

Cypirus Rotundus L: As Antiseptic Soap Materials

Sri Dwiyantri^{1,*}, Siti Sulandjari², Dindy S. Megasari³, Nia Kusstanti, Mutimmatul

Faidah, Sri Usodoningtyas

¹ Family welfare education, Faculty of Engineering, Universitas Negeri Surabaya, Surabaya, Indonesia

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

ABSTRACT

Solid bath soap is a product that is used as a body cleansing agent or certain parts of the body. A good soap serves to cleanse, not damage the skin and can protect the skin from disease by microorganisms. In addition to the main ingredients, soap can be added natural ingredients that contain compounds that are antiseptic. The weed tuber (*Cypirus rotundus L*) is a weed plant that contains anti-Candid, anti-inflammatory, antimicrobial, antibacterial, and antioxidant and antipyretic analgesic properties, which can be easily obtained so that it can be used as a soap additive. In the puzzle grass tubers contained alkaloids, flavonoids, tannins, starches, glycosides, and furochromones, and sesquiterpenoids. This study aims to determine the user's favorite response to the aroma, color, texture and froth of antiseptic soap made from puzzle grass tubers and the perceived impact on the skin. This research is descriptive research. The data collection technique used a questionnaire filled out by 30 respondents who used antiseptic soap from tubers of puzzles. Data analysis was performed as a percentage. The results showed that the majority of soap users gave a statement like enough: 30% liked and 50% liked the color of the soap, 25% liked and 55% liked the aroma of soap, 25% liked and 55% liked the texture of the soap, 25% likes and 55% likes enough to froth, 25% likes and 55% likes enough to taste on the skin. Preference for the feeling caused by the skin is because it can reduce itching and abrasion. The most advice given by users for the soap grass tuber soap is the improvement in aroma and scum.

Keywords: Antiseptic Soap, Puzzle Grass Bulbs, Preferred Response

1. INTRODUCTION

Soap is a product that is one of the community's needs. Soap has long been used as a body cleansing agent, which is available in many shapes and aromas that can be chosen according to your needs. In its development not only limited to being used as bath soap for the purpose of cleaning the entire body, but also used specifically as a soap for the face as part of cosmetics, feet, to soap for washing hands.

Soaps are cosmetics with the ability to clean and are made by mixing excess fat and base compounds with the heating process. Excessive bases cause soap to have a residual base. Bath soap is a compound of sodium with fatty acids which are used as body cleaning agents, in the form of solid, foamy with or without other additives and does not cause irritation to the wound [2]. Soap is

the result of the saponification process. Saponification is a saponification process that reacts a fat or glyceride with a base [6].

Based on the form of soap is divided into several types, namely liquid soap, sticks / solids and gels. Solid soap is soap made from the saponification reaction of solid fat with NaOH. One of the solid soap is opaque which is bath soap that is usually used daily. Gel, foam and scrub soap are usually packaged in tubes. Soap in the form of gel is usually used as face soap or other types of soap.

The main ingredients for making soap are oil, alkali, and water [1]. Oil when viewed from its form is classified into two, namely solid oil and soft oil or liquid oil. Solid oils commonly used as soap making are coconut oil, palm oil, palm kernel oil, cocoa butter, and

beeswax. Liquid oil commonly used as an ingredient in making soap are olive oil, castor oil, canola oil, sunflower seed oil, and some oils that have many benefits that are good for the skin [1]. Alkali which is commonly used as a soap making material is NaOH and KOH. NaOH is used as a manufacture of solid soap or sticks, while KOH is used as a material for making liquid soap [1]. Water serves to dissolve NaOH. The water used is water without any other mineral additions [1]. The most commonly used oils are palm oil, coconut oil, and olive oil. While the alkaline materials commonly used are potassium hydroxide and sodium hydroxide.

In addition to these two raw materials, supporting materials and additives are usually added.

In addition to these basic ingredients, can be added with additives or other additives. Additives are used to improve the quality or benefits of soap. The addition of additives is very diverse, the most commonly used for soap making is fragrance, superfat, coloring, exfoliant, milk, honey, and other additives which provide good benefits for the skin [1].

The main principle of soap work is the pull between the molecules of impurities, soap and water. Dirt attached to the human body is generally in the form of fat, oil, and sweat. Soap has the ability to emulsify fatty and oily dirt so that it can be removed by rinsing.

There are several specifications for the quality requirements of soap so that it is suitable for use and market. Specifications of soap quality requirements according to SNI 06-3235-1994 include water content, the amount of fatty acids, free alkalis, free fatty acids or neutral fats, and mineral oil.

Puzzle grass is a natural material that can be used as traditional medicine which is widely used as an analgesic, anti-inflammatory, sedative, antispasmodic agent, and to relieve diarrhea. This plant grows naturally in tropical, subtropical, and temperate climates. Puzzles are the oldest medicinal plants known to be used for the treatment of dysmenorrhoea and menstrual irregularities, stimulating the thyroid, increasing metabolism, and acting as a carminative. It has been reported that essential oils from tuber grasses show anti-bacterial, antimutagenic and antigenotoxic properties [6].

The puzzle grass belongs to the Cyperaceae family, also known as purple nutsedge or nutgrass, is a perennial weed with scaly, creeping, rounded roots and emerges individually from tubers 1-3 cm long. , but is also commonly found in tropical, subtropical, and temperate regions [4]. Teki grass is quite fierce and has a wide

spread. Usually it grows wild in the open or a little protected As weeds will be detrimental to agriculture and weeding measures greatly help reduce the impact of their growth on the growth of other plants.

According to the results of Mannarreddy's phytochemical studies (2017), they are sesquiterpenes, flavonoids, phenylpropanoids, phenolic acids, alkaloids, and saponins with anticancer effects. The methanol extract of puzzle grass bulbs also shows hepatoprotective, antioxidant activity by inhibition of lipid peroxidation.

Different phytochemical studies on puzzle grass tubers reveal the presence of alkaloids, flavonoids, tannins, starches, glycosides, furochromones, monoterpene, sesquiterpenes, sitosterol, fatty oils containing neutral waxy substances, glycerol, linolenic, myristic and stearic acids. The main compounds which are isolated from essential oils and extracts of puzzle grass tubers are Alpha-rotunol, Beta-cyperone, Beta-pinene, Beta-rotunol, Beta-selinene, Calcium, Camphene, Copaene, Cyperene, Cyperenone, Cyperol, Cyperolone Cyperotundone Dcopadiene, D-Beta - epoxyguaiene, D-fructose, D-glucose, Flavonoids, Gamma-cymene, Isocyperol, Isokobusone, Kobusone, Limonene, Linoleic Acid, Magnesium, Manganese, C. Rotunduskone acid, Oleanolic Acid, Oleanolic Acid 3 oneohesperidoside, Oleic Acid, Oleic Acid, Oleanolic Acid 3 -cymol, Patchoulone, Pectin, Polyphenol, Rotundene, Rotundenol, Rotundone, Selinatriene, Sitosterol, Stearic-acid, Sugeonol, Sugetriol [4].

Flavonoids include many of the most common pigments and are present in all plants. The effect of flavonoids on various organisms is the reason for the use of tubers in traditional medicine. Flavonoids are good reducing compounds, which can inhibit many oxidation reactions, both enzymes and non-enzymes. Flavonoids act as good reservoirs of hydroxide and superoxide radicals and thus protect membrane lipids against damaging reactions [5]. Flavonoids are good reducing compounds, inhibiting oxidation reactions, both enzymes and non-enzymes. Flavonoids act as a good reservoir of hydroxide radicals (free radicals) and superoxide (free radicals) thereby protecting the lipid membrane against damaging reactions [5]. The benefits of flavonoids include protecting the cell structure, having a synergistic relationship with vitamin C (increase the effectiveness of vitamin C), anti-inflammatory, prevent bone loss, and as an antibiotic.

There are three groups of flavonoids that are very interesting in plant physiology, namely anthocyanins,

flavanols, and flavones. Anthocyanins are colored pigments that are commonly found in red, purple and blue flowers. This pigment is also found in various parts of other plants, for example, certain fruits, stems, leaves, and even roots. Flavonoids are bound in epidermal cells.

Alkaloids are aromatic nitrogen compounds. The nitrogen in the alkaloids acts as a base (accepts hydrogen ions), so many alkaloids are somewhat alkaline.

Ordinary sesquiterpenoids are thought to originate from three isoprene units. Like monoterpenoids, sesquiterpenoids are present as a component of steam-distilled essential oils, and play an important role in giving aroma to fruits or flowers [5].

Tannins are phenol compounds which have a sense of sepat and have the ability to tan the skin. Chemically plant tannins are divided into two groups namely, condensation tannins or catechin tannins.

Saponins have soap-like properties (Latin is *sapo* soap). Saponins are strong surface active compounds that give rise to foam when shaken in water and at low concentrations.

The antioxidant activity of methanol tubers of puzzles seemed to be stronger than other solvent extracts. Puzzle grass bulbs are also extracted with methanol which is used effectively to treat damage caused by free radicals on the rat's gastric mucosa. This research is focused on explaining the anticarcinogenic effect of methanol extracts of puzzles of tubers in different cancer cell lines, based on their antioxidant activity [3].

The benefits of puzzle grass tubers in pharmacological and biological activities including anti-Candida, anti-inflammatory, antidiabetic, antidiarrheal, cytoprotective, antimutagenic, antimicrobial, antibacterial, antioxidant, cytotoxic and apoptotic, antipyretic and analgesic properties have been reported for this plant. The contents of flavonoids, sesquiterpenes, tannins, saponins make it possible to obtain benefits according to the nature of each of these compounds when the puzzle tubers are used as ingredients of a product.

Research on the use of puzzle grass tubers in the form of flour or extracts as ingredients for cosmetic or soap products has been carried out. Trial application of masks made from additional tuber extract extracts for skin care with spots gives results can reduce spots, whereas with the addition of puzzle tuber flour results in brightness on the skin.

Utilization of the puzzle tubers has also been carried out in the manufacture of transparent soap. Utilization of puzzle tuber extracts as much as 1.5% of the total number of soap ingredients was chosen by respondents based on their physical properties. The physical properties of the soap are a dark brown color, typical of the flavor of the puzzle, the texture of the puzzle of the grain and the foam more easily.

Soap is a product that people use every day. The more diverse needs and tastes of society, soap products are now very varied. In addition to the Indonesian National Standard (SNI), public acceptance of soap products is also an important thing, among others, is the color, texture, impression abrasive (scum) and aroma.

Grass bulbs as a soap additive are utilizing the properties of the compounds they contain, especially antioxidant, anti-inflammatory, and antibiotic properties so that in addition to meeting SNI requirements and public acceptance, they can also become antiseptic soaps. The tubular antiseptic soap consists of the oil phase, foam booster and the active substance of the puzzle tuber which is characterized as a soap capable of cleaning germs, as an anti-microbial, cleansing mold, reducing pigmentation, itching and acne.

Further research is conducted on the use of grass tuber flour as an additional ingredient in antiseptic soap. The purpose of this study was to determine the user's favorite response to the aroma, color, texture and froth of antiseptic soap made from tuber grass puzzles and the perceived impact on the skin.

2. METHODS

This research is a descriptive study of the respondent's response to antiseptic soap with additives from tuber grass puzzle. The soap formula is determined based on the results obtained from the application of the puzzle tuber mask to the face and the physical properties test of the tuber-shaped transparent soap. Applied masks of using tuber flour enlighten the skin, and the use of flour as much as 1.5% of the soap material provides the nature of the soap received by the public in terms of aroma, color, and texture.

2.1. Tools and Materials

The tools used in making antiseptic soap are:

1. The instrument used for sterilization is an autoclave
2. The instrument used to dry the puzzle tubers is the oven
3. Tools used to make soap on a small scale are beaker glass, stirring rods, basins, water baths and measuring cups. For large scale use a stainless steel pan and a printing press.

Soap ingredients used are:

1. Tubers that have been dried mashed and filtered to get a finely prepared part of 17.5 grams
2. 250 grams of water
3. 800g of palm oil.
4. Sodium Hydroxide (NaOH) in the form of 115 grams of white crystals

The procedure of conducting research is as follows:

(1) Preparation of the tool

The tools used in the manufacture of antiseptic soap made from added grass roots puzzle must be clean, not damaged and in accordance with its function. The equipment used is sterilized first. Cleaned with 96% alcohol or boiled with hot water to remove bacteria.

(2) Material preparation

The material used is the main ingredient of soap and puzzle tubers according to the formula

(3) Implementation

a. Making grass puzzle bulbs

Puzzle grass bulbs are separated from the rest of the puzzle plant, selected without defects, washed and dried. Subsequently dried tubers are smoothed.

b. Soap making

First NaOH dissolved into distilled water and stirred until dissolved, placed in a heat-resistant place and allowed to stand until room temperature. Puzzle grass powder is poured into palm oil and stirred until homogeneous. Then the caustic soda solution is poured into the oil mixture with a tuber, then enter the foam booster, and stir until it thickens to form a soap dish

and the stirring is stopped. Soap will be poured in molds, wait about 2 weeks for aging.

c. Test the acceptance of soap grass tuber soap user acceptance

The soap reception test was carried out to determine the response of the acceptance of the antiseptic soap formula of the tuber grass of puzzles after it was used for bathing. The data collection technique used was a questioner method using a questionnaire sheet filled out by respondents (soap users) to convey their preferred response choices to the physical properties of the antiseptic soap of the puzzle grass tubers which included aroma, color, texture, froth and overall properties.

The organoleptic properties of antiseptic soap of tuber grass puzzles are shown in table 1.

Table 1. Test results of antiseptic soap teki grass tubes

| No | Specifications | Result |
|----|----------------|------------------------|
| 1 | Color | Dark brown spotted |
| 2 | Parfume | parfume of oil mixture |
| 3 | Texture | Quite solid |
| 4 | Froth power | Less bubbly |

3. RESULT AND DISCUSSION

3.1 Transparent Soap Research Results

The results of antiseptic soap user responses to the physical properties of the soap namely color, aroma, texture, froth power are presented in table 2 and figure 1.

Table 2. Results of user acceptance responses

| No | Soap property | Very like | Like | Like enough | Dislike |
|----|-------------------|-----------|------|-------------|---------|
| 1 | Color | 15 | 35 | 50 | 0 |
| 2 | parfume | 10 | 25 | 55 | 10 |
| 3 | Texture | 5 | 25 | 55 | 15 |
| 4 | Froth power | 5 | 25 | 50 | 20 |
| 5 | Taste in the skin | 15 | 25 | 55 | 5 |
| 6 | whole | 0 | 50 | 40 | 10 |

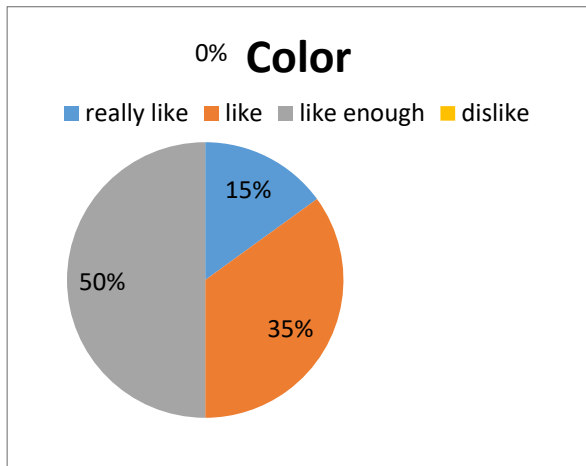


Figure 1a Response to the color of soap

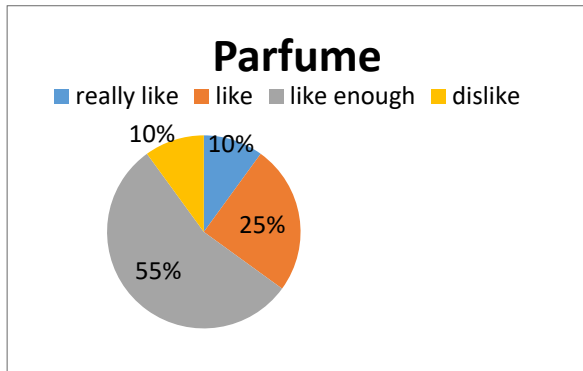


Figure 1b The response to the scent of soap

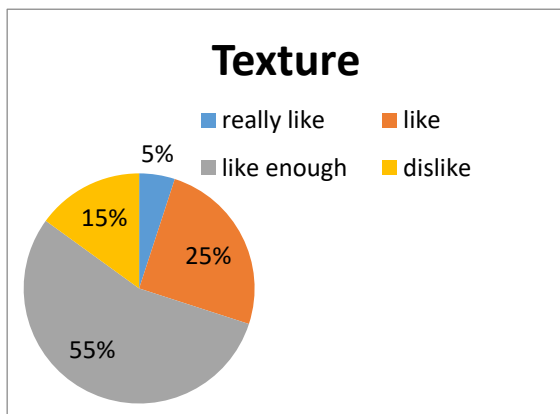


Figure 1c Response to soap texture

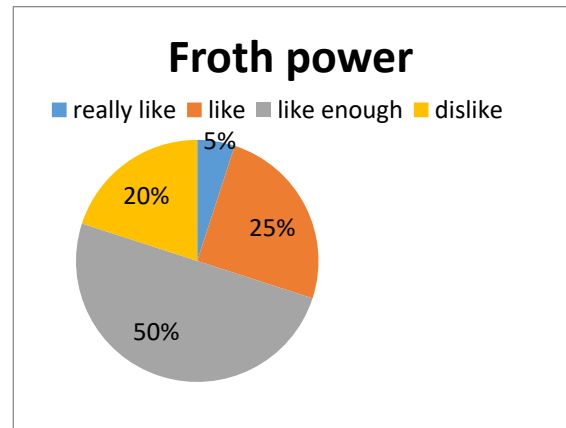


Figure 1d Response to soap scum

Table two explains that the user's response is centered on the level of liking enough to like it. Most of the color of soap (50%) said that they liked it. Towards the aroma of soap, the highest number of respondents (55%) said they liked it. Towards the texture of soap the highest number of respondents (55%) stated cykyp likes. And, the highest number of respondents (45) stated that they liked it. With regard to the overall nature of soap, 50% of respondents said they liked it. Further explanation is given that like because the skin feels rough, if there are itching to be reduced. The response given is only to the liking it is caused by the lack of aroma and scum.

Furthermore, users are also asked to submit suggestions for improving the nature of the antiseptic soap of tuber grass puzzles. Suggestions given by respondents were 10% giving suggestions for color improvement, 45% giving suggestions for scent improvement, 15% giving suggestions for texture improvement and 30% giving suggestions for improvement in froth. It seems that the scent and froth is a factor that quite influences the community in determining the choice to use the soap offered, although soap provides benefits for skin hygiene and health.

3.2 Discussion

3.2.1. Color

Antiseptic grass soap puzzles have a light brown color with dark brown spots. The light brown color is a blend of basic ingredients with grass grass puzzle flour. Dark brown spots are part of the solids of the

puzzle grass bulbs that cannot dissolve with other soap ingredients.

This is in accordance with the statement of Hardiyanthi (2015) that the color formed on the product is influenced by the color of the constituent ingredients. The color of the puzzle grass tubers is very dark brown, so that it gives the result of the color of a light brown soap alloy with dark brown.

3.2.2. *Perfume*

The antiseptic soap of the puzzle grass tuber has a blend of the main ingredients, towards the aroma of oil. Puzzle grass bulbs that do not have a strong aroma with a small amount of use (1.5%) are not able to give effect to the appearance of the distinctive aroma of the tuber. Not using scent additives causes the soap scent not to be attractive.

This is in accordance with the statement of Anggraini (2014) in Ratih (2016), that the soap content is incomplete if it is not added with fragrance ingredients. A fragrance or scent is an additive intended to give a fragrance to a preparation. The use of scents will increase the attractiveness to the user.

3.2.3. *Texture*

The grass tuber soap has a fairly solid texture to the point. With this texture, the majority of respondents said they liked it enough to like it.

The texture of the puzzle grass tuber soap is produced by the composition of the amount of liquid with the solids used. The use of puzzle grass bulbs by 1.5% actually does not take a large portion to change the composition of the soap ingredients that determine the texture. The hardness of soap is more influenced by the saturated fatty acids used. Saturated fatty acids have a higher melting point, resulting in a tougher soap (Gusviputri et al., 2013). Palm oil as a soap ingredient contains high fatty acids, adding other ingredients to the soap reduces the hardness of the soap.

3.2.4. *Froth Power*

The grass tuber soap has a low foam. The froth can be seen when saponin in soap reacts to cleaning impurities on the skin with the help of water splashed on the skin.

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 the soap material has a role to increase the stability of the foam, the low saponin content of the tuber flour causes no increase in the stability of the soap foam, and provides soft foam. The type of fat used will affect the foam produced. Palm oil produces little but long-lasting foam. The majority of people do not like the state of soap with a little foam.

3.2.5. *pH*

The pH test is done to test the degree of acidity in the soap. 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 soap is around 10 (8-11). Very high or very low pH can increase the absorbance of the skin, which can cause irritation to the skin. Alkalinization can cause skin damage if prolonged contact, for example a very high soap pH (Anggraeni, 2014). The use of puzzle grass tubers as an additional ingredient in soap produces soap with a pH of about 9 pH, so it does not cause irritation to the skin.

4. CONCLUSION

Based on the results of research and discussion, it can be concluded as follows:

1. The antiseptic soap of the grass of the puzzles has the characteristics of light brown berwa with dark brown spots, oil-scented, quite dense texture, and produces a little froth. The pH of the antiseptic soap of the puzzle grass tubers is still at the pH level that meets the SNI requirements.
2. Users of antiseptic soap from tuber grass puzzles state that they like the color of the soap quite, like the aroma of soap, like the soap texture, and like the soap produced by the scum.
3. Most antiseptic soap users suggest adding scents and ingredients that increase soap scum in order to increase the attractiveness for the user.

REFERENCES

- [1] A. M. Peerzada, H. H. Ali, M. Naeem, M. Latif, Bukhari, A. Hussain, A. Tanveer, "Cyperus rotundus L.: Traditional uses, phytochemistry, and pharmacological activities," *J Ethnopharmacol*, vol. 174, pp. 540-60, 2015. Doi: 10.1016/j.jep.2015.08.012
- [2] Banaran, *Membuat Sabun Mandi Alami untuk Hobi Maupun Bisnis*, 2016. [E-book]. Available: banaransoap.com, pp. 6-7, 12, 46, 52-54.
- [3] S. N. Indonesia-SNI, *Nomor 06-3532-1994 tentang Sabun Mandi Padat, Badan Standarisasi Nasional*, Jakarta, 1994, Hal 1–8.
- [4] Mannarreddy, Prabu, M. Denis, Durgadevi Munirredy, R. Pandurangan, K. P. Thangavelu, K. Venkatesan, "Cytotoxic effect of Cyperus rotundus rhizome extract on human cancer cell lines," *Biomedicine & Pharmacotherapy Elsevier Masson SAS*, pp. 1375-1387, 2017.
- [5] S. S. Ranjani, "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, 2013.
- [6] Robinson, Trevor, *Kandungan Organik Tumbuhan Tinggi. Edisi ke-4 `Terjemahan Kosasih Padmawinata* Bandung, ITB Press, 1995, Pp. 71-72, 145, 147, 156-157, 161-162, 191-193.
- [7] A. Widyasanti, C. L. Farddani, & D. Rohdiana, "Pembuatan Sabun Padat Transparan Menggunakan Minyak Kelapa Sawit (Palm Oil) dengan Penambahan Bahan Aktif Ekstrak Teh Putih (Camellia Sinensis)," *Jurnal Teknik Pertanian Lampung (Journal of Agricultural Engineering)*, vol. 5, no. 3, pp. 125–136, 2016.