

Characterization of Natural Face Toner from Rice-washed Water

Karakteristik *Toner* Wajah Alami Berbahan Baku Air Cucian Beras

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ABSTRACT

Toner is a skin treatment that serves to refresh and clean facial skin. This study used rice-washed water as the main ingredient for producing toner. Rice-washed water is the main ingredient because it contains abundant nutrients such as carbohydrates in the form of starch, fat, protein, gluten, cellulose, hemicellulose, sugar, vitamins, and minerals. This study aims to determine the effect of toner application made from rice-washed water on the skin, storage time on toner quality, and the production process. The method used in this study uses a simple method of soaking with a rice/water with a various ratio (kg/L). The analysis results show that the toner has a pH of 6.4, considered safe for all skin types with good moisture. The effect on skin moisture was analyzed on six respondents. The toner has a viscosity that is not too thick with a cloudy white color caused by rice grains. Rice grains are beneficial for the skin because they can regenerate skin cells. Rice-washed water toner for seven days contains fat, manganese, protein, oil, fat, and is odorless.

Keywords: rice-washed water, toner, skin

ABSTRAK

Toner adalah perawatan kulit yang berfungsi untuk menyegarkan dan membersihkan kulit wajah. Pada penelitian ini air beras digunakan sebagai bahan utama untuk pembuatan toner. Limbah air beras digunakan sebagai bahan utama karena memiliki kandungan nutrisi yang berlimpah seperti karbohidrat berupa pati, lemak, protein, gluten, selulosa, hemiselulosa, gula serta mengandung vitamin dan mineral. Penelitian ini bertujuan untuk mengetahui pengaruh penggunaan toner dari air cucian beras terhadap kulit, pengaruh lama penyimpanan toner terhadap kualitas air beras dan reaksi pada kulit serta proses pembuatannya. Metode yang digunakan dalam penelitian ini menggunakan metode sederhana dengan melakukan perendaman dengan rasio beras/air sebesar ½ (kg/L). Berdasarkan metode yang digunakan didapatkan hasil analisa pH 6,4 dimana pH tersebut aman untuk semua jenis kulit dengan kelembaban yang baik. Kelembaban dianalisa oleh 6 responden dengan viskositas toner yang tidak terlalu kental dan memiliki warna yang putih keruh yang diakibatkan butiran beras. Namun, butiran tersebut baik untuk kulit karena dapat meregenerasikan sel-sel kulit. Toner air beras selama 7 hari memiliki kandungan lemak, mangan, protein dan minyak dan lemak. Bahkan toner ini tidak memiliki bau.

Kata Kunci: limbah air beras, toner, kulit

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1. INTRODUCTION

Increasing public awareness of physical appearance and skin health has led to a rise in the use of skincare products. According to data from the Ministry of Industry of the Republic of Indonesia, cosmetic consumption increased by 20 % in 2018, four times the national economic growth of 2017. The need for raw materials and additives derived from natural sources increased with the replacement of synthetic components due to the negative impact of synthetic materials on health and the environment. Therefore, natural raw materials are used to manufacture cosmetics, one of which is rice-washed water. Rice-washed water skin care is cheap and effective for various skin problems. Rice-washed water is excellent for all skin types and is a simple facial skin treatment. Rice-washed water contains minerals and vitamins beneficial for skin and hair beauty. Rice grains are rich in ferulic acid, which has anti-inflammatory properties. Ferulic acid is an antioxidant that is rich in allantoin compounds. Besides being one of the gentlest skin cleansing agents, rice-washed water also contains vitamins such as B1, C, E, and minerals, which can shrink pores, tighten, brighten, and soften the skin (Moeskin, 2015).

There are various types of facial skin. Normal skin has good hydration, tone, and resilience produced by a well-functioning epidermis and dermis, well hydrated and supported by adipose tissue (Micalun, 2014). Oily skin is a condition that develops due to an overactive sebaceous. The glands (oil) produce a lot of sebum (oil). Oily skin can be recognized by its shiny, thick, and firm appearance (Micalun, 2014). Dry skin is usually dehydrated and often feels scaly, rough, and itchy. Dry skin can often be very smooth, too delicate, and thin, with barely visible pores (Micalun, 2014). Combination skin occurs when oily, dry, or normal skin

types are present together. The most common forms of combination skin tend to be normal in the cheek area with an oily T zone or dry cheeks with a normal T zone (Micalun, 2014).

In this era, there are lots of new brands that sell cosmetics according to the skin problems experienced by consumers. However, sometimes there are still quite a lot of cosmetics on the market that are unsuitable for certain skin types. Therefore, consumers use more natural ingredients, one of which is rice-washed water. Rice has many components, including vitamins, minerals, and phenolic compounds 1. The coarse structure of rice can also be used as a body scrub or facial scrub to remove dead skin cells. Rice is a natural ingredient that has been widely used for various cosmetic purposes, such as masks. The oryzanol substance contained in rice can function as an antioxidant, renew melanin pigment, and neutralize ultraviolet light (Juliano et al., 2005).

Rice-washed water has the potential as an antioxidant and antiaging because of its starch. These carbohydrate group compounds can shed dust and dead skin cells on the face and regenerate skin cells (Samahah et al., 2015). The content of water-soluble micronutrients in rice-washed water is very good for skin health. In addition, rice-washed water can brighten the face because rice-washed water contains oryzanol which can renew the development and formation of melanin pigment, effectively warding off ultraviolet rays (Nisa, 2017). Extract from rice helps increase the production of collagen, which functions to maintain skin elasticity. In addition, the oryzanol substance in rice helps regenerate the melanin pigment in the skin, where the primary function of melanin is as an antidote to UV radiation. Not only that the vitamin E in rice helps nourish the skin so that the skin will look fresher, and the ferulic acid content functions as an antioxidant and an antidote to free radicals (Ijiri et al., 2013).

Table 1. Composition of rice-washed water

Composition	Amount (%)
Carbohydrate	90
Protein	8.77
Fat	1.09
Vitamin B1	70
Vitamin B3	90
Vitamin B6	50
Manganese (Mn)	50
Phosphorus (f)	60
Iron (Fe)	50
Nitrogen (N)	0.015
Magnesium (Mg)	14.525
Potassium (K)	0.02
Calcium (Ca)	2.94

Source: Wardiah, 2014

2. MATERIALS AND METHODS

2.1. Materials

The tools used in this study were various Pyrex beakers (100, 500, 1000 mL), stir bar, spatula, funnel, analytical balance (Ohaus), watch glass, viscometer, bulb, skin analyzer, test tube, measuring flask, dropper, and pH meter (Hanna HI 98107). The materials used were Ramos rice, distilled water, water, 0.2 N NaOH, 0.3 N NaOH, FeCl₃, 2% CuSO₄, and Whatman filter paper No. 42.

2.2. Methods

A total of 500 grams of rice was washed with water. In the first washing, rice was added with 3 L of water (1:6) and soaked for 1 hour. After 3 hours, the rice-washed water was

tested for pH, odor, viscosity, color test for 7 days, moisture test on facial skin for 30 days, protein content, and Vitamin B6. The same method was carried out for other samples with a ratio of raw material: water, namely 1:4 and 1:5.

3. RESULTS AND DISCUSSION

3.1. Odor Test

The odor test was carried out to determine whether the facial toner produced an odor during the storage process. Table 2 shows that rice-washed water stored for seven days is odorless. It is because the toner is made from natural ingredients without adding other chemicals. This odor test was carried out in Baristan Samarinda.

Table 2. Odor Test

Day	Odor
1	Odorless
2	Odorless
3	Odorless
4	Odorless
5	Odorless
6	Odorless
7	Odorless

3.2. Color Test

The color test was carried out in Baristan Samarinda to determine the color change during storage. Tests for seven days of storage are presented in Table 3. Analysis with the

platinum-cobalt scale (Pt per Co unit) showed results that fluctuated daily. It is presumably because the toner container is contaminated with other materials.

Table 3. Color Test

Day	Color (Pt.Co)
1	158
2	66.81
3	139
4	78.12
5	138
6	105
7	166

3.3. Viscosity Test

Based on Table 4, it can be seen that on the fourth and fifth days, there is a decrease in toner viscosity, and it start to stabilize again on the sixth and seventh days. It occurs because

the storage temperature fluctuates. The higher the temperature, the lower the viscosity. This decrease occurs because the longer the storage time, the longer the toner will be affected by the environment, such as air.

Table 4. Viscosity Test

Day	Viscosity
1	1.8
2	2.03
3	2.06
4	2.06
5	1.8
6	1.8
7	1.7

The longer the storage, the lower the viscosity of the preparation. Decreased viscosity occurs because hygroscopic starch can absorb moisture, thereby increasing the volume of water in the preparation (Sulastri et al., 2016).

Toner with an acidic pH can irritate facial skin, while a pH that is too alkaline can cause

a dry effect on the skin (Sulastri et al., 2016). The pH of the toner from the rice-washed water fluctuated, causing pH instability during seven days of storage (Table 5). Changes in room temperature cause instability. However, the pH of the toner produced is still in the pH range of the skin, so it is safe to use.

Table 5. pH Test

Day	pH
1	7
2	6
3	6.1
4	6.5
5	6.3
6	6.8
7	6.4

3.4. Skin Moisture Test

Skin moisture test aims to determine the effect of toner on facial skin moisture before and after application. This test was conducted on six respondents using a skin analyzer. A skin analyzer was used before and after toner's application. Table 6 shows the criteria for facial skin types in general. Each skin type has different water content. The moisture test results before and after toner's application are presented in Table 7 and Table 8.

The skin moisture test on the respondents on the first day before the toner application showed that respondents A, B, D, E, and F had very dry facial skin while respondent C had

dry skin. Tests on the seventh day after the toner application showed that respondents A, C, E, and F showed very dry skin, while respondents B and D showed dry facial skin. After toner's application, respondents A, B, C, D, and F showed changes in skin moisture from very dry to dry skin, and for respondent E, the skin moisture became normal. The skin moisture test on the six respondents for 14 days showed a fluctuating percentage of water content. It is thought to be caused by the accuracy factor of the skin analyzer. In addition, different room conditions or air temperatures when checking skin moisture can also affect the results of the skin moisture test.

Table 6. Criteria for Skin Types Based on Water on Facial Skin

Water Content	Skin Types
$\leq 33\%$	Very Dry
34 – 37%	Dry Skin
38 – 42 %	Normal Skin
43 – 46 %	Moist Skin
$\geq 47 \%$	Very Moist

Source: Masluhiya AF and Fidiastuti, 2019.

Table 7. Respondent's Skin Moisture Before Toner Application

Day	Mosture Content (%)					
	A	B	C	D	E	F
1	24.7	24.3	36	31.8	28.5	26
2	31.9	27.9	36.3	35.3	37.3	36
3	30	34.9	26.6	29.1	37.1	31.8
4	34.9	32.6	36	30.9	30.4	35.8
5	34.4	24.5	24.6	28.1	30.4	30
6	33	20	37.4	25.8	35.8	35.1
7	20.7	27.3	29.2	26.1	31.6	34.4
8	27.9	30.4	38	35.7	28.9	36.6
9	26.5	33.1	35.4	35.7	33.4	32.3
10	33.6	33	0	0	34.3	35.8
11	30.1	33.3	29.4	31.1	36.4	35.7
12	30.5	30.7	38.2	0	36.5	32.4
13	29.7	349	37.2	26.8	32.2	32.1
14	27.9	34	31.7	28.8	37.7	37.4

Table 8. Respondent's Skin Moisture After Toner Application

Day	Mosture Content (%)					
	A	B	A	D	A	F
1	36.7	36.9	34.9	36.6	38.2	31.4
2	30.9	31	31.2	32	31.6	32.6
3	21.6	33.6	31.1	32.8	31.2	30
4	23.8	29.7	33.7	35.2	32.8	33.6
5	32.1	27.6	27.9	33.3	32.5	34.7
6	26.2	32.6	31.4	24.1	30.7	34.1
7	24.4	33.4	31.9	33.6	27.6	28.3
8	27.7	25.9	37.8	25.6	31.0	32.5
9	29.0	31.6	34.6	27.7	32.0	30.8
10	29.9	31.6	0.0	0.0	36.0	35.7
11	24.8	33.8	37.0	30.3	36.1	28.3
12	34.1	34.5	34.1	0.0	36.1	37.8
13	31.3	34.1	38.1	24.5	33.9	35.5
14	31.3	34.6	24.5	29.5	32.1	36.8

3.5. Protein Content Test

The protein content test determines the protein content for seven days of storage. Table 9 shows the results of the protein content test for the stirring time for one hour, and Table 10 shows the results of the protein content test for the stirring time for three hours.

Based on the tables above, it can be seen that the toner from rice-washed water contains

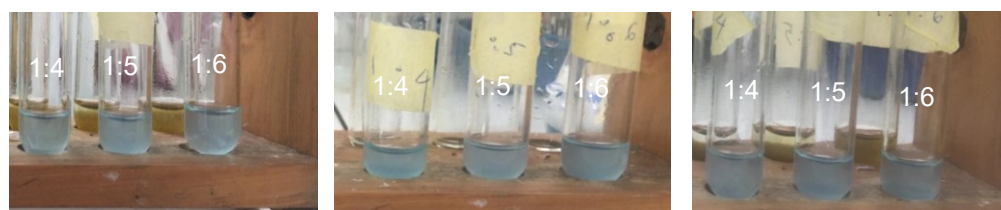
protein. According to Sumardjo (2008), the protein content test was carried out to show the presence of compounds containing an acidic amide group together with other amide groups. This test gives a positive reaction indicated by the appearance of a red-violet or blue-violet color, as shown in Fig. 1 and Fig. 2.

Table 9. Protein content test for stirring for 1 hour

Day	(1:4)	(1:5)	(1:6)
1	Blue	Blue	Blue
2	Lighter blue	Slightly faded blue	Blue
3	Light blue	Light blue	Light blue
4	Blue	Clear blue	Blue
5	Blue	Blue Blue	Blue
6	Blue	Lighter blue	Blue
7	Blue	Blue	Blue

Table 10. Protein content test for stirring for 3 hour

Day	(1:4)	(1:5)	(1:6)
1	Blue	Blue	Blue
2	Blue	Blue	Blue
3	Light blue	Light blue	Light blue
4	Blue	Blue	Blue
5	Blue	Lighter blue	Blue
6	Blue	Blue	Blue
7	Blue	Blue	Blue

**Figure 1.** Protein content test results for 1 hour**Figure 2.** Protein content test results for 3 hour

3.6. Vitamin B6 Content Test

The Vitamin B6 test aims to determine the content of Vitamin B6 for seven days of storage. Table 11 shows the results of the Vitamin B6 content test for the stirring time for one hour, and Table 12 shows the results of the Vitamin B6 content test for the stirring time for three hours.

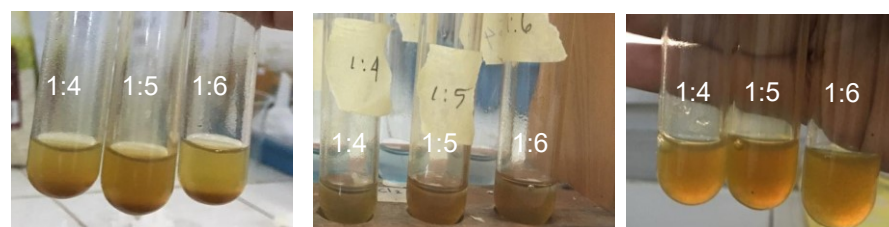
Based on Fig. 3, Fig. 4, Table 11, and Table 12, toner from rice-washed water contains Vitamin B6. According to Poedjiadi *et al.* (2009), vitamin B6 consists of three compounds: pyridoxine, pyridoxal, and pyridoxamine. These three vitamins are found in animals and plants, especially rice and wheat. It is characterized by a color change from orange to dark red. This proves that the toner from rice washing water contains vitamin B6.

Table 11. Test the content of Vitamin B6 for 1 hour of stirring

Day	(1:4)	(1:5)	(1:6)
1	Orange	Orange	Orange
2	Orange (with sediment)	Orange (with sediment)	Orange (with sediment)
3	Orange (with sediment)	Orange (with sediment)	Orange (with sediment)
4	Orange (with sediment)	Orange (with sediment)	Orange (with sediment)
5	Orange (with sediment)	Orange (with sediment)	Orange (with sediment)
6	Deep reddish orange (with sediment)	Deep reddish orange (with sediment)	Deep reddish orange (with sediment)
7	Orange (with a lot of sediments)	Orange (with a lot of sediments)	Slightly dark orange (with a lot of sediment)

Table 12. Test the content of Vitamin B6 for 3 hour of stirring

Day	(1:4)	(1:5)	(1:6)
1	Orange	Orange	Orange
2	Orange (with sediment)	Orange (with sediment)	Orange (with sediment)
3	Orange (with sediment)	Orange (with sediment)	Orange (with sediment)
4	Orange (with sediment)	Orange (with sediment)	Orange (with sediment)
5	Orange (with sediment)	Orange (with sediment)	Orange (with sediment)
6	Deep reddish orange (with sediment)	Deep reddish orange (with sediment)	Deep reddish orange (with sediment)
7	Orange (with a lot of sediments)	Orange (with a lot of sediments)	Orange (with a lot of sediments)

**Figure 3.** Test results for Vitamin B6 content for 1 hour of stirring**Figure 4.** Test results for Vitamin B6 content for 3 hours of stirring

3.7. Fats and Oils Testing

The toner's oil and fat content test was carried out at the Regional Public Service Agency (BLUD) UPTD Health Laboratory of East Kalimantan Province. This test was carried out to determine the oil and fat content contained in toner from rice-washed water

which was treated with variations in composition ratio and stirring time. Oil and fat test results are presented in Table 13. On the first day, with a time of 1 hour of stirring, the oil and fat content of 1.028 mg/L was produced, and the time of 3 hours of stirring was 1.049 mg/L. On the seventh day, with a

time of 1 hour of stirring, the oil and fat content of 2.042 mg/L was produced, and the time of 3 hours of stirring was 1.002 mg/L. It can be seen that the oil and fat content after

seven days of storage increased. According to Wang (2019), this toner's oil and fat content is helpful as a moisturizer, especially for sensitive skin.

Table 13. Fats and oils testing

Day	t = 1 hour	t = 3 hour
1	1.028 mg/L	1.049 mg/L
7	2.042 mg/L	1.002mg/L

3.8. Manganese Content Test

Manganese testing was carried out at the Regional Public Service Agency (BLUD) UPTD Health Laboratory of East Kalimantan Province. This test aims to determine the manganese content in toner from rice-washed water treated with variations in composition ratio and stirring time. Table 14 shows the manganese content in the toner produced.

On the first day, with a time of 1 hour of stirring, the Manganese content was 0.3493 mg/L, and for 3 hours of stirring, it was 0.2524 mg/L. On the seventh day, with a time of 1 hour of stirring, the manganese content was 0.2524 mg/L, and at 3 hours of stirring, it was 0.2575 mg/L. It indicates that the toner produced contains Manganese. The manganese content in this toner is useful as an antioxidant and overcomes excess oil on facial skin (T. G. Polefka et al., 2012).

Table 14. Manganese content test

Day	t = 1 hour	t = 3 hour
1	0.3493 mg/L	0.2524 mg/L
7	0.2524 mg/L	0.2575 mg/L

4. CONCLUSIONS

Based on the tests that have been carried out, it can be concluded that the toner from rice-washed water is safe for facial skin because it has been proven to contain protein, manganese, vitamin B6, oils, and fats which are known to be good for facial skin. This toner has a color that is not too cloudy, not thick, odorless, and has a pH that is safe for all types of facial skin.

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