

Cypirus Rotundus L: Formulation and Evaluation Antiseptic Soap

Sri Dwiyanti^{1*}, Siti Sulandjari¹, Titik Winanti², IGP. Asto², Lilik Anifah²

¹ Home economic, Universitas Negeri Surabaya, Surabaya, Indonesia

² Vocational education, Universitas Negeri Surabaya, Surabaya, Indonesia

*Corresponding author. Email: sridwiyanti@unesa.ac.id

ABSTRACT

Soap is a product that is one of the people's needs, used as a body cleansing agent, which is available in many forms and perfume that can be selected according to your needs. Natural soap products are rarely used in the market. Today's soap products use a lot of artificial ingredients as their active ingredients, which have side effects on human skin because they have the potential to irritate users with sensitive skin. This study aims to describe the antiseptic soap formula and evaluate the antiseptic soap from *C. rotundus*. This research is experimental research with a quantitative descriptive research method. : 1) Determining and making an antiseptic soap formula with active ingredients of *C. rotundus* formulas X1, X2, X3, 2) Evaluating the antiseptic soap product of *C. rotundus*. The results of the study were 1) product evaluation based on the response descriptively X2 is the most superior in terms of color and texture, and X3 is superior in aroma, but the results of statistical analysis, X1, X2, and X3 have similarities in color and aroma. The only difference is the texture, namely X2 is superior 2) evaluation of laboratory test results on bacterial killing power, froth power, and product pH stated that the three formulas of tuber-based soap nuts which are neither (X1) nor those that use olive oil (X2) or lime leaf powder (X3) are included in the category of antiseptic soap which has good bacteria-killing power

Keywords— antiseptic soap, *C. Rotundus*, bar soap

I. INTRODUCTION

Soap products based on natural ingredients are still rarely used in the market. Soap products in this era generally use artificial ingredients or synthetic ingredients as their active ingredients, which have side effects on human skin, because they have the potential to irritate users who have sensitive skin. Soap is also one of the emulsion preparations that function as a good drug conductor. The use of natural ingredients containing functional compounds as soap ingredients can be an option. Many natural raw materials can be used as herbal cosmetics. [1] based on the phytochemical content that can be formulated into various categories of cosmetic preparations, such as skin care, hair care, anti-aging, skin whitening, and antioxidants. [2] Trees are the most abundant form of life, while bark and seeds are the most frequently used parts. More than 40% of recorded plants are used for skin care. Cosmetics from listed plants include dermatology, anti-cancer, antioxidant, perfume, anti-inflammatory, antimicrobial, wound healing activity, skin lightening, dental caries, astringent, and hair care.

[3] Soap is a product that is one of the needs of the community. Soap has long been used as a body cleansing agent, which is available in many shapes and scents that can be chosen according to needs. In its development, it is not only limited to being used as bath soap to clean the whole body but also specifically used as soap for the face as part of cosmetics, feet, to soap for washing hands. Soap is a cosmetic with the ability to clean and is made by mixing excess fatty and alkaline compounds with a heating process. Excess base causes soap to have residual alkaline properties. [4] Herbal soap preparations are medicines or drugs containing Antibacterial & antifungal agents which mostly use parts of plants such as leaves, stems, roots & fruits for the treatment of injury or disease or to achieve good health. [5] It is administered topically and is available to apply in various forms such as creams, lotions, gels, soaps, solvent extracts or ointments. Various properties of creams & soaps have been used to treat various skin disorders. [6] Soap also shows good cleaning efficiency in removing microbes on hands. Therefore, based on antimicrobial effects and parameters, the soap formulated further can be standardized and become an alternative to commercial drugs and skin whitening soaps.

The same contains very many important medicinal and pharmacological properties. The most effective parts of this perennial herb are the rhizomes and tubers. The presence of various secondary metabolites makes it important and very valuable for medicinal purposes. The ancient use of natural compounds, especially of plant origin has received a lot of attention because their effects have been well tested and are usually believed to be safe for human and animal use. *C. rotundus* illustrates the fact that it is the preferred remedy among various ethnic groups, ayurvedic and ancient practitioners for the treatment of various ailments. Applied research is needed to obtain more and more valuable data output from *C. rotundus* for commercial purposes using various techniques. This plant has many properties that make it a useful medicine. To achieve more benefits should be explored in the therapeutic potential of this plant. [7] The content of nutgrass tubers according to the results of phytochemical studies are sesquiterpenes, flavonoids, phenylpropanoids, phenolic acids, alkaloids, and saponins with anticancer effects. The methanolic extract of nut grass tuber also exhibited hepatoprotective, antioxidant activity by inhibiting lipid peroxidation.

Grass tubers as an additive for soap are to utilize the properties of the compounds they contain, especially antioxidant, anti-inflammatory, and antibiotic properties so that apart from meeting the requirements of SNI and public acceptance, they can also be used as an antiseptic soap. The teki tuber antiseptic soap consists of an oil phase, foam booster, and the active substance *C. rotundus* is characterized as a soap that can clean germs, as an anti-microbial, clean fungi, reduce pigmentation, itching, and acne.

Antiseptic soap from teki grass tubers is an innovative use of natural ingredients which are considered as weeds or nuisance plants. The innovation was made because the nutgrass tubers have very good content for skin health and beauty. The purpose of the study was to describe the formula for antiseptic soap and to evaluate the antiseptic soap from *C. Rotundus*.

2. METHODS

The study used an experimental method with quantitative descriptive.

Table 1: Formulation of antiseptic soap

Material	X1	X2	X3
Coconut oil	√	√	√
Coastic soda	√	√	√
Foam booster	√	√	√
Dionize water	√	√	√
C.Rotundus	√	√	√
Kaffir lime leaves	-	-	√
Olive Oil	-	√	-

Organoleptic test of antiseptic soap using SPSS then followed by the one-way ANOVA test with Duncan.

The Material of antiseptic soap is Palm oil, Coastic soda, foam booster, dionized water, olive oil, *C. rotundus*, kaffir lime leaves. To obtain the best antiseptic soap and preferred by the respondents, the following 3 formulas were varied. It is also described as shown in Table 1.

3. RESULT AND DISSCUSION

3.1 Discussion 1 Organoleptik

Figure 1 shows the color graph of antiseptic soap. The color of the *C. Rotundus* antiseptic soap which was preferred by 44% of the respondents was yellowish-brown because the mixture of dark brown nutmeg powder with greenish kaffir lime leaf powder was preferred by dark brown spots, namely *C. Rotundus* X2 antiseptic soap. [8] Powders are an increasingly used ingredient in the formulation of cosmetic products for the sensory qualities they provide

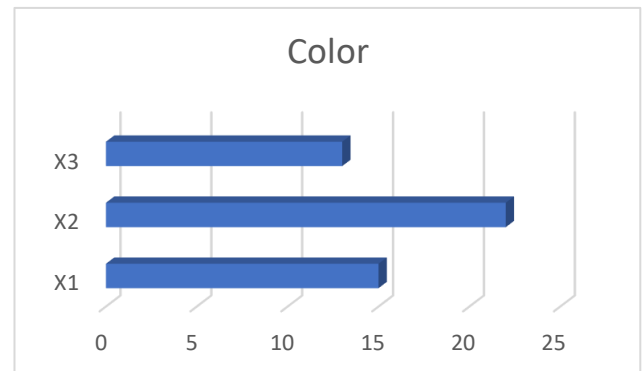


Figure 1. The color of the *C. Rotundus* antiseptic soap

Sample	N	Color	
		Duncan ^{a,b}	Subset
X3	50		1
X1	50		1
X2	50		1
Sig.			1,143

Means for groups in homogeneous subsets are displayed.

Based on observed means.

The error term is Mean Square(Error) = ,331.

a. Uses Harmonic Mean Sample Size = 50,000.

b. Alpha = 0,05.

The texture of the soap that is preferred by the respondents is quite hard on X2 soap and has a granular texture like granules. The results of the physiochemical analysis of palm oil show that palm oil can be used as a good oil for making traditional soaps; Palm oil is very popular for its ability to add hardness to soaps and produce stable, creamy skin.[9] 171.1 palm oil which is used in soap making and produces a soap that is relatively hard and soluble in water

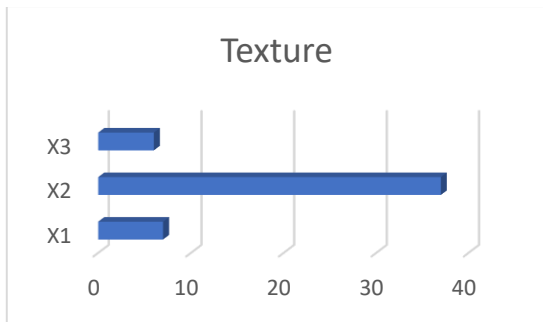


Figure 2. The texture of the C. Rotundus antiseptic soap

Texture

Duncan^{a,b}

Sample	N	Subset	
		1	2
X3	50	,12	
X1	50	,14	
X2	50		,74
Sig.		,829	1,000

Means for groups in homogeneous subsets are displayed.
 Based on observed means.
 The error term is Mean Square(Error) = ,213.
 a. Uses Harmonic Mean Sample Size = 50,000.
 b. Alpha = 0,05.

The respondent's preferred scent is the **Parfume** of X3 soap, namely C. Rotundus antiseptic soap which is added with olive oil to X3 soap. C. Rotundus tuber powder has a distinctive aroma like the smell of herbs, so the respondents who are mostly teenage women do not like the original C. Rotundus aroma without the addition of other substances

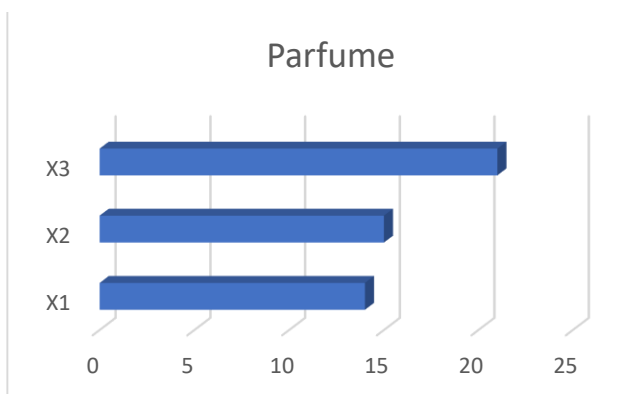


Figure 3. The perfume of the C. Rotundus antiseptic soap

Parfume

Duncan^{a,b}

Sample	N	Subset
		1
Formula 1	50	,28
Formula 2	50	,30
Formula 3	50	,42
Sig.		,258

Means for groups in homogeneous subsets are displayed.
 Based on observed means.
 The error term is Mean Square(Error) = ,334.
 a. Uses Harmonic Mean Sample Size = 50,000.
 b. Alpha = 0,05.

3.2 Evaluation 2: the killing power of bacteria

Table 2: killing power bacteria

	Before	After
X1	3,1 X 10 ³	16
X2	3,8 10 ³	12
X3	3,6 10 ³	17
Control DTL	3,6 10 ³	51

C. Rotundus antiseptic soap has a higher killing power than the control. This is because the nutgrass tubers contain flavonoid compounds that function as antiseptic compounds that can kill bacteria. [10] Stated that teki tuber extract has anti-microbial and anti-bacterial benefits. Mannarredy et al [7] stated that the methanol extract of nut grass tuber has anti-oxidant activity. The addition of olive oil or lime leaf powder will increase the number of compounds that are antioxidant and antibacterial so that all formulas have bacterial killing power, where the killing power of formulas added with olive oil or lime leaves tends to be higher. [11] The results of the analysis showed that the antibacterial activity of the tuber extract was bacteriostatic for S. epidermis and bacteriostatic for P. acnes. [7] Research on C. rotundus tubers has reported antigenotoxic, antimutagenic, and antiaging activities

3.3 Evaluation 3: Foaming Power

Puzzle grass tuber soap has a low foaming power. The foaming power can be seen when the saponins in the soap react to cleaning the dirt on the skin with the help of water splashed on the skin. Because antiseptic soap uses less foam booster than commercial soap, which is 0.1%. So that the foaming power becomes low, but does not reduce the function of soap which can make the skin clean and rough.

Saponins are natural foam-producing compounds that can be used in the detergent, soap, and shampoo industry (Thoha et al, 2009). The saponin content in soap has a role in increasing the stability of the foam, the low content of saponins in nutmeg flour causes no increase in the stability of the soap foam, and provides a soft foam. The type of fat used will affect the foam produced. Palm oil produces a slight but long-lasting foam. The majority of people do not like the state of soap with a little foam.

3.4 Evaluation 4: pH

The pH test is carried out to test the degree of acidity in the soap. The quality requirements for transparent soap that have been set by the National Standardization Agency no. SNI 06-3532-1994, does not mention the pH requirements, but in general, the pH of bath soaps is around 10 (8-11). Very high or very low pH can increase the absorbance of the skin, so it can cause skin irritation. Alkalinization can cause skin damage if the contact is prolonged, for example, the pH of soap is very high. The use of nutgrass tuber flour as an additive to bath soap produces soap with a pH of 9.5-10 pH, so it does not irritate the skin.

[12] The pH value is a very important parameter in soap making because the pH value determines the suitability of soap to be used as a bath soap. The pH value of a soap solution depends on the type of fat, for example, soap made from coconut oil has a pH between 9 and 10, whereas soap made from animal fats gives a pH of around 10.8. The research liquid soap has an average pH value between 9.84-10.29.

4. CONCLUSION

C. Rotundus antiseptic soap is a solid soap that uses C. Rotundus weed as an active substance because C. Rotundus contains anti-oxidant, anti-bacterial, and anti-inflammatory properties. C. Rotundus antiseptic soap has organoleptic properties, dark brown, and has a granular texture and a distinctive aroma that is inconsistent depending on the respondent's preferences. Organoleptic properties descriptively X2 is the most superior in terms of color and texture, and X3 is superior in aroma, but the results of statistical analysis, X1, X2, and X3 have similarities in color and aroma. The only difference is the texture, namely X2 is superior. The bacteria-killing power of the three soap formulas has a higher value than commercial antiseptic soaps on the market, so the three C. Rotundus antiseptic soaps are categorized as capable of killing germs. PH levels in antiseptic soap C. Rotundus 9 which is cleansing but not irritating to the skin. Puzzle grass tuber soap has a low foaming power but does not eliminate the ability to clean the skin and make the skin rough, all because of the habit of people who prefer a lot of foam.

ACKNOWLEDGMENT

Special Gratitude and Appreciation to Rector Unesa Prof. Dr. Nurhasan, M.Kes, who give chance to us to develop our knowledge, Head of The Institute for Research and Community Service Unesa Prof. Dr. Darni, M.Hum who entrusting us to hold this research., Dean of Technique Faculty, Dr. Maspiyah, M.Kes. who support us to do this research, Head of Department PKK Unesa Dr. Sri Handajani, M.Kes., All Academicians of Unesa.

REFERENCES

- [1] Nasrul wathoni, ani haerani, nia yuniarsih. A Review On Herbal Cosmetics In Indonesia. International journal of applied pharmaceuticals, Innovare academic science, ISSN 0975-7058, Vol 10, Issue 5, 2018.
- [2] Evariste Fongzossie Fedoung , Tize Zra, Christine Fernande Nyangono Biyegue , Achille Nougou Bissoué, Suzanne Baraye, and Nole Tsabang. Herbal Cosmetics Knowledge of Arab-Choa and Kotoko Ethnic Groups in the Semi-Arid Areas of Far North Cameroon: Ethnobotanical Assessment and Phytochemical Review. *Cosmetics* 2018, 5, 31; doi:10.3390/cosmetics5020031. www.mdpi.com/journal/cosmetics
- [3] Rostamailis. Perawatan badan, kulit, dan rambut. Jakarta : Rineka Cipta, 2005
- [4] Kareru, P. G., Keriko, J. M., Kenji, G. M., Thiong'o, G. T., Gachanja, A. N., & Mukiira, H. N. (2010). Antimicrobial activities of skincare preparations from plant extracts. *African Journal of Traditional, Complementary and Alternative Medicines*, 7(3).
- [5] Bandyopadhyay, U., Biswas, K., Sengupta, A., Moitra, P., Dutta, P., Sarkar, D., ... & Banerjee, R. K. (2004). Clinical studies on the effect of Neem (*Azadirachta indica*) bark extract on gastric secretion and gastroduodenal ulcer. *Life sciences*, 75(24), 2867-2878.
- [6] Gana Manjusha K*, Balakrishnaiah P, Syamala R, Mounik N, Ravi Chandra T. Formulation And Evaluation Of Herbal Bath Soap Containing Methanolic Extracts Of Three Ayurvedic Varnya Herbs. *Asian Journal Of Pharmaceuticels and clinical research. Innovare Academic Sciences* vol 12 Issue 11. 2019. Online - 2455-3891 Print - 0974-2441.
- [7] A. Bajpay, R.C. Nainwal*, D. Singh and S.K. Tewari. Medicinal value of *Cyperus rotundus* Linn: An updated review. *Medicinal Plants* Vol. 10 (3), September 2018, 165-170 DOI: 10.5958/0975-6892.2018.00027.8 Indian Journal.com
- [8] Mannarreddy, Prabu, Maghil Denis, Durgadevi Munirredy, Ranjani Pandurangan, Kalaichelvan Puthupalayam Thangavelu, Kaviyarasan Venkatesan, 2017. Cytotoxic effect of *Cyperus rotundus* rhizome extract on human cancer cell lines. *Biomedicine & Pharmacotherapy Elsevier Masson SAS*. 1375-1387.2017
- [9] M. Moussour*, M. Lavarde† , A.-M. Pense-Lheritier† and F. Bouton*. Sensory analysis of cosmetic powders: personal care ingredients and emulsions. *International Journal of Cosmetic Science*, 2016, 1–7. DOI: 10.1111/ics.12352
- [10] Atiku, F. A. I. M. Fakai, A. A. Wara, A.U. Birnin-Yauri, Musa, M.A. Production of Soap Using Locally Available Alkaline Extract from Millet

Stalk: A Study on Physical and Chemical Properties of Soap

- [11] Sivapalan, Sri Ranjani, 2013. Medicinal uses and Pharmacological activities of *Cyperus rotundus* Linn—A Review. *International Journal of Scientific and Research Publication*, Volume 3, Issue 5. ISSN 2250-3153.
- [12] Rafael Pinto Vieira, Alessandra Ribeiro Fernandes, Telma Mary Kaneko, Vladi Olga Consiglieri, Claudinéia Aparecida Sales de Oliveira Pinto, Claudia Silva Cortez Pereira, André Rolim Baby, Maria Valéria Robles Velasco. Physical and physicochemical stability evaluation of cosmetic formulations containing soybean extract fermented by *Bifidobacterium animalis*. *Brazilian Journal of Pharmaceutical Sciences* vol. 45, n. 3, jul./sep., 2009
- [13] Susinggih Wijana, Soemarjo, dan Titik Harnawi. Susinggih Wijana, Soemarjo. STUDI Pembuatan Sabun Mandi Cair Dari Daur Ulang Minyak Goreng Bekas (Kajian Pengaruh Pengaruh Lama Pengadukan Dan Rasio Air:Sabun Terhadap Terhadap Kualitas Sabun). *Jurnal Teknologi Pertanian* Vol. 10 No. 1 (April 2009) 54 – 61