results and Discussion

Red betel leaves vines or creepers, can reach about 5-10 m in length, stems round, red-purple green, segmented with 3-8 cm long segments, one leaf on each node of the plant. Single leaf, stiff, seated alternate leaves, leaf shape oblong-oblong, the surface of the upper leaf blade is slightly convex, shiny, the lower surface of the leaf is concave with protruding leaf veins, leaf length 6-15 cm, Leaf width 4-7 cm, leaf base color is green on both surfaces, green above with reddish-pink green below, lower surface purplish dark red green. Red-purplish petiole, 2.6-3 cm long, the base of the petiole on the leaf blade is slightly in the middle, about 0.7-1 cm from the lower edge of the leaf. The results of the examination of the simplicia characterization of red betel leaves are in table 1 below

**Table 1 Total ash content, and insoluble acid ash of red betel leaf simplicia**

No	Simplicity characteristics	Results
1	Total ash content	9.56%
2	Acid insoluble ash content	1.20%

Based on table 1 the results of determining the total ash content of red betel leaf simplicia were obtained 9.56%, this is in accordance with the standardization of total ash content of simplicia in general with the conditions listed on the Indonesian Medika Stamp, namely not more than 10% (Directorate General of Drug and Food Control, 1995 ). For acid insoluble ash content of 1.20%.

**Table 2 Results of phytochemical screening of red betel leaf simplisa powder**

No	Class of chemical compounds	Results
1	Flavonoids	+
2	Alkaloids	+
3	Saponins	+
4	tannins	+
6	Steroids/triterpenoids	+

Information : + = give result, - = didn't work

Based on table 2 it is known that red betel leaf simplicia contains chemical compounds, namely flavanoids, tannins, saponins, and steroids/triterpenoids. These compounds are attracted by the nature of ethanol which has polar hydroxyl groups and nonpolar alkyl groups (Wibraham and Matta). According to Robinson (1995), flavanoids, saponins and steroids/triterpenoids are chemical compounds that have potential as antibacterial and antiviral agents.

**Table 3 Data on determining the type of emulsion cream for red betel leaf ethanol extract**

No	Formulas	Methyl blue solubility in the preparation
1	Formula 1	-
2	Formula 2	√

The results of the emulsion type test in table 3 show that the cream formula with a concentration of 5% can dissolve methyl blue. This proves that the type of cream emulsion made is O/O. The results of determining the type of preparation emulsion can be seen in Appendix 10.

**Table 4 Data on pH measurements of red betel leaf cream preparations**

No	preparation	Observation time (Days)													
		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	H11	H12	H13	H14
1	F1	5	5	5	5	5	5	5	5	5	5	5	5	5	5
2	F2	6	6	6	6	6	6	6	6	6	6	6	6	6	6

Based on measurements of the pH of the formula during observation, there was no significant change in pH which indicated that the pH of the cream preparation was stable. The test results on the pH of the cream preparations obtained show that the cream preparations produced are in accordance with the pH of the skin and can be used safely and do not cause irritation to the skin because according to Balsam and Sagarin (1972), the pH of cream preparations suitable for skin pH is between 5 and 8.

**Table 5 Data on stability examination of red betel leaf cream preparations**

No	preparation	Observation time (Days)														
		0th h			1st H			3rd h			5th h			7th h		
		x	Y	Z	X	Y	z	x	y	z	x	y	Z	X	y	Z
1	F1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	F2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

The results of the organoleptic examination of the preparations were carried out for changes in the shape, color and smell of the preparations. Sedian is declared stable if it does not change shape, color, and smell (Draelos and Thaman, 2006). From the results of the organeleptic stability test, the cream of red betel leaf extract did not change shape, color and smell during 3 weeks of storage at room temperature, it was declared stable.

**Table 6 Results of measuring the diameter of the inhibition area for the growth of Staphylococcus aureus and Escherichia coli bacteria.**

EEBPT concentration (mg/ml)	Diameter of inhibition area for bacterial growth (mm)*	
	<i>Staphylococcus aureus</i>	<i>Escherichia coli</i>
100	28.00mm	25.00mm
Blank	-	-

The data above shows that red betel leaf extract is effective in inhibiting the growth of Staphylococcus aureus and Escherichia coli bacteria. Plant extracts with minimum inhibitory concentrations (MIC < 100 µg/ml have very active antibacterial activity; MIC between 100-500µg/ml have moderately active antibacterial activity; MIC > 1000 µg/ml have weak antibacterial activity (Silva, et al., 2013) Based on the results of the tests that have been carried out, it can be concluded that the Minimum Inhibitory Concentration (MIC) of the ethanol extract of red betel leaves is in the range <100 µg/ml, which means that the antibacterial activity is weak.

The results of measuring the diameter of the inhibition area of the ethanol extract of red betel leaves on *Staphylococcus aureus* bacteria at a concentration of 100 mg/ml obtained a diameter of 28.00 mm and for *Escherichia coli* bacteria at a concentration of 100 mg/ml obtained a diameter of 25.00 mm.

**Table 7 Data on irritation test of red betel leaf extract cream**

Reaction	Volunteer									
	1	2	3	4	5	6	7	8	9	10
Erythema	-	-	-	-	-	-	-	-	-	-
Edema	-	-	-	-	-	-	-	-	-	-

From table 7 it can be seen that there are no side effects in the form of erythema and edema, this indicates that the preparation does not irritate the skin.

## CLOSING

### Conclusion

Based on the research that has been done it can be concluded that:

1. Check up result Macroscopic simplification of red betel leaves shows a brown dry powder, very bitter taste, and has a distinctive betel aroma;
2. The results of examining the simplicia characteristics of red betel leaf obtained a total ash content of 9.56%, and an acid insoluble ash content of 1.20%;
3. The results of the phytochemical screening showed that the simplicia of red betel leaves contains flavanoids, tannins, saponins, and steroids/triterpenoids;
4. The test results on 5% red betel leaf cream preparation obtained homogeneity preparations, M/A emulsion type, preparation pH 6;
5. Test results for checking the stability of cream preparations that do not change color, smell, and break the emulsion;
6. The results of the antibacterial activity test of the ethanol extract of red betel leaves have antibacterial activity against *Staphylococcus aureus* and *Escherichia coli*.

### Suggestions and Acknowledgments

After doing this research, it is hoped that there will be further studies that make more concentrations to be able to determine the maximum concentration that can still inhibit bacterial growth *Staphylococcus aureus* and *Escherichia coli* with a strong inhibitory response. In addition, you can look for the Minimum Inhibitory Level (MIC) and Minimum Killing Rate (KBM) of red betel leaf extract against *Staphylococcus aureus* and *Escherichia coli* bacteria.

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