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Hair Tonic Combination Product from Daun Bunga Sepatu (*Hibiscus rosasinensis, L.*) and Biji Saga (*Abrus precatorius, L.*) for Hair Growth

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ABSTRACT

Biji saga (*Abrus precatorius*) and leaves of hibiscus (*Hibiscus rosasinensis*) are recommended for alopecia in traditional and folklore medicines. The preliminary screening of the phytochemical seed and leaf revealed the presence of these terpenoids and steroids. Extracts are used in research in a single dosage, combination and made in preparations hairtonic. In this activity, the test is done by observing two test parameter i.e. average length of hair in every week and the weight of the hair of a rabbit on the twenty-eight. Specific test against steroids, namely sitosterol do, obtained results of 0.67% at hibiscus and 0.19 in abrus. In a test of a single extract made activities each with 0.5%, with a concentration of 1% and 1.5% of the obtained results on the respective extract with a concentration of 1% has the potential in the growth and thicken the hair in rabbits. Test the effectiveness of extracts combined with comparison of 1:2, 2:1 and 1:1, based on activity assay, obtained comparison 1:1 has better potential. Hair tonic preparations made with the extract of 1:1 by comparison with comparison of the concentration of 0.1:0.1; 0.25:0.25; 0.5:0.5; the 1:1 (% b/v) with normal control, negative control and the positive control as a comparison, the best results are obtained by comparison of 0.5% b/v: 0.5% b/v. The average length of hair and the SD were obtained within twenty-eight days by using the three times the experiment is 1.24 ± 0.90 . The results of the average weight of hair within 28 days against the rabbit with a comparison of the normal control, negative control (formula without extract), positive control (minoxidil) as a comparison is 56.16 mg, 82.65 mg and 84.91 mg, 315.51 mg show results significantly to the weight of rabbit hair. Stability testing and irritation hair tonic preparations done. **Objective:** Test the hair growth of daun kembang sepatu (*Hibiscus rosasinensis L.*) extract, biji saga (*Abrus precatorius Lin.*) extract, and combination, also in hair tonic dosage form, sitosterol. **Methods:** Hair growth activity of each extract and combination were test in albino rabbits and formulated into hair tonic dosage form. Evaluation of hair tonic forms, including organoleptic, homogeneity, pH, viscosity, rheology and dermal irritation test, as well as tonic hair growth activity test. **Results:** Hair tonic activity test on the single extract or combination showed the length of hair and showed thickening of hair. In single extract show, 1% is effective for hair growth and combination extract 0.5% of each other extract.

INTRODUCTION

Baldness or hair loss in men can cause very serious impact psychologically as it can cause interference with self-confidence, stress and declining someone's productivity. First baldness experienced more than 50% at age 60 to 70 years old, the rest is experienced at the age under 60 years old. Dermatological disorders in most men who can cause quite serious baldness commonly referred to as alopecia. Alopecia is a syndrome of hair loss can be caused by heredity, aging, illness, drugs or a particular lifestyle. The syndrome has a high prevalence of late especially androgenic alopecia, baldness is related to a hormonal basis. Androgenic alopecia is a condition that is determined genetically. When married couples equally miserable, then all boys and half the number of children a woman would experience the same thing. Baldness in men is determined by the hormone androgen, whereas in women, androgenic alopecia is thought to be influenced by genetics. Androgenetic disorder, alopecia (AGA) is caused by excessive activity of the enzyme 5- α -reductase in the hair follicle. Currently, there are some drugs used to treat the AGA. For example, 5- α -reductase inhibitor, minoxidil, finasteride and dutasteride, which is used to treat androgen-related disorders. Baldness or alopecia is clinically not caused aesthetic impact, but in some people, it can cause a sense of confidence, stress and disruption in social life. As for the many drugs that can be used however these drugs have some unwanted side effects, for example, impotence (erectile dysfunction), abnormal ejaculation, a decrease in the volume of normal sexual function, ejaculate, gynecomastia, testicular pain, the decline in muscle growth, and severe myopathy. In line with this, the concept of living back to nature began to demand and supported by the abundance of natural resources in Indonesia. Utilization of nature as a hair grower has been widely used and some of the herbal extracts that are found effective in *Abrus precatorius* androgenetic such as alopecia and *Hibiscus rosasinensis* hailed as hair growth promoter and in previous research proven effective as a hair grower and much used in formulations hair grower. But its use is still in the respective single extract preparations. For that research needs to be done to combine the two extracts in hopes of increasing the effectiveness of the synergized as enhancing hair grower. Based on the research of Ross, 2003, seed saga contains campesterol, cholesterol, Palmitic acid, lignoceric acid, oleic acid, linoleic acid, linolenic acid, cycloartenol, β -amirin, β -sitosterol, stigmasterol, and brassicasterol trigonelline. Effective as a nutritious hair growth promoter, gave strength to the hair, softens the hair especially at long hair and found effective against the fungus *Candida albicans* control in head skin. Based on the research of Rastogi and Mehrorta, 1993 part leaves contain β -sitosterol, stigmasterol, tarakseril acetate and cyclopropane as well as the

three components of their derivatives. Nutritious leaves as a cure the fever in children, cough medicine, hair grower and in discolor hair.

MATERIALS AND METHODS

Leaves of hibiscus (*Hibiscus rosasinensis*) and saga seeds (*Abrus precatorius*) of Bogor in West Java.

The Making Extracts

Powder each simplisia is extracted by means of maceration using solvent petroleum ether for 24 hours. Split macerate by way of filtration. The process of maceration is carried out by as much as 3 times the repetition with the same amount of solvent. After the maceration is completed, the filtrate is obtained then concentrate with rotary evaporator vacuum at temperature of 40-50°C to viscous extract was obtained.

Extract specific parameters

Quantitative analysis of sitosterol

Sample simplisia each weighed approximately 0.25 grams entered into 25 ml measuring flask, then ethanol is added as much as 1/3 measuring flask volume, beaten for 2 hours then filtered, the TLC plate ditotolkan into the filtrate by as much as 5 µl. Sitosterol standard then 100 ppm ditotolkan by as much as 5 µl. After ditotolkan and then dielusi with eluen: ethanol ethyl acetate during \pm 45 minutes. After it was measured using TLC scanner for sitosterol with wavelength (λ) 285 nm.

Single Extract Activity Test

Activity assay against the extract by using multilevel concentration of 0.5% extract (b/v) in ethanol, 1% extract (b/v) in ethanol, 1.5% extract (b/v) in ethanol to each extract. In this activity, the test is done by observing two test parameter i.e. average length of hair in every week and the weight of the hair of a rabbit on the twenty-eight.

Activity Assay of Combination Extracts

The measurement is performed against a mixed extract of hibiscus leaves and seeds saga by using a mixture of concentration of 1:1; 1:2; and 2:1 to see its effect on hair on the extract combination.

Activity Assay of Hair Tonic Preparations of Hair Grower

Preparations already made hair fertilizer efficacious assay activity is performed to find out if there is a difference in hair fertilizer efficacious preparation activity compared to in the form of extracts. These areas are as follows:

A: Not any smeared as blank

B: Formula hair tonic without extract

C: The tonic formula with a combination of extract: 0.1%:0.1%

D: Formula with a combination of tonic extract 0.5%: 0.5%

E: Formula with a combination of tonic extract 1%: 1%

F: Tonic formula with a combination of extract: 1.5%:1.5%

G: Positive control Smeared (minoxidil that is circulating in the market)

Test The Stability of The Preparation



Done by storing tonic hair at different temperatures, i.e. low temperature ($4 \pm 2^{\circ}\text{C}$), room temperature ($25 \pm 2^{\circ}\text{C}$) and high temperature ($40 \pm 2^{\circ}\text{C}$) for 3 months, carried out observations of the organoleptic and measurement of the pH every 15 days.

RESULTS AND DISCUSSION

Sitosterol Content of Test Results

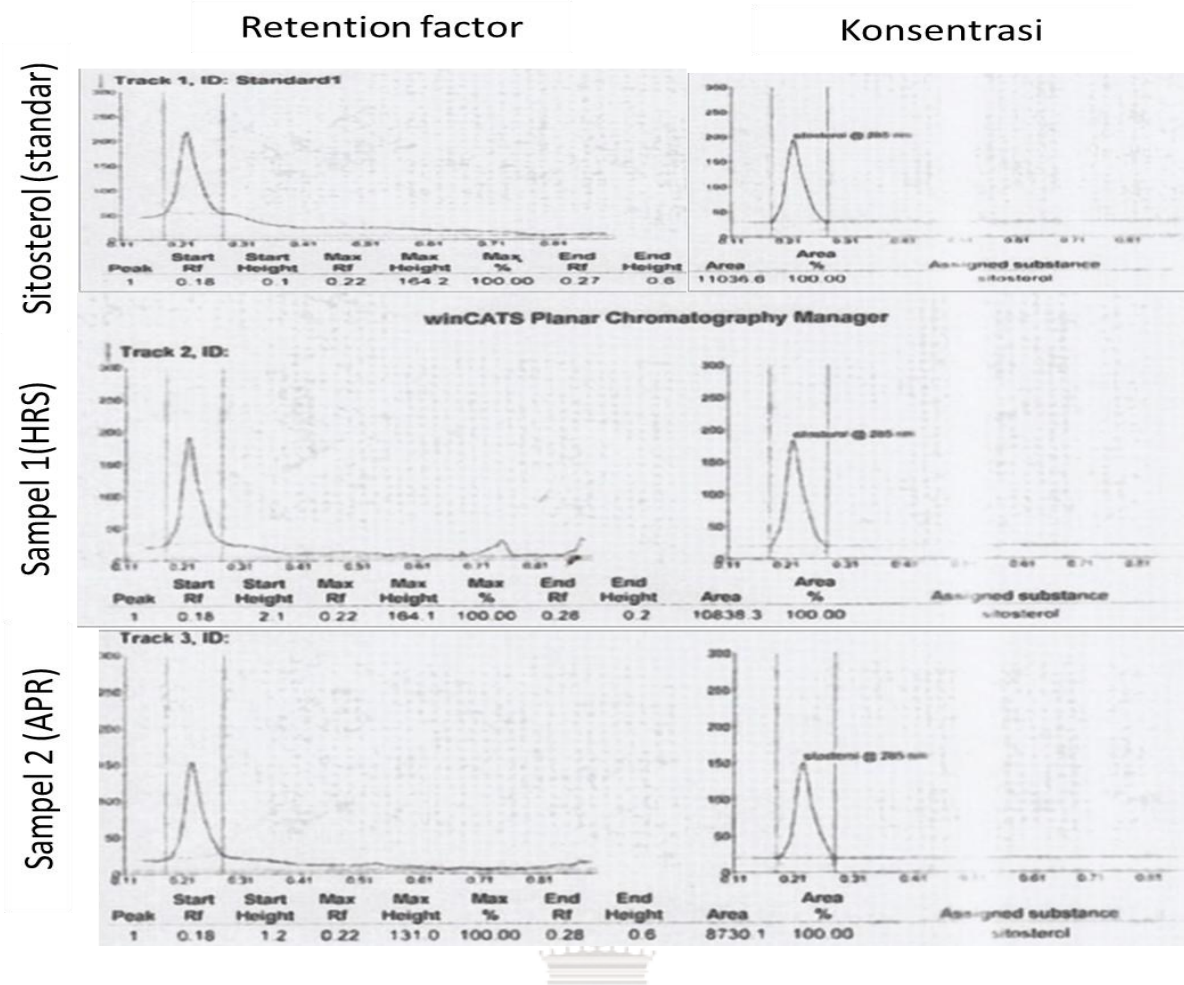


Figure 1: Result of each extract with sitosterol standard

Table 1. Results the average hair length of each treatment per week

| Sr. No. | Treatment | Average length (cm) | | | | Average (cm) ± SD |
|---------|--------------------------|---------------------|--------|--------|--------|-------------------|
| | | Week 1 | Week 2 | Week 3 | Week 4 | |
| | Normal Control | 0,13 | 0,26 | 0,53 | 1,07 | 0,4975 ± 0,42 |
| 1 | <i>Hibiscus</i> 0,5% | 0,11 | 0,37 | 0,60 | 1,35 | 0,6075 ± 0,53 |
| | <i>rosasinensis</i> 1,0% | 0,16 | 0,37 | 0,65 | 1,37 | 0,6375 ± 0,53 |
| | extract (HRS) 1,5% | 0,14 | 0,32 | 0,59 | 1,17 | 0,555 ± 0,45 |
| 2 | <i>Abrus</i> 0,5% | 0,14 | 0,27 | 0,53 | 1,08 | 0,505 ± 0,42 |
| | <i>preicatorius</i> 1,0% | 0,17 | 0,29 | 0,56 | 1,27 | 0,573 ± 0,49 |
| | extract (APR) 1,5% | 0,15 | 0,29 | 0,54 | 1,24 | 0,555 ± 0,48 |

Table 2. The results of the weight of the hair every treat per week

| Treatment | Average weight (mg) | | | | Average (mg) \pm SD | |
|--|---------------------|----------|----------|-------|-----------------------|-------|
| | Rabbit 1 | Rabbit 2 | Rabbit 3 | | | |
| Normal Control | 17,48 | 17,02 | 16,49 | | 16,99 | \pm |
| <i>Hibiscus rosasinensis</i> extract (HRS) | 0,5% | 27.56 | 18.12 | 24.67 | 23,46 | \pm |
| | 1,0% | 28.51 | 20.41 | 27.46 | 4,8368 | \pm |
| | 1,5% | 14.81 | 17.13 | 21,37 | 25,46 | \pm |
| <i>Abrus precatorius</i> extract (APR) | 0,5% | 23.56 | 18.12 | 21.67 | 4,4048 | \pm |
| | 1,0% | 24.5 | 19.41 | 23.46 | 17,77 | \pm |
| | 1,5% | 20.21 | 17.13 | 15.56 | 3,3265 | \pm |

Table 3. The results of the average length of hair of rabbits with extracts of hibiscus leaves combination osphronemidae and saga

| Sr. No. | Treatment | Average length (cm) \pm SD | | | | Average (cm) \pm SD |
|---------|-----------------------------------|------------------------------|--------|--------|--------|-----------------------|
| | | Week 1 | Week 2 | Week 3 | Week 4 | |
| 1 | Normal Control | 0,135 | 0,268 | 0,533 | 1,083 | 0,5047 \pm 0,42 |
| 2 | Combination 1:1 (1% HRS:1% APR) | 0,185 | 0,367 | 0,731 | 1,483 | 0,6915 \pm 0,57 |
| 3 | Combination 1:2 (1% HRS:0,5% APR) | 0,159 | 0,316 | 0,628 | 1,275 | 0,5945 \pm 0,49 |
| 4 | Combination 2:1 (0,5% HRS:1% APR) | 0,169 | 0,334 | 0,664 | 1,348 | 0,6288 \pm 0,52 |

Table 4. The results of the weighted average of the rabbit hair with combination of extracts of hibiscus leaves (HRS) and the seeds of the saga (APR)

| Sr. No. | Treatment | Average weight (mg) \pm SD | | | Average weight (mg) \pm SD |
|---------|--------------------------------------|------------------------------|--------|--------|------------------------------|
| | | Week 1 | Week 2 | Week 3 | |
| 1 | Normal Control | 9.56 | 10.52 | 15.2 | 11,76 \pm 3,01 |
| 2 | Combination 1:1 (1% HRS:1% APR) | 39.12 | 40.6 | 37.7 | 39,14 \pm 1,45 |
| 3 | Combination 1:2 (1% HRS:0,5% APR) | 35.51 | 22.48 | 31.46 | 29,81 \pm 6,66 |
| 4 | Combination 2:1 (0,5% HRS:1% APR) | 28.11 | 15.85 | 33.21 | 25,86 \pm 8,97 |

Table 5. Formula hair tonic for hair growth activity test

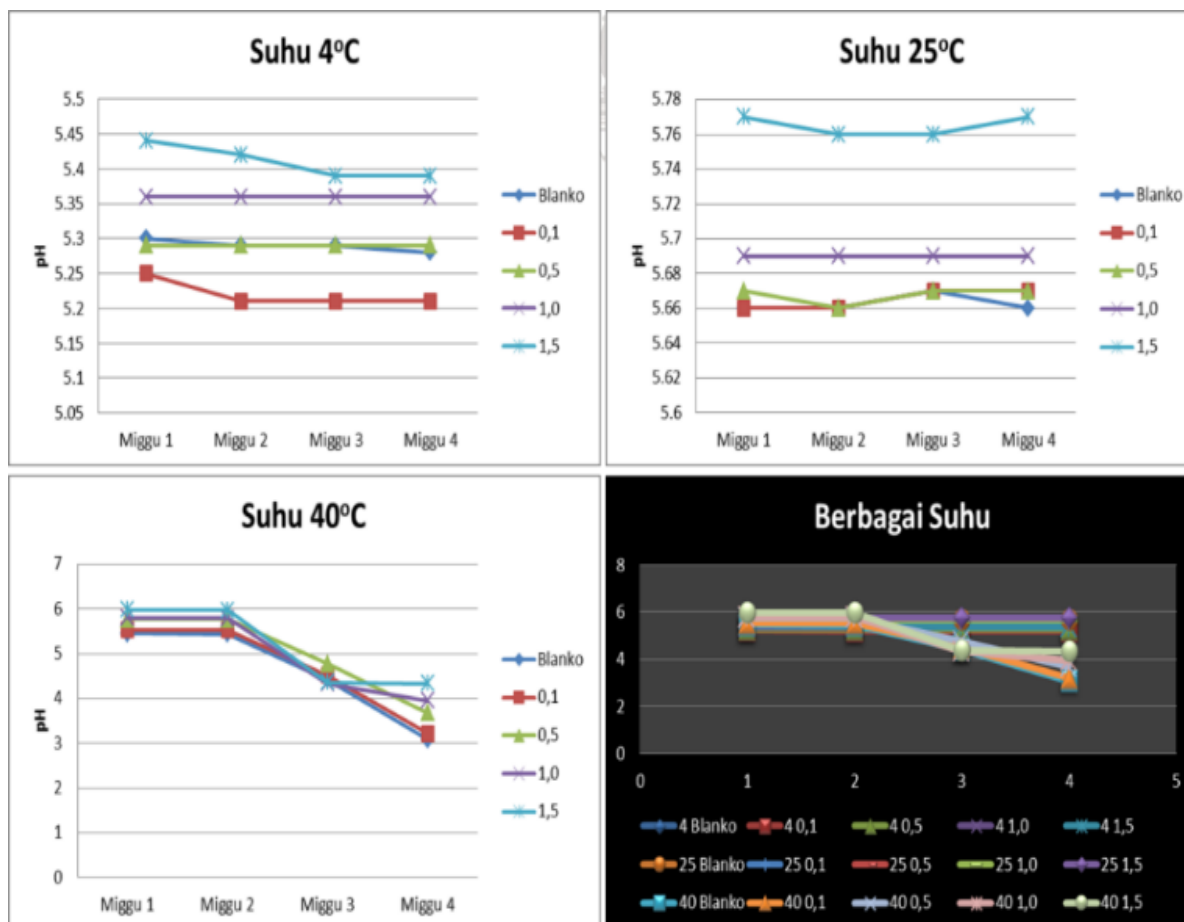
| Sr. No. | Materials | Amount (%) | | |
|--------------------------|------------------------------------|--|------------------|-------|
| | | Hair tonic | Positive control | Blank |
| Active Substances | | | | |
| 1. | Combination extract (HRS : APR) | 0,1%:0,1% 0,5%:0,5% 1%:1% 1,5%:1,5% | - | - |
| 2 | Minoxidil | - | 5% | - |

Formula Hair Tonic**Table 6. Results the average hair length of each treatment per week at hair tonic dosage form**

| Sr. No. | Perlakuan | Hair length (cm) | | | Average (cm) \pm SD |
|---------|---|------------------|----------|----------|-----------------------|
| | | Rabbit 1 | Rabbit 2 | Rabbit 3 | |
| 1 | Normal control | 0,61 | 0,57 | 0,64 | 0,61 \pm 0,44 |
| 2 | Negative control (tonic formula without extract) | 0,75 | 0,81 | 0,79 | 0,96 \pm 0,69 |
| 3 | Positive control | 1,01 | 0,91 | 0,95 | 0,78 \pm 0,57 |
| 4 | Extract 0,2% (0,1%HRS:0,1APR%) | 0,75 | 0,70 | 0,77 | 0,74 \pm 0,53 |
| 5 | Extract 1% (0,5%HRS:0,5%APR) | 1,32 | 1,18 | 1,22 | 1,24 \pm 0,90 |
| 6 | Extract 2% (1%HRS:1%APR) | 0,91 | 0,87 | 0,92 | 0,90 \pm 0,65 |
| 7 | Extract 3% (1,5%HRS:1,5%APR) | 0,77 | 0,70 | 0,78 | 0,75 \pm 0,54 |

Table 7. The results of the weight of each hair treatment per week on hair tonic preparations

| Sr. No. | Perlakuan | Panjang Rambut (mg) | | | Rata-rata (mg) |
|---------|--|---------------------|-----------|-----------|----------------|
| | | Kelinci 1 | Kelinci 2 | Kelinci 3 | |
| 1 | Normal control | 7.56 | 151.72 | 9.2 | 56,16 |
| 2 | Negative control (tonic formula without extract) | 60.5 | 7.4 | 180.06 | 82,65 |
| 3 | Positive control | 66.21 | 101.3 | 87.21 | 84,91 |
| 4 | Extract 0,2% (0,1%KS:0,1BS%) | 81.12 | 110.6 | 38.7 | 76,81 |
| 5 | Extract 1% (0,5%KS:0,5%BS) | 382.52 | 220.8 | 343.2 | 315,51 |
| 6 | Extract 2% (1%KS:1%BS) | 276.20 | 156.70 | 265.12 | 229,67 |
| 7 | Extract 3% (1,5%KS:1,5%BS) | 115,78 | 97,12 | 201,75 | 138,22 |



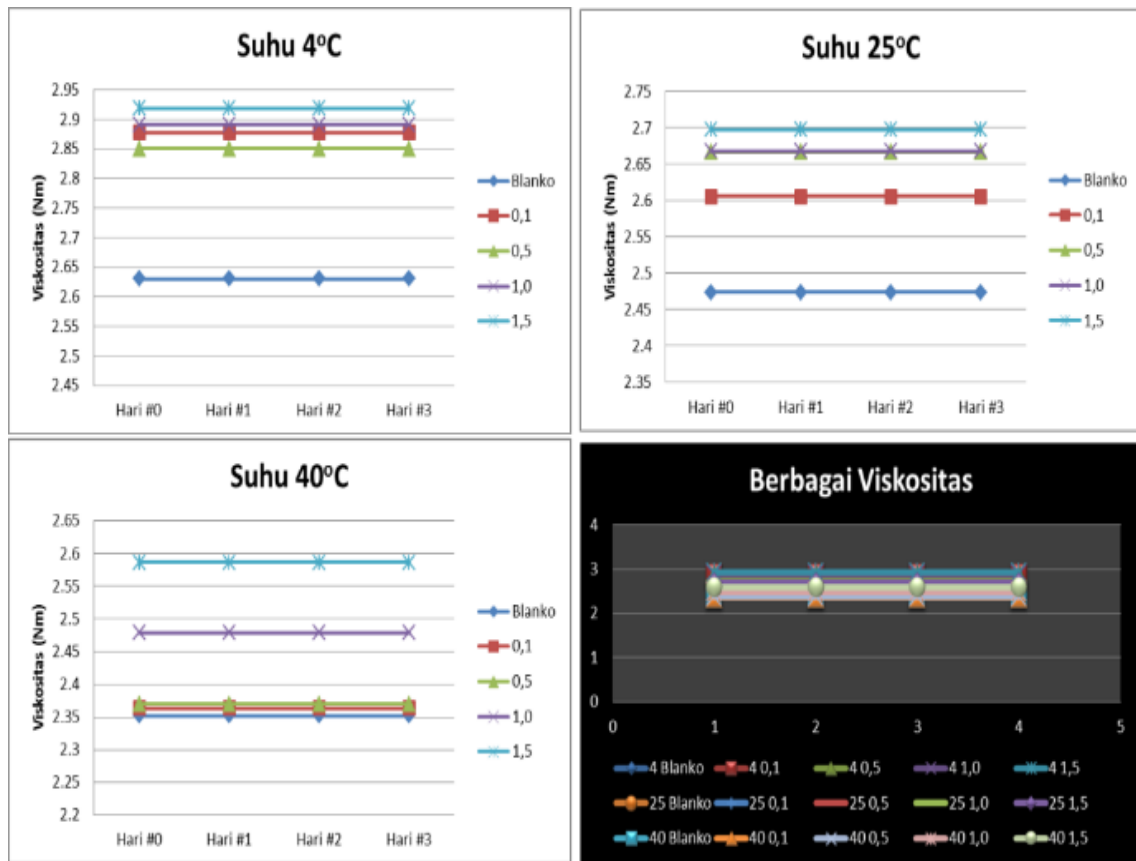


Figure 2: Stability assay

Table 8. Observation on test of irritation of the hair Tonic and base temperature stability test after $2 \pm 2^\circ\text{C}$

| Sr. No. | Group test | Waktu Pengamatan | | | | | | | |
|---------|---|------------------|-------|---------|-------|---------|-------|---------|-------|
| | | 1 | | 24 | | 48 | | 72 | |
| | | Eritema | Udema | Eritema | Udema | Eritema | Udema | Eritema | Udema |
| 1 | Aquadest | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Average | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2 | Hair tonic after a test of the stability of the $2 + 2^\circ\text{C}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Average | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3 | Base after testing the stability $2 + 2^\circ\text{C}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Average | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Table 9. Irritation Index of hair Tonic and base after temperature stability assay at 2 ± 2°C

| Sr. No. | Group test | Index Of Irritation |
|---------|---|---------------------|
| 1 | Negative control (Aquadest) | 0 |
| 2 | Hair tonic after a test of the stability of the 2 + 2°C | 0 |
| 3 | Base after testing the stability of the 2 + 2°C | 0 |

CONCLUSION

Results of the study prove that the combination of extracts of *Hibiscus rosasinensis* and *Abrus precatorius* seeds can increase hair growth, optimum concentration at concentrations of 1% in each of the extracts, but when combined the best concentration on comparison of 1:1 where the concentration of the extract used 0.5% - 0.5% abrus and hibiscus in the formula hair tonic with an average length and weight of the hair is 315.51 mg and 1.24 SD ± 0.90 cm. The results of the data obtained are interpreted using statistical methods with ANOVA test.

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