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RESEARCH PAPER

Formulation and evaluation of the effectiveness hair tonic containing ethanolic extract of garden balsam leaves (*Impatiens balsamina* L.) using the Tanaka method

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Abstract: Hair issues such as hair loss and slow growth require safe and effective treatment products. Garden balsam leaves (*Impatiens balsamina* L.) contain secondary metabolites specifically flavonoids, alkaloids, saponins, and tannins that have the potential to serve as active ingredients in hair tonic formulations. This study aimed to formulate, evaluate the physical quality of, and test the effectiveness of a hair tonic containing an ethanolic extract of garden balsam leaves on hair growth using the Tanaka method. This was a laboratory-based experimental study utilizing the maceration extraction method with 96% ethanol. Three concentrations were formulated F1 (4%), F2 (6%), and F3 (8%) and compared against a negative control (distilled water) and a positive control (5% minoxidil). Physical quality evaluations included tests for organoleptic properties, homogeneity, pH, and viscosity, while effectiveness was analyzed using the Shapiro-Wilk test, homogeneity test, One-Way ANOVA, and the Least Significant Difference (LSD) test. The results showed an extraction yield of 28.3%, with positive test results for flavonoids, alkaloids, saponins, and tannins. All formulations met physical quality standards and promoted hair growth compared to the negative control. Statistical analysis revealed significant differences in effectiveness among the treatment groups ($p<0.05$). Formula F3 (8%) produced the highest average hair growth, making it the most effective formulation for stimulating hair growth.

Keywords: Hair tonic, Impatiens, hair growth, tanaka method.

INTRODUCTION

Hair is a part of the body that plays an important role in supporting appearance and increasing a person's confidence even though it is not a vital organ. In addition to having aesthetic value, hair also functions to protect the scalp from exposure to sunlight, dust, and changes in environmental temperature [4]. One of the problems that people often experience is hair loss, dandruff, and slow hair growth so that it can reduce confidence. These problems can be influenced by various factors, such as stress, hormonal changes, unhealthy diets, the use of inappropriate hair care products, and exposure to environmental pollution [10]. This condition shows that hair care preparations are needed that are able to maintain a healthy scalp while stimulating hair growth. One of the products that is widely used to overcome this problem is *hair tonic*. *Hair tonic* is a liquid cosmetic preparation that is applied to the scalp to help strengthen hair roots, reduce hair loss, and stimulate hair growth. This form of preparation has several advantages, including being easy to apply, quickly absorbed by the scalp, and not causing a sticky feeling after use [12]. A good *hair tonic* must also meet physical quality requirements, such as good homogeneity, a pH that matches the scalp, and a low viscosity so that it is comfortable to use [7]. However, most *hair tonic* products in circulation still use synthetic active ingredients, such as minoxidyl, which although effective can cause side effects if used in the long term, such as scalp irritation, swelling, and headaches [11]. Therefore, the development of natural *hair tonic* is one of the alternatives that is widely researched because it is expected to have a better level of safety.

One of the plants that has the potential to be developed as an active ingredient in *hair tonic* is the water Garden Balsam leaves(*Impatiens balsamina* L.). This plant is known to contain secondary metabolites in the form of flavonoids, alkaloids, saponins, and tannins that have various biological activities. Flavonoids act as antioxidants that are able to protect hair follicles from damage caused by free radicals, while alkaloids play a role in increasing

blood circulation on the scalp so that the supply of oxygen and nutrients to the hair follicles is more optimal. In addition, saponins have antimicrobial activity that helps maintain scalp cleanliness, while tannins have astringent properties that can help maintain healthy scalp tissues. This combination of activities makes henna leaves potentially used as a natural active ingredient in *hair tonic* preparations [8]. Garden Balsam leaves as illustrated in Figure 1.



Figure 1. Garden Balsam leaves(*Impatiens balsamina* L.).

Research conducted by [1] Bagus et al. (2025) shows that water Garden Balsam leavesethanol extract obtained through the maceration method using 96% ethanol has a high yield and positively contains flavonoids, alkaloids, saponins, and tannins with very strong antioxidant activity. These results suggest that Garden Balsam leavesethanol extract has the potential to be developed as an active ingredient in hair care products, including *hair tonic*. However, research on the formulation of *hair tonic* ethanol extract of Garden Balsam leaveswater accompanied by physical quality evaluation and testing of hair growth effectiveness using the Tanaka method in New Zealand White rabbits is still limited. In fact, in addition to the effectiveness of the active ingredients, the physical quality of the preparation is an important factor that determines the quality, stability, safety, and comfort of using topical products.

Based on this description, this study was conducted to formulate ethanol extract of Garden Balsam leaves(*Impatiens balsamina* L.) into *hair tonic* preparations with concentration variations of 4%, 6%, and 8%, evaluate the physical quality of the preparation which includes organoleptic, homogeneity, pH, and viscosity, and test its effectiveness on hair growth using the Tanaka method in New Zealand White rabbits. This study is expected to provide scientific information regarding the potential of water Garden Balsam leavesethanol extract as a natural active ingredient that meets physical quality requirements and is effective in stimulating hair growth

MATERIALS AND METHODS

Research Design. The study used a laboratory experimental method with a Posttest-Only Control Group Design, where physical quality testing was carried out after the *hair tonic* preparation was formulated, then compared with negative control (aquadest), positive control (Minoxidil 5%), and test formula, while effectiveness evaluation in rabbits was carried out using the Tanaka Method through hair length growth measurement. The research was conducted in March-June 2026 at the Laboratory of the State Islamic University of Mataram (plant determination), the Biochemistry Laboratory of Bumigora University Mataram (Manufacture of extracts and phytochemical screening), the Laboratory of Pharmaceutical Preparation Technology of the University of Mataram (Manufacture of *hair tonic* preparations), the Biochemistry Laboratory of the University of Mataram (Activity Test of rabbit hair growth)

Population and Sample. The study population included Garden Balsam leaves(*Impatiens balsamina* L.) from Mataram City, West Nusa Tenggara, as well as New Zealand White male rabbits. Inclusion criteria included fresh dark green leaves, intact, harvested in the morning, and healthy rabbits aged 3–4 months with a weight of 1.5–2 kg. Exclusion criteria included damaged, yellowing, moldy leaves, as well as rabbits that were sick, had a back injury, drastic weight loss, or irritation during the study

Tools and Materials. The tools used include analytical scales, blenders, maceration jars, rotary evaporators, pH meters, Ostwald viscometers, picnometers, calipers, scissors, razors, as well as laboratory glass equipment such as measuring cups, beakers, erlenmeyers, test tubes, funnels, drip pipettes, stirring rods, petri dishes, spatulas, and filter paper. New Zealand White rabbit rearing equipment in the form of cages, feeding containers, and drinking containers was also used during the study. The ingredients used include water Garden Balsam leavessimplicia (Impatiens balsamina L.), ethanol 96%, propylene glycol, Tween 80, methyl paraben, propyl paraben, menthol, Na_2EDTA, aquadest, minoxidyl 5%, magnesium powder, hydrochloric acid (HCl), iron(III) chloride solution ($FeCl_3$), alkaloid reagents, distilled water, pellet feed, and male New Zealand White rabbits as test animals.

Work Procedures. The determination of the plant is carried out in order to confirm the original identity of the Garden Balsam leavesplant (Impariens balsamina L.). Simplisia is made through wet sorting, washing, stirring, and drying in the sun with a black cloth covering, then pollinated and filtered (mesh 40).

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A total of 200 g of simplicia powder was extracted using the maceration method with 2 L of 96% ethanol (1,500 mL) for 3 × 24 hours at room temperature accompanied by light stirring daily. The residue was then remacerated twice using the same solvent (500 mL). The macerated and remacerated filtrate is combined, then evaporated using a rotary evaporator until a viscous extract is obtained. Next, the extract yield is calculated:

$$\text{Extract Yield} = \frac{\text{Weight of Concentrated Extractl (grams)}}{\text{Weight of Dried Simplicia (grams)}} \times 100\%$$

Phytochemical screening was performed on the condensed extract of water Garden Balsam leaves(Impatiens balsamina L.) for the identification of alkaloids (Mayer and Dragendorff reagents), flavonoids (Mg + concentrated HCl), saponins (foam test), and tannins ($FeCl_3$ 1%).

The process of making hair tonic begins by dissolving a concentrated extract of ethanol from the Garden Balsam leavesaccording to the concentration of each formula (F1, F2, and F3) into 96% ethanol until a homogeneous solution is formed that functions as an alcohol phase. Elsewhere, methyl parabens and propyl parabens are dissolved in 96% ethanol because they are both more soluble in alcohol solvents. Then Na_2EDTA is dissolved in a small amount of aquadest until everything dissolves well. Next, the additives consisting of propylene glycol, Tween 80, and menthol are mixed until homogeneous. The extract solution is then combined with a solution of methyl paraben, propyl paraben and Na_2EDTA, then a mixture of propylene glycol, Tween 80, and menthol is gradually added while continuing to stir until thoroughly mixed. Once all the ingredients are well mixed, aquadest is added until the total volume reaches 100 mL. Then, the pH is measured and adjusted to ensure the value is within the scalp-safe range of 4.5–6.5 as presented in table 1.

Table 1. *Hair tonic* formula

Materials	Function	F1 (%)	F2 (%)	F3 (%)
Ethanol extract of henna leaves water	Active substance	4	6	8
Ethanol 96%	Solvent	30	30	30
Propylene Glycol	Humphectan	15	15	15
Tween 80	Solubilisator	1	1	1
Methyl paraben	Preservatives	0,18	0,18	0,18
Profile paraben	Preservatives	0,2	0,2	0,2
Na_2EDTA	Compound	0,10	0,10	0,10
Bulb	Cold sensation	0,10	0,10	0,10
Aquadest	Solvent	Ad 100	Ad 100	Ad 100

Physical quality evaluation was carried out on all hair tonic (F1–F3), negative control (KN), and positive control (KP) formulas to assess the suitability of the preparation characteristics. The parameters observed include: (1) organoleptic test, namely observation of the color, aroma, shape, and texture of preparations using the five senses; (2) homogeneity test, by applying the preparation between two glass objects to ensure that there are no particles or deposits so that the preparation is evenly distributed; (3) pH test, using a pH meter to ensure that the pH is within the standard range of hair tonic according to SNI, which is 3.0–7.0; and (4) viscosity test, using an Ostwald viscometer to measure the flow time of the preparation as the basis for calculating viscosity, with a viscosity value requirement of less than 5 cP according to the SNI 16-4955-1998 standard.

Hair growth activity test. The hair growth activity test was carried out in vivo using the Tanaka method on New Zealand White male rabbits as test animals. Before treatment, the rabbit's back is shaved clean, then five treatment areas are made with sizes of 2 cm × 2 cm (4 cm² area) each. Each area is separated by a distance of ±1 cm to prevent mixing of preparations between treatments. The five areas were divided into negative control groups (aquadest), positive control (minoxidil 5%), and three groups of test formulas, namely F1, F2, and F3 which contained ethanol extract of henna leaves (*Impatiens balsamina* L.) with different concentrations. Area division is carried out regularly on the back so that each treatment can be objectively compared. Next, the length of each strand of hair is measured using a caliper in millimeters (mm), calculated from the base to the end of the hair. The value of the hair length of the 3 strands in each of the treatment areas was then averaged.

Data Analysis. The data from phytochemical screening and physical quality evaluation were analyzed descriptively. Hair growth data was analyzed using IBM SPSS Statistics version 25.0.

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Before the statistical test was carried out, the data was tested for normality using the Shapiro–Wilk test and homogeneity using the Levene test. Data with normal and homogeneous distribution were then analyzed using One Way ANOVA at a confidence level of 95% ($\alpha = 0.05$). If there is a significant difference ($p < 0.05$), the analysis is continued with the Least Significant Difference (LSD) test to determine the difference between treatment groups.

RESULTS AND DISCUSSION

Plant determination. The results of the determination at the Integrated Laboratory of UIN Mataram confirmed that the sample used was Impatiens balsamina L. from the Balsaminaceae family, so that the authenticity of the research material could be ascertained.

Extraction results. Extraction of Garden Balsam leaves(*Impatiens balsamina* L.) using maceration and remaceration methods with 96% ethanol solvent yielded 56.61 g of thick extract from 200 g of simplicia powder with a yield of 28.3%. This yield value is higher than the research of [6] which reported a yield of 17.64%, which is suspected to be influenced by differences in simplicia conditions, particle size, comparison of materials with solvents, and extraction processes. According to [13], yield is one of the indicators of the success of the extraction process because it reflects the number of compounds that have been extracted from natural materials as presented in table 2.

Table 2. Extract Yield Calculation

Sample	Weight of simplicia powder	Weight of thick extract	Result
Garden Balsam leaves	200 gram	56,61	28,3%

Chemical screening. Based on the results of phytochemical screening, the ethanol extract of water Garden Balsam leaves (*Impatiens balsamina* L.) is positive for flavonoids, alkaloids, saponins, and tannins. Flavonoids are characterized by the formation of orange-red color, alkaloids with white precipitation in the Mayer reagent and red-orange precipitation in the Dragendorff reagent, saponins with the formation of a stable foam, and tannins with a blackish-green discoloration after the addition of $FeCl_3$ solution. These results show that the extraction method using 96% ethanol successfully extracts secondary metabolites that have the potential to be utilized as active ingredients in *hair tonic* formulations.

Physical Quality of Hair Tonic. Physical quality evaluation was carried out to determine whether the hair tonic preparation of ethanol extract of water Garden Balsam leaves(*Impatiens balsamina* L.) met the quality requirements which include organoleptic, homogeneity, pH, and viscosity. The results of the evaluation showed that all formulas met the physical quality requirements and were therefore suitable for use as a topical preparation as illustrated in Figure 2.



Figure 2. Results of the formulation of *hair tonic* preparations

Results of the Orgnoleptis Test. Based on the results of organoleptic tests, all hair tonic formulas have a liquid form with a distinctive aroma of Garden Balsam leavesand menthol. The difference in extract concentration affects the color of the preparation, namely F1 is green, F2 is brownish-green, and F3 is deep green, where the higher the concentration of the extract results in a more intense color. During the observation period, there was no change in shape, color, or aroma in the entire formula, indicating that the preparation has good physical stability and meets the requirements of organoleptics as presented in table 3.

Table 3. Organoleptic test result

Formula	Shape	Color	Odor
F1	Liquid	Green	Typical Garden Balsam leaves and Bulbs
F2	Liquid	Green Brownish	Typical Garden Balsam leaves and Bulbs
F3	Liquid	Concentrated Green	Typical Garden Balsam leaves and Bulbs

Homogeneity Test Results. Based on the results of the homogeneity test, the entire *hair tonic* formula of Garden Balsam leavesextract showed homogeneous results without any coarse particles, clumps, or deposits. This indicates that all components of the formula are evenly mixed so that the active substances are well distributed in the preparation. Thus, the entire formula meets the requirements of homogeneity and has good physical qualities.

pH Test Results. Based on the pH test results in Table 4, the entire hair tonic formula of Garden Balsam leavesethanol extract has a pH value ranging from 5.1–5.4, so it is still within the appropriate pH range for the scalp, which is 4.5–6.5 [2]. The pH value indicates that the preparation meets the pH requirements, is safe to use, and can minimize the risk of irritation and dryness on the scalp. The difference in extract concentration does not have a significant effect on the pH value so that the whole formula has good pH stability as presented in table 4.

Table 4. pH test results

Formula	Replication			Average
	I	II	III	
F1	5,2	5,3	5,3	
F2	5,1	5,3	5,3	5,3
F3	5,1	5,3	5,4	

Viscosity test results. Based on the results of the viscosity test in Table 5, the viscosity values of hair tonic F1, F2, and F3 are 2.30 cP, 2.60 cP, and 2.90 cP, respectively. The results showed that the increased concentration of the extract led to an increase in the viscosity of the preparation, which was thought to be influenced by the increased content of dissolved solids in the extract. F1 formula has the lowest viscosity so it flows more easily and is applied to the scalp, while F2 and F3 have a higher viscosity but are still in the low viscosity range suitable for hair tonic preparations. Thus, all formulas meet physical quality requirements and still provide comfort during use as presented in table 5.

Table 5. Viscosity test result

Formula	Viscocity (Cp)
F1	2,30
F2	2,60
F3	2,90

Test the Effectiveness of Hair Tonic Preparations on Rabbit Hair Growth. Based on the observation results in Table 6, the entire *hair tonic* formula of ethanol extract of water Garden Balsam leaves(*Impatiens balsamina* L.) showed better hair growth compared to negative controls. In the first week there was no hair growth, while in the second and third weeks there was an increase in hair length in all treatment groups. The average hair length in the third week in a row was 11.30 ± 0.13 mm (F1), 11.75 ± 0.41 mm (F2), and 12.13 ± 0.72 mm (F3), while positive control resulted in hair length of 12.01 ± 0.57 mm and negative control only 5.43 ± 0.25 mm. The results showed that the higher the concentration of the extract used, the better the hair growth activity produced, with F3 providing the highest results and approaching positive control.

The increase in hair growth is thought to be influenced by the content of secondary metabolites in the ethanol extract of henna leaves, namely flavonoids, alkaloids, saponins, and tannins. Flavonoids act as antioxidants that protect hair follicles from oxidative damage and improve blood circulation, while alkaloids help facilitate blood flow to hair follicles thereby supporting the hair growth phase (anagen). In addition, tannins act as astringent and anti-inflammatory, while saponins have antimicrobial activity that helps maintain a healthy scalp. The synergy of the four compounds is thought to

contribute to hair growth activity, so that the whole formula shows better effectiveness than negative controls as presented in table 6.

Table 6. Average Yield of Rabbit Hair Growth

Treatment Group	Average Rabbit Hair Length (mm)		
	1st Week	2nd Week	3rd Week
K-	-	3,47 ± 0,17	5,43 ± 0,25
F1	-	7,22 ± 0,06	11,30 ± 0,13
F2	-	7,49 ± 0,32	11,75 ± 0,41
F3	-	7,53 ± 0,31	12,13 ± 0,72
K+	-	7,31 ± 0,14	12,01 ± 0,57

Data analysis. The results of the statistical analysis showed that all hair growth data were normally distributed ($p>0.05$) based on the Shapiro–Wilk test and homogeneous ($p>0.05$), thus meeting the assumptions for parametric analysis. Furthermore, the results of the One Way ANOVA test showed a significance value of $p=0.000$ ($p<0.05$) in all observations, which showed a difference in the effectiveness of hair growth between treatment groups. Therefore, the analysis was continued using the Least Significant Difference (LSD) test. And the graphic illustrated in figure number 3 below.

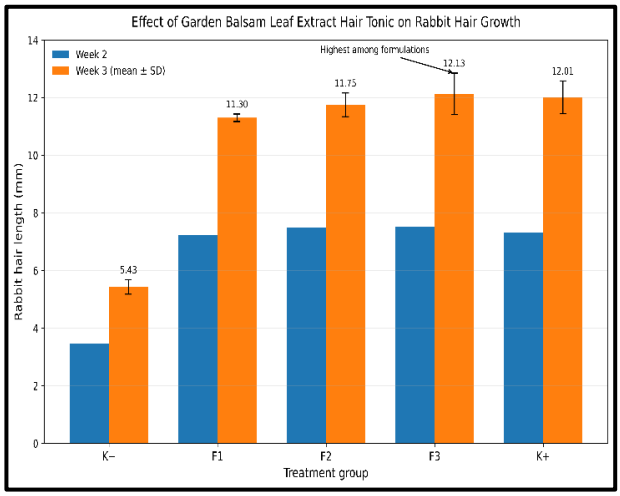


Figure 3. Effect of Garden Balsam Leaf (*Impatiens balsamina* L.) extract hair tonic on rabbit hair growth.

The results of the LSD test showed that the entire formula of the water Garden Balsam leaves ethanol extract hair tonic was significantly different from the negative control, which showed that the administration of the extract was able to promote hair growth. However, some treatment groups did not show significant differences with positive controls, especially F3 which at some observation times had effectiveness comparable to 5% minoxidyl. Overall, F3 (8%) produces the highest average hair growth and is the most effective formula in stimulating rabbit hair growth.

CONCLUSION

Hair tonic preparation of ethanol extract of Garden Balsam leaves(*Impatiens balsamina* L.) has been successfully formulated and meets physical quality requirements including organoleptic, homogeneity, pH, and viscosity so that it is suitable for use as a topical preparation. The results of the hair growth activity test showed that the entire hair tonic formula was able to increase the growth of New Zealand White rabbit hair compared to negative controls. Statistical analysis using One Way ANOVA showed a significant difference in hair growth effectiveness between treatment groups ($p<0.05$), while the results of the Least Significant Difference (LSD) test showed that some formulas did not differ significantly from the positive control (minoxycil 5%). Among all the formulas tested, Formula 3 (8%) provided the highest average hair growth and showed the closest effectiveness to positive control, so it could potentially be developed as a natural active ingredient in *hair tonic* preparations.

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REFERENCES

[1] Bagus, I., Mahardika, P., Luh, N., Diah, P., & Saka, I. (2025). Antioxidant activity and phytochemical profile of water Garden Balsam leavesextract (*Impatiens balsamina* L.) With a variety of solvents. *Journal of Malahayati Pharmacy,* 8(2), 249–260.

[2] Collins, E., Rollando, & Monica, E. (2023). Manufacture of Hair Growth Serum Combination of Pecan Oil (Aleurites moluccanus) and Apple Fruit Extract (*Pyrus*

malus L.). *Journal of Pharmacy Ma Chung: Science, Technology, and Community Clinical,* 1((1)), 32–41.

[3] Eni Tri Mastuti, Wicahyo Septian Maulid, & Wardani Tatiana Siska. (2024). Formulation of *Hair Tonic* Preparation from a Combination of Celery Leaf Ethanol Extract (*Apium graveolens* L.) and fragrant pandan leaves (Pandanus amaryllifolius Roxb.) As a hair growth stimulant in rabbits (New Zealend White). *Tambusai Health Journal*, 5(4), 10871–10872.

[4] Hayati, P. P., Pratama, G., Surilayani, D., & Hasanah, A. N. (2024). Formulation of *Hair Tonic* Preparation of Seaweed Extract (*Hormophysa triquetra*) with a Combination of Pecan Extract (Aleurites moluccana) as a Hair Grower. *Journal of Halal Agroindustry*, 10(1), 45–56. https://doi.org/10.30997/jah.v10i1.12008

[5] Koralina, S., Sunarsih, E. S., & Wulandari, F. (2023). Activity Test of *Hair Tonic* Preparation Ethanol Extract 70 % Bitter Melons (*Momordica charantia* L.) Against hair growth in rabbits (Oryctolagus cuniculus). *Journal of Pharmacy and Pharmacology,* 27(3), 103–109. Https://Doi.Org/10.20956/Mff.V27i3.27548

[6] Mahardika, IBP (2025). Antioxidant Activity and Phytochemical Profile of Water Garden Balsam leavesExtract (*Impatiens balsamina* L.) With a variety of solvents. *JFM (Journal of Malahayati Pharmacy),* 8 (2), 249-260.

[7] Muliani, W., Setiawan, F., & Sukmawan, Y. P. (2022). Formulation and Evaluation *of Hair Tonic* Preparation of Katuk Leaf Ethanol Extract (*Sauropus androgynus* (L.) Merr.) as Hair Growth in New Zealand White Male Rabbits. *In Proceedings of the National Seminar on the Dissemination of Research Results of the S1 Pharmacy Study Program*, 2, 101–112.

[8] Pandya, P., & Nallanchakravarthula, S. (2022). Determination of the Quantitative Phytochemical Screening and Antioxidant Activity of *Impatiens balsamina* L. Leaves and Flower under Heavy Metal Stress (Nickel). *Environment and Ecology*, 40(1), 146–155.

[9] Puspitasari, A., & Sulistyawati, R. (2024). Formulation and Physical Stability Test of *Hair Tonic* Preparation of Ethanol Extract of Bitter Melons (*Momordica charantia L.). IJMS – Indonesian Journal of Medical Science*, 11(2), 109–114.

[10] Rantika, N., Hindun, S., Najihudin, A., & Indra, A. (2023). Formulation of *Hair Tonic* Preparation Ethanol Extract Moringa Leaf (Moringa leifera Lamk.) and Rambutan Leaf (*Nephelium lappaceaum* L.) Against hair growth. *Pharma Xplore: Journal of Pharmaceutical Science and Sciences*, 8(1), 65-76.

[11] Rifaldi, M., Ode, W. L., & Hj.Nurlina. (2025). Formulation of *Hair Tonic* Preparation with Ethanol Extract from Kepok Banana Stem (*Musa paradasiaca* L) from Pinrang Regency to Overcome Hair Loss. *Al-Ghafiqi Journal of Pharmacy (JUFAL),* 1(2), 1–6.

[12] Safitri, M., & Novelni, R. (2024). Eligibility of Hair Tonic Bitter Melons (*Momordica charantia* L.) For hair loss treatment. *Journal of Cosmetology*, 14(01), 33–45.

[13] Selviana, A.P., Khoirotunnisa, U., Ulandari, A.S., Rahayu, I.D., & Andrifianie, F. (2024). Effect of Ethanol Concentration and Volume on the Yield of Telang Flower Extract (*Clitoria ternatea* L.) In the ade maceration extraction method. *Journal of Health and Agromedicine*, 11(2), 94–100.

[14] Suraiya, C., Utami, W., Tinggi, S., Health, I., & Aceh, A. (2025). *Hair Tonic* Formulation Based on Tea Leaves (Camellia sinensis) as a Hair Growth Stimulator. *Thermometer: Scientific Journal of Health and Medical Sciences,* 3(1), 302–309.