Formulation of pomade with atisiri oil pandan wangi leaves (pandanus amaryllifolius roxb.)

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Abstract. This research aims to: 1) know the formulation of pomade making from aromatic pandan wangi leaf essential oil, 2) know the characteristics of pomade from the essential oil of pandan wangi leaves, and 3) know the quality of pomade from the essential oil of fragrant pandan leaves, and 4) the anti-fungal activity of pomade from the essential oil of pandan wangi leaves. Research methods used by research and development (R&d) models. Formulation of pomade manufacture of pandan wangi leaf essential oil is carried out based on the results of research that produces a stable formula that is pomade with the appropriate quality SNI with the base of pomade type oil based and not petrol based with a concentration of 34% of the total weight of pomade. Pomade formula is added to the essential oil of pandan wangi leaves with different concentrations of 2.5% (formula 1), 5% (formula 2) and 7.5% (formula 3). The characteristics and quality of pomade are known from organoleptic and hedonic tests that 47% of respondents strongly agree with pomade has the aroma of essential oil of pandan wangi leaves, 52% of respondents strongly agree with the color of pomade in dark green, 45% of respondents strongly agree with the texture of pomade very smooth without any granules, the respondent's response after pomade is on a smooth impression as much as 90.56% and the impression is moist as much as 90.00%. Formula 1 to formula 3 provide homogeneous results. Formulas 1 through 3 have a pH balance with pH range of hair and oil on the scalp which is 5.5 between pH 4.5 -5.5. The largest antifungal activity is in formula 3 (essential oil content 7.5%) with an inhibithor zone diameter of 37 mm. This indicates that the greater the concentration of pandan wangi leaf essential oil, the stronger the antifungal activity against niger's Aspergillus.

1. Introduction

The phenomenon of beauty trends that emerged in people's social life in the era of digitization makes people need cosmetics not only to look after/care for beauty but to want to look beautiful, stylish, and show their existence. This is in similar to Ibrahim's statement in Ardi Dadang Kusniadi, that in Indonesian society now the affairs of styles are starting to become a very serious concern for almost everyone [1]. At this time not only women are required to maintain their appearance but men also feel the need to appear ala dandy society.

With the rapid beauty trend in the era of digitization, some aesthetic industries, especially the cosmetics industry, are rapidly growing rapidly and rapidly. This is in accordance with the data of the Ministry of Industry of the Republic of Indonesia which explains that the national cosmetics industry is experiencing a 20% growth or four times the growth of the national economy every year. Thus, the
Ministry of Energy and Human Services placed the cosmetics industry as the mainstay sector as stated in the National Industrial Development Master Plan (RIPIN) in 2015-2035.

One of the cosmetic products that many men see is pomade. This is because of the large number of foreign-style barbershops that are mushrooming in Indonesia. The trend of pomade cosmetics usage reached its peak in 2010 and until now still received a positive response especially by young people / millennials.

Data on the sales report of hair styling (pomade) owned by one of the giant cosmetic companies in Indonesia states that sales of hair styling products occupy the highest position compared to other categories of cosmetic products and in addition sales of hair styling cosmetics have increased significantly from year to year can be seen in the following table [2].

| Product Category | 2014 Billion | % | 2015 Billion | % | 2016 Billion | % |
|------------------|-------------|---|-------------|---|-------------|---|
| Hair Styling     | 845.718     | 36.6 | 898.431     | 38.8 | 1,053.480   | 41.7 |
| Skin Care        | 794.479     | 34.4 | 811.214     | 35.0 | 811.194     | 32.1 |
| Perfume          | 627.514     | 27.2 | 564.333     | 24.4 | 633.261     | 25.1 |
| Etc              | 40.492      | 1.8  | 40.912      | 1.8  | 28.841      | 1.1  |

The phenomenon of the increasing pomade usage trend causes many cosmetic industries both large and small industries such as SMEs to compete to create superior and quality pomade cosmetic innovation products. Products with new variants that are superior are expected to provide more effects / properties than just the use of pomade before that is only aimed as cosmetic hair styling only and does not pay attention in terms of health or scalp care and hair itself.

The phenomenon of pomade trend is supported by promotional media and online sales methods where people /consumers can easily access and obtain pomade.

Looking at the phenomenon of pomade trend is remarkable then the younger generation, especially milineal children also participate as pomade producers. The younger generation who also like the trend and they are also experts in technology then the production of pomade is a great potential for the younger generation to do entrepreneurship.

Efforts to create pomade products with new variants that are more innovative to meet the considerable market demands can be seen from the research results that there are manufacturers who create organic pomade that does not contain a petrol base called pomade non-petrol based [3]. Organic pomade is pomade made not using petrolium gel base but replaced with beewax wax and added essential oil as a substitute for fragrance oil/ fragrance.

The presence of organic pomade received a positive reception from the community. In general pomade on the market are non organic pomade with petrolium gel base and fragrance oil/ perfume. Pomade found that many complaints from the public such as riris endah respati research that there were 29.5% of respondents said it was difficult to rinse pomade by using pomade petrol based and as many as 26.4% of respondents experienced acne after using gas station based. The use of petroleum-containing pomade can cause pomade acne or pomade acne [4].

In addition to infections and acne caused by the use of petrol-based pomade, another problem that has the potential to arise due to the growth of bacteria on the scalp is the onset of dandruff. The more pomade volume used and the longer using pomade can trigger the onset [5]. In addition, the use of pomade that does not comply with the rules of use can also cause problems on the scalp of one of them dandruff.

Many problems arise from pomade products and the incorrect use of pomade then at this time many developed more innovative cosmetic products both in terms of quality and efficacy of the product itself. One way of developing pomade products is by replacing the pomade base with non petrol material and fragrance oil replaced with essential oil. The development of pomade products with a non petrol base and the addition of essential oils is expected to address problems arising from pomade usage.

One of the aromatic plants that also produces essential oils and is widely used is pandanus leaves (Pandan amaryllifolius Roxb.). Pandan wangi is a plant that often used its leaves as a food addition,
generally as a green dye and aromatic ingredient. The distinctive aroma of pandanus is thought to be
due to the compound derivative of the amino acid phenyl alanine namely 2-acetyl-1-pyrroline [6].

Pandanus amaryllifolius Roxb.) has the content of terpene-type essential oils that are useful as
aroma ingredients, food coloring and cosmetics. The ingredients contained in pandan leaf essential oil
are obtained 11 types of components consisting of eucalyptol 61.26%, 3.7-dimethyl, 1,3,6-octatriene
25.01%, 3.7-dimethyl, 1,3,7-octatriene 3.84%, 1-methyl-2-(1-methylethyl)-benzene 3.49%, tridecane
1.23%, hexylene glycol 1.20%, beta-pinene 0.99%, dihydro-carveol 0.90%, gamma-terpinene 0.87%,
2-methyldecalin 0.62%, and ethenyloxy-isooctane 0.59% [7].

2. Method

Pomade cosmetic manufacturing research with the addition of pandan leaf essential oil is done with
Research and Development model. The technique of making pomade with the addition of pandan leaf
essential oil is carried out using a standard formula pomade that is added essential oil with a variation
in concentration and replicated as much as 3 times from each different formula so that it will be
produced a formula that is precisely in accordance with the desired pomade quality standards.

| Table 2. Pomade Formula Modification Table with Various Comparisons of Pandan Leaf
| Essential Oil Concentrations |
|-----------------------------|
| Ingredients                  | Formula 1 (gr) | Formula 2 (gr) | Formula 3 (gr) |
| Pandan leaf essential oil    | 2.5            | 5              | 7.5            |
| Bees wax                    | 5              | 5              | 5              |
| Vaselin album               | 25             | 25             | 25             |
| BHT                         | 0.02           | 0.02           | 0.02           |
| Coconut oil ad              | 50 gr          | 50 gr          | 50 gr          |

Data analysis techniques conducted in this study aim to find out the exact formula of pomade
quality with pandan leaf essential oil including organoleptic test, favorite/hedonic test, evaluation of
the physical and chemical properties of pomade which refers to pomade quality requirements in SNI
06-3532-1994 which include homogeneity test, pH test, Freeze-Thaw test, and scatter power test. In
addition, a test of the ingredients of pandan leaf essential oil in pomade is a test of anti-fungal activity
with diffusion method in order to wells in niger aspergillus bacteria. Testing of antifungal activity is
carried out on pomade with the addition of pandan leaf essential oil with concentrations of 2.5%, 5%,
and 7.5%, and pomade without the addition of essential oil oil pandan leaves as negative control.

3. Results and Discussion

The manufacture of pomade from red ginger essential oil is done by optimizing the pomade base to
get the right pomade base so that the resulting pomade products are stable, the base of pomade used is
a type of oil based and not petrol based with a concentration of 34% of the total weight of pomade.
After obtaining the right pomade base then continued with the formula test by adding aromaic pandan
leaf essential oil with different concentrations of 2.5%, 5%, and 7.5%.

The organoleptic test used in this study is measuring pomade characteristics that include aroma,
color, texture, impression at the time of use, and impression after use. Data retrieval using
questionnaires. Panelists/respondents taken as many as 20 men in the ptbb major. The average
assessment of characteristics and fondness for pomade aromas was that at most about 47% of
respondents rated the aroma of pomade with a distinctive pandan leaf fragrance. This indicates that
the majority of respondents (47%) respondents strongly agree with pomade has a distinctive aroma of
pandan leaves and only a little about 8% agree with pomade does not have a distinctive aroma of
pandan leaves fragrant. The aroma of pomade with aromatic oil of pandan leaves is caused by the
essential oil of pandan leaves, which has a chemical compound 2-acetyl-1-pyrroline (ACPY) which is
also found in jasmin/jasmine plants, only that the concentration of ACPY in pandan fragrance is
higher than jasmin.
The average percentage of responses/ color characteristic scoring shows that the average percentage of respondents’ responses to the largest color is pomade with a dark green color of 52%. This indicates that most respondents strongly agree with the color of pomade with the essential oil of dark green pandan leaves. Furthermore, the second largest average is a bright green pomade color, quite affected by the color of pandan leaves that is as much as 20%. This indicates that as many as 20% of respondents who gave a highly agreeable assessment of the color of pomade are bright green.

As it is known that the chemical content of pandan leaves is alkaloids, saponins, flavonoids, polyphenols, tannins, and color substances [8]. Thus pandan leaf essential oil also contains a color substance that is green / chlorophyll color substance. The essential oil of pandan leaves produced from pandan leaf ethanol extract produces a brownish green color while extracts from hexane and ethyl acetate fractions produce a blackish green color. This green color appears because part of chlorophyll is extracted, and during the evaporation process it is damaged.

The average percentage of responses/ characterstic assessments of textures showed that the average percentage of respondents’ responses to the largest textures was that 45% of respondents strongly agreed with the pomade texture which was very soft and no granules, and there were 22% of respondents strongly agreeing with the pomade texture to feel soft and there were few grains. The rest are few (13%) respondents rated the pomade texture as not soft and lots of granules.

The average percentage of responses /impression assessments when using pomade shows that the average percentage of responses of the largest respondents is on soft and moist impressions which as much as 26% of respondents strongly agree with the soft and moist impression when using pomade. Furthermore, the average percentage of responses of the second respondent was a slippery impression of 25%. Furthermore, the average percentage of respondents’ response to the impression of not being hot is 23% respondents strongly agree with the impression of not being hot when using pomade. The average result of the percentage of respondents’ responses strongly agreed to the impression of soft, moist, slippery, and not hot when the usage is high enough so it can be concluded that most respondents can accept/like the impression when using pomade. Thus, the hope is that in addition to the respondents / wider scale such as the public can accept / like the impression when using pomade from the essential oil of pandan leaves fragrant

The average percentage of responses / impression assessments after pomade usage shows that on average the percentage of responses of the largest respondents there are two that are on a subtle impression of 90.56% and a moist impression that 90.00% of respondents strongly agree on the two impressions after the completion of pomade usage. Furthermore, the second most percentage of prescription responses is clean, fresh, not allergic, and not irritable. The average percentage of respondents’ responses to these four impressions was about the same as 86.25%, 87.50%, 87.78%, and 87.78% of respondents strongly agreed with the clean, fresh, non-allergic, and non-irritant impression after the use of pomade essential oil of fragrant pandan leaves

Homogeneity test is carried out by means of pomade samples applied on a piece of glass or other suitable transparent material, the preparation must show a homogeneous arrangement and no visible rough granules

Pomade Homogeneity Test Table with Pandan Leaf Essential Oil.

| Treatment Group            | Homogenity |
|----------------------------|------------|
| Formula 1 ( essential oil 2.5%) | Homogen    |
| Formula 1 ( essential oil 5%)   | Homogen    |
| Formula 1 ( essential oil 7.5%)  | Homogen    |
| Negative Control (without essential oil) | Homogen    |

PH testing is performed using measurements performed using a universal pH indicator. The pH measurements in this study are intended to determine the nature of the pomade's pre-existing whether the balance with the pH of the scalp irritates the skin. Normal skin ranges from pH 4.5–6.5. Meanwhile hair and oil on the human scalp (sebum) have a pH between 4.5 to 5.5.
### Table 4. Pomade pH Rate Test Table with Pandan Leaf Essential Oil

| Treatment Group                  | Homogenity |
|----------------------------------|------------|
| Formula 1 (essential oil 2.5%)   | Homogen    |
| Formula 1 (essential oil 5%)     | Homogen    |
| Formula 1 (essential oil 7.5%)   | Homogen    |
| Negative Control (without oil)   | Homogen    |

Based on the results of the pH test shows that all pomade formulas (Formula 1 - Formula 3) enter into the pH range of hair and oil on the scalp which is 5.5 between pH 4.5 - 5.5. In addition, the pH pomade of the three formulas also enters into the ideal pH range of Pomade's available between 4.5 – 6.5. Thus pomade with the addition of essential oil oil with concentrations of 2.5%, 5%, and 7.5% safe for use on hair.

4. Conclusion

The manufacture of pomade from essential oil of pandan leaves is fragrant with the base of pomade type oil based and not petrol based with a concentration of 34% of the total weight of pomade. Furthermore, formulas with the right base are added aromas of pandan leaf essential oil with different concentrations of 2.5%, 5%, and 7.5%. There are 47% of respondents strongly agree with pomade having the aroma of aromatic oils of fragrant pandan leaves. There are 52% of respondents strongly agree with the color of pomade with the essential oil of pandan leaves in dark green. There are 45% of respondents strongly agree with the very smooth pomade texture without any granules. 26% of respondents strongly agreed with the soft and moist impression of pomade use. Furthermore, the average percentage of responses of the second respondent was a slippery impression of 25%. Furthermore, the average percentage of respondents' response to the impression of not being hot is 23% respondents strongly agree with the impression of not being hot when using pomade. The average percentage of responses / impression assessments after pomade usage shows that on average the percentage of responses of the largest respondents there are two that are on a subtle impression of 90.56% and a moist impression that 90.00% of respondents strongly agree on the two impressions after the completion of pomade usage. Furthermore, the second most percentage of prescription responses is clean, fresh, not allergic, and not irritable. From the homogeneity test results can be seen in formula 1, formula 2, and formula 3 giving homogeneous results when applied to a piece of glass. Ph test results show that all pomade formulas (Formula 1 – Formula 3) enter the pH range of hair and oil on the scalp which is 5.5 between pH 4.5 -5.5. Pomade Formula 3 is the larger spread of formulas 1 and 2. the diameter of the slave zone of each pomade essential oil of pandan leaves fragrant formula 1 by 27 mm, formula 2 by 33 mm, and formula 3 by 34 mm. Pomade slave zone without aromatic pandan leaves essential oil (negative control) is 14 mm.

5. References

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