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Original Research Report

Chemical Composition and Acceptability of Organic Bath Soap among Students in Yaba College of Technology, Yaba, Lagos State, Nigeria

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Abstract: The study determined the chemical composition and acceptability of organic bath soap among students in Yaba College of Technology, Yaba, Lagos State, Nigeria. The study was guided by two research questions. Mixed method research design was used for the study. Population was 46 which comprised all Home Economics students from the Department of Vocational Education. In-home use questionnaire was used for data collection. The study produced two samples of turmeric bath soap. Findings showed that the chemical compositions of the turmeric soap samples are in accordance with the specifications of the Standard Organization of Nigeria (SON) with toilet soap specifications of pH ranging from 9 to 11, total fatty matter ranging from 60-75 gm and total free caustic soda ranging from 0.05 to 0.08 %. Findings showed that the sensory evaluation attributes for colour, smell, consistency foam ability and skin sensitivity were accepted after use for three months as the samples were skin friendly, safe to use without side effects. It was recommended that turmeric body soap and turmeric face gel can be produced in large quantities for commercial purpose as a form of income generation for unemployed graduates.

Keywords: Acceptability, Bath Soap, Chemicals, Organic, Students

1. Introduction

Use of cosmetics is an age long process practiced among various ethnic groups in Nigeria. Cosmetics is used to enhance body beauty as well as to ensure adequate skin care. Skin care is the practice of taking care of the skin. Kolawole (2021) described skin care as a hygienic routine that helps to ensure healthy skin. Olutegbe and Ajetumobi (2020) noted that women in ancient times in Nigeria used indigenous cosmetics to enhance and maintain their body beauty by using several cosmetics made from local materials. Indigenous skin care products such as aloe vera and black soap were used in treating skin conditions such as pimples and eczema (Siyaka, Joda, Yesufu & Akinleye, 2016). Modernization and the advert of technology brought about paradigm shift in the use of indigenous cosmetics resulting in increased use of conventional skin care products. Olutegbe and Ajetumobi (2020) defined skin care products as substances used by individuals for personal, health and cosmetics reasons. Skin care products are manufactured from different natural plant extracts (organic materials) and synthetic chemicals. Organic skin care products are manufactured from natural plant and animal extracts. Kolawole (2021) noted that organic skin care products are cosmetics that have at least 70% of natural plant extracts in its composition.

Skin care products include body cream for moisturizing the body, bath soap for ensuring a healthy skin, hair cream for maintaining hair and scalp, hand lotion for tenderizing the palm, face creams and face wash for ensuring acne-free and smooth facial looks. The focus of the study was bath soaps which can be available in liquid, gel and bar form. Bath soaps, also known as body soaps are skin care products formulated to clean the body. Bertin, Kedar and Masamba (2020) defined bath soaps as cleaning agents that have moisturizing properties. According to NCBI (2017) cited in Olutegbe and Ayetunmobi (2020), common organic products used in organic soap production include cocoa, argon oil, apple cider vinegar, bentonite clay, tumeric extracts, honey, aloe-vera, charcoal, coconut oil, jojoba oil, olive oil, among other essential oils. Wongthondee and Inprakhon (2013) noted that in organic soap making, the main ingredients are usually replaced with alkali salts of fatty acids derived from vegetable fats and oil. Also, synthetic colourants as well as preservatives such as butylated hydroxytoluene (BTH) are replaced with essential oils. Furthermore, Korac and Khambhlja (2014) reported that the yellow and gold colourants such as tartrazine can be replaced with several natural colour pigments such as carotenoids, curcumin and lutein which can be extracted from oil palm, turmeric and marigold flower. The present study produced organic bath soap from turmeric, honey, carrot and coconut oil.

Turmeric (Curcuma Longa) is a flowering plant belonging to the ginger family. Turmeric is commonly used as an additive for enhancing food colour. Wongthondee and Inprakhon (2013) noted that the dried powder of turmeric contains values ranging from 3 to 5 % of curcumin which provides high anti-oxidant, anti-inflamatory and anti-carcinogen properties. Kolawole (2021) noted that use of turmeric in skin care products help to slow down naturally the aging appearance, protect the skin against ultraviolent radiation and act as a natural healing agent for skin conditions such as eczema, acne, dry skin and psoriasis. The study also determined study also determined the chemical composition of the organic bath soap using chemical analysis to determine the pH, total fatty matter,

total free caustic soda, hydroquinone, zaconium and mercury content of the soap samples. The chemical composition of the soap samples were certified safe for use by the laboratory. Thereafter, samples of the bath soaps were given out to consented students for sensory evaluation.

Sensory evaluation is the scientific process used to measure and interpret people's responses to products as perceived by the senses of smell, sight, taste, feel and hearing (Sukeksi, Iriany & Vira, 2021). Sensory evaluation was used to measure the colour, smell, consistency, foam ability and skin sensitivity of the soap samples. Foam ability can be described as a dispersion system consisting of gas bubbles covered with a layer of liquid. Foam ability is one of the parameters that determines the quality of a good bath soap. One of the ingredients that functions in foam production in bath soaps is the triglycerides. Triglycerides with a saponification value require a greater amount of base to complete the saponification process. Coconut was used as the triglyceride for the study. Susanti et al. (2018) noted that coconut has a higher saponification value than palm oil and other fats. There are several studies on the production and chemical composition of soaps, creams and other skin care products. No study reviewed by the authors focused on the determination of chemical analysis and acceptability of organic bath soap made from turmeric, honey and carrot. The study filled this gap in literature.

1.1. Statement of Problem

Researchers in cosmetology, Home Economics and other stake holders are concerned about the long term effects of using synthetic skin care products. Harmful synthetic chemicals used in skin care production included zincite, cuprite, geothite, elemental silicon or talc hematite and heavy metals such as mercury and lead (Olutege & Ajetuobi, 2020). Presently in Nigerian markets, there are different skin care sets claimed to have different qualities such as body lightening, half-caste look, acne treatment, knuckle removers, Asian whitening look among others. Siyaka, et al. (2016) reported that the active ingredient in most whitening skin care product is hydroquinone (HQ) which is responsible for adverse skin reactions with features such as progressive darkening of the skin area to which the cream is applied. On the other hand, skin care products made from organic and natural ingredients are skin friendly without negative consequences on the skin. Hence, the need to produce organic bath soap from natural product (turmeric body soap and turmeric face gel).

1.2. Purpose of the Study

The general purpose of this research is to determine the chemical composition and acceptability of organic bath soap among students in Yaba College of Technology, Yaba, Lagos State, Nigeria.. Specific purpose is to:

(a) Produce two samples of organic bath soap which included turmeric face gel (TFG) and turmeric body soap (TBS).
(b) Determine the chemical composition (pH, Total Tatty Matter, Total Free Caustic Soda, Hydroquinone, Zaconium and Mercury) and safety of TFG and TBS.
(c) Determine the sensory evaluation (colour, smell, consistency, skin sensitivity and foam

ability) as well as the acceptability of TBS and TFG.

1.3. Research Questions

The following research questions guided the study:

(a) What are the chemical composition (pH, Total Tatty Matter, Total Free Caustic Soda, Hydroquinone, Zaconium and Mercury) and safety of TFG and TBS?

(b) What are the sensory evaluation (colour, smell, consistency, skin sensitivity and foam ability) as well as the acceptability of TBS and TFG?

2. Materials and Methods

1.1. Design for the Study

The study adopted mixed method research design. Specifically, laboratory tests were used to determine the chemical composition of the soap samples while in-home use questionnaire was used to determine the sensory evaluation of the soap samples.

2.1.1. Ethics Statement

Approval was sought from School of Technical Education (STE) Research Committee, Yaba College of Technology, before conducting the study among STE students. Also, Informed consent was obtained from the STE students before participation in the study. The soap samples were certified safe for use by the cosmetology laboratory before its use by students.

2.2. Area of the Study

The study was carried out in Epe Local Government Area of Lagos State. Epe is an urban area located on the northern part of Lekki lagoon in Lagos State. Epe was chosen for the study because of proximity for the researchers and also because there are several tertiary institutions with students who use organic skin care products.

2.3. Population and Sample

The population of the study was 46 which comprised of all Home Economics students from the Department of Vocational Education, School of Technical Education, Yaba College of Technology, Yaba, Lagos State, Nigeria. There was no sample since the population was manageable size.

2.4. Instrument for Data Collection and Study Procedure

In-home use questionnaire was the instrument used for data collection. The questionnaire was adapted from the hedonic scale developed by Peryam and Girardot (2013) cited in Sukeksi, Iriany and Vira, (2021). The sensory evaluation attributes (colour, smell, consistency, foam ability and general acceptability) of the processed samples were collected using 9-point hedonic scale. The 9-point hedonic scale had values ranging from 9 (like extremely) as 9 point, to (dislike extremely) as 1 point. The 9-point hedonic scale was validated by three lecturers from Hospitality Management Department, Yabal College of Technology, Yaba, Lagos State.

2.4.1. Sources of Materials

Materials and ingredients needed for making the turmeric face gel included: 1 cup soda ash light, 1/4 cup texapon, 1/2 cup caustic soda, 2 tablespoons fragrance, 2 tablespoon extracted turmeric

colourant, sea salt, 1/4 ml Kojik dip, 10 ml Vitamin E, 5 ml Glycerine, 1/2 cup SLS (Sodium Lauryl Sulphate), 10 ml Fragrance and 10 ltrs of water. All material and ingredients were purchased from Ojota Chemical Market, Lagos State

2.4.2. Sample Preparation

The study adapted the liquid body wash procedure developed by Ashish, Rehana, Rajanee, Ahuradha and Niranjan (2018). The steps are: In a bowl add in the sea salt and rinse out with water pour the water leaving the salt. Add the texapon and mix until the salt dissolves. Dissolve soda ash light with 1 liter of water and add to the mixture. Dissolve SLS with 1liter of water and add to the mixture, add the kojik dip, Add glycerine and vitamin E, add the turmeric extracts and fragrance. Let the mixture rest and package until ready to use.

For making the turmeric body soap, cold soap-making procedure developed by Faiola (2016) was adapted. The procedure included: Get all equipment, safety wears, ingredients and sundries ready, line all molds and place them aside. The ingredients were all weighed and kept aside. Sodium hydroxide was dipped in water and stirred until there was no more gritty feeling at the bottom of the mixing bowl. This shows that the sodium hydroxide has dissolved completely. In a sauce pan, add the shea butter, oils and waxes and place on heat until all the solids melt. Pour a small amount of the dissolve sodium hydroxide in to the melted oils. If there is no reaction, such as the oils trying to fizz and react to the solution, carry on carefully in pouring the solution into the melted oils. Stir the oils and solution together until they form a light trace (still runny). Allow the mixture to cool to around 100-110°F (38-43°C). Add essential oils, turmeric colourants and stir until well combined. Pour the soap batter into molds, gently tapping to remove air bubbles. Cover the molds and place them in a cool, undisturbed location to allow the soap to harden and cure, usually for 4-6 weeks. Once the soap has fully cured, it is ready to be packaged. Store the packaged soap in a cool, dry place away from direct sunlight.

2.4.3. Sample Formulation

Sample A: Turmeric Face Gel (TFG)

Sample B: Turmeric Body Soap (TBS)

2.4.4. Chemical Analysis procedure

The laboratory test were carried out to determine the soap content of pH, total fatty matter, total free caustic soda, hydroquinone, zirconium and mercury. The soap pH was determined using the pH test strips. Total fatty matter of the soap samples were determined using standard volumetric potassium hydroxide solution through evaporation. Total free caustic soda was determined using sanponification value test. Hydroquinone value was determine using spectrophotometer. Zarconium content was ascertained using gravimetric determination of percentage while Mercury content was determined using cold vapour atomic fluorescence spectrometry.

2.4.5. Sensory Evaluation Procedure / In Home Use-Test

In-home use test was conducted using the 9-point hedonic scale. The respondents were given 1000 ml of the turmeric face gel and 375 gm of the turmeric body soap each to use for 3 months and record their observations in the in-home use questionnaire. The parameter evaluated included:

Colour: The colour of the samples were checked visually. Smell: The samples were evaluated for odour by smelling it. Consistency: It was determined manually during usage. Foam ability was observed physically by applying the product on the hand and observed under running water and also while using it to bath to determine if it foams quickly and if the foam go down slowly or quickly.

2.5. Data Collection Technique

The respondents were given 1000 ml of the turmeric face gel and 375 gm of the turmeric body soap each to use for 3 months and record their observations in the in-home use questionnaire.

2.6. Data Analysis Technique

Data obtained were analysed using mean and standard deviation. For the decision rule, since the hedonic scale was a 9-point scale, mean values of 4.50 and above were accepted while mean values below 4.44 were rejected.

3. Results and Discussion

Research Question 1: What are the chemical composition (pH, Total Fatty Matter, Hydroquinone, Zaconium and Mercury) and safety of TFG and TBS?

Table 1: Chemical Composition of the Soap Samples

Chemical Parameters	Turmeric Face Gel (TFG)	Turmeric Body Soap TBS)
pH	9.0	9.5
TFM (gm)	61	68
TFCS (%)	0.05	0.06
Hydroquinon	Not Detected	Not Detected
Zaconium	Absent	Absent
Mercury	Absent	Absent
Remark on Safety: Soap samples are safe for usage in bathing		

Key: TFM = Total Fatty Matter, TFCS = Total Free Caustic Soda

Table 1 contains the chemical composition of the two bath soap samples. From the analysis, TFG contains pH of 9.0 while TBS contains pH of 9.5; For total fatty matter, 61 gm was detected in TFG while TBS contains 68 gm. For total free caustic soda, TFG contains 0.05 % while TBS contains 0.06 %. Hydroquinon was not detected in the two samples; Zaconium was absent in the two bath soap samples and mercury was also absent in the two bath soap samples.

Research Question 2: What are the sensory evaluation (colour, smell, consistency, foam ability and skin sensitivity) as well as the acceptability of TBS and TFG?

Table 2: Mean and Standard Deviation Responses on the Sensory Evaluation Colour, Smell, Consistency and Foam ability of TBS and TFG

Sensory Parameter		TBS Mean ± SD	TFG Mean ± SD
Colour:	Brightly Coloured	7.64 ± 0.73	7.42 ± 0.89
	Dark	0.12 ± 0.21	0.82 ± 0.66
	Opaque	0.08 ± 0.51	0.42 ± 0.53
	Brown	0.46 ± 0.77	1.69 ± 0.51
	Black	0.00 ± 0.00	0.00 ± 0.00
	Greenish	0.00 ± 0.00	0.00 ± 0.00
	Dull	1.04 ± 0.31	0.42 ± 0.02
	Milky	1.22 ± 0.48	0.00 ± 0.00
Smell:	Fruity	6.38 ± 0.71	6.54 ± 0.55
	Citrus	6.11 ± 0.55	7.97 ± 0.40
	Choking	0.00 ± 0.00	0.00 ± 0.00
	Minty	0.50 ± 0.12	0.16 ± 0.11
	Fresh	8.66 ± 0.75	8.62 ± 0.62
	Earthy	0.11 ± 0.22	0.51 ± 0.24
Consistency:			
	Smooth	7.72 ± 1.01	7.81 ± 0.71
	Gel-like	0.00 ± 0.00	7.91 ± 0.63
	Hard	7.94 ± 1.01	0.00 ± 0.00
	Coarse with rough particles	0.00 ± 0.00	0.00 ± 0.00
	Soft	0.00 ± 0.00	7.96 ± 0.25
	Oily	0.08 ± 0.13	0.78 ± 0.11
	Spreads easily	0.06 ± 0.04	0.09 ± 0.04
	Watery	0.00 ± 0.00	0.01 ± 0.03
Foam Ability:			
	Foams easily in water	7.88 ± 1.01	7.91 ± 0.96
	Do not foam in water	0.00 ± 0.00	0.00 ± 0.00
	Forms scum (milky water)	0.00 ± 0.00	0.00 ± 0.00
	Foam goes down quickly	1.02 ± 0.06	0.34 ± 0.11
	Foam go down slowly	8.72 ± 0.61	8.88 ± 0.55
General Acceptability		8.92 ± 0.84	8.97 ± 0.44

Key: SD= Standard Deviation, TBS = Turmeric Body Soap, TFG = Turmeric Face gel

Analysis in Table 2 contains the mean and standard deviation responses of the sensory evaluation (colour, smell, consistency, foam ability and general acceptability) of the two soap samples. From the analysis, the two samples were rated different attributes for colour, smell, consistency, foam ability and general acceptability. The highest rated attribute for colour was "brightly coloured" with mean value of 7.64 for TBS and 7.42 for TFG. For smell, the highest rated attribute was "fruity" with mean 6.38 for TBS and 6.54 for TFG; followed by "citrus" with mean values of 6.11 for TBS and 6.97 for TFG, then followed by "fresh smell" with mean values of 8.66 for TBS and 8.62 for TFG. For consistency, the highest rated attribute for both was "smooth" with mean value of 7.72 for TBS and 7.81 for TFG. TBS was rated as "hard" with mean value of 7.94 while TFG was rated as "gel-like" and "soft" with values of 7.91 and 7.96 respectively. For "foam ability", the attribute rated highest was "foams easily in water" with mean values of 7.88 for TBS and 7.91 for TFG, followed by "foam go down slowly" with mean values of 8.72 for TBS and 8.88 for TFG. For general acceptability, the panelists rated high values for both samples with mean values of 8.92 for TBS and 8.97 for TFG.

Table 3: Mean and Standard Deviation Responses on the Sensory Evaluation (Skin Sensitivity) of TBS and TFG

S/N	Skin Sensitivity Parameters	TBS Mean ± SD	TFG Mean ± SD
The soap sample resulted in:			
1.	Skin dryness	1.07 ± 0.41	1.48 ± 0.32
2.	Sunburn on the face and skin	0.42 ± 0.56	0.22 ± 0.40
3.	Burning sensation on the skin	0.00 ± 0.00	0.00 ± 0.00
4.	Ringworm on the face and body	0.12 ± 0.20	0.31 ± 0.21
5.	Skin irritation	0.00 ± 0.00	0.00 ± 0.00
6.	Itchiness of the skin	0.02 ± 0.01	0.00 ± 0.00
7.	Dark knuckles on fingers and toes	0.03 ± 0.02	0.00 ± 0.00
8.	Patches and eczema on the skin	0.00 ± 0.00	0.00 ± 0.00
9.	Soft and supple skin	7.87 ± 0.41	8.76 ± 0.13
10.	Skin discolouration	0.01 ± 0.04	0.00 ± 0.00

Findings in Table 3 contains the mean and standard deviation responses on the sensory evaluation (skin sensitivity) of the two soap samples. From the analysis, all but one of the skin sensitivity parameters tested had low mean values ranging from 0.00 to 1.48 indicating that the soap samples did not negatively affect the respondents in terms of skin sensitivity. On the other hand, item 9 was rated high with mean values of 7.87 for TBS and 8.76 for TFG which implies that the respondents had soft and supple skin after using the soap samples.

3.4. Discussion of Finding

Findings of the study on the chemical composition of the two bath soap samples indicated that TFG contains pH of 9.0 while TBS contains pH of 9.5. For total fatty matter, 61 gm was detected in TFG while TBS contains 68 gm. For total free caustic soda, TFG contains 0.05 % while TBS contains 0.06 %. Hydroquinon was not detected in the two samples; Zaconium was absent in the two bath soap samples and mercury was also absent in the two bath soap samples. The chemical compositions of the turmeric soap samples are in accordance with the specifications of the Standard Organization of Nigeria (SON), by the Nigeria Industrial Standard (2006) NIS 004, with toilet soap specifications of pH ranging from 9 to 11, total fatty matter ranging from 60 - 75 gm and total free caustic soda ranging from 0.05 to 0.08 %. The turmeric bath soap and face gel pH values of 9.0 - 9.5 indicated that soap has a good pH implying that the soap is neutral and not acidic and also safe for usage as confirmed by the laboratory results. The pH level obtained by the study was higher than the percentage reported by Solanki, Suraj, Shrikrushna, Briyariu, Quazi and Chittle (2020) in a study on formulation development and evaluation of instant whitening face wash which recorded pH levels ranging from 6.00 to 6.45 for the different samples of the face wash. Also, Asish, Rehana, Rajanee, Ahuradha and Niranjan (2018) reported pH of 7.66 in a study on formulation and analysis of herbal face wash using *Luffia Cylinderia s*eed oil extract as a soap base. Also in agreement with the findings, Tarun, Susan, Suria, Susan, Criton (2014) studied the pH of 64 types of bar soap and found that 53 samples had a pH in the mean range of 9.01 to 10.7.

Findings in Table 2 revealed that the highest rated attribute for colour was “brightly coloured” with mean value of 7.64 for TBS and 7.42 for TFG. For smell, the highest rated attribute was “fruity” with mean values of 6.38 for TBS and 6.54 for TFG; followed by “citrus” with mean values of 6.11 for TBS and 6.97 for TFG, then followed by “fresh smell” with mean values of 8.66 for TBS and 8.62 for TFG. For consistency, the highest rated attribute for both was “smooth” with mean value of 7.72 for TBS and 7.81 for TFG. TBS was rated as “hard” with mean value of 7.94 while TFG was rated as “gel-like” and ”soft” with values of 7.91 and 7.96 respectively. For “foam ability”, the attribute rated highest was “foams easily in water” with mean values of 7.88 for TBS and 7.91 for TFG, followed by “foam go down slowly” with mean values of 8.72 for TBS and 8.88 for TFG. For general acceptability, the panelists rated high values for both samples with mean values of 8.92 for TBS and 8.97 for TFG.

The “bright colour” rated for the soap samples could be attributed to the bright colour of turmeric. The high foaming ability of the soap samples indicates that it has high cleaning capacity. Susanti, et al (2018) noted that a greater foam stability would increase the cleaning capacity of the soap. In agreement with the findings, Bertin, Kedar and Masamba (2020) in a study on quality improvement of soaps perfumed with some selected essential oil reported the mean values of “colour” ranging from 6.1 to 7.2; smell ranging from 6.0 to 7.3; hardness ranging from 6.3 to 7.5 and foam ability ranging from 6.2 to 9.0. The high acceptability value of the two soap samples indicates that the respondents agreed that turmeric bath soap and face gel is acceptable in terms of colour, smell, consistency and foam ability.

Findings in Table 3 showed that all but one of the skin sensitivity parameters tested had low mean values ranging from 0.00 to 1.48 indicating that the soap samples did not negatively affect the respondents in terms of skin sensitivity. On the other hand, one item was rated high with mean values of 7.87 for TBS and 8.76 for TFG which implies that the respondents had soft and supple skin after using the soap samples. In agreement with the finding, Yadav, Maury, Yadav, Kumar and Manish (2021) found out in their study on formulation and development of face wash that the four samples of face wash produced has no skin irritation after application on skin. Implications of the study is to create awareness on the use of organic turmeric bath soaps since the respondents rated the products with high acceptability. This also implies that mass production of the soap samples can be produced and use as a source of revenue for unemployed graduates. The study was limited to students in STE as a result of high cost of producing larger amount of bath soaps for more population size. Getting students willing to participate in the study was also a major limitation. The suggestions for further studies include the determination and acceptability of bath soaps / face gels, produced from other organic essential oils such as coconut oil, carrot oil, avocado oils and neem oil.

4. Conclusion

Based on the findings of the study, it can be concluded that the study produced two samples of turmeric bath soap. Findings showed that the chemical compositions of the turmeric soap samples are in accordance with the specifications of the Standard Organization of Nigeria (SON) with toilet soap specifications of pH ranging from 9 to 11, total fatty matter ranging from 60 - 75 gm and total free caustic soda ranging from 0.05 to 0.08 %. Findings showed that the highest rated sensory evaluation attributes for colour was “brightly coloured”, smell was “fruity”, “citrus” and “fresh smell”. For consistency, the highest rated attribute for both was “smooth”. For “foam ability”, the highest rated was “foams easily in water” fand “foam go down slowly”. All the skin sensitivity parameters tested had low mean values indicating that the soap samples did not negatively affect the respondents in terms of skin sensitivity. The organic turmeric face gel and turmeric body soap was rated as accepted after use for a period of three months as the samples were skin friendly, safe to use without side effects. Based on the findings of the study, it was recommended that turmeric body soap and turmeric face gel can be produced in large quantities for commercial purpose as a form of income generation for unemployed graduates. People should be sensitized on the health benefits of using organic skin care products since the product developed was skin friendly. Also, awareness should be created by government at different levels on the harmful effects of using skin lightening products.

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Conflict of Interest

The authors declare that there is no clash of interest

Author Contributions

Conceptualization: NOA
Formal Analysis: NOA, JSS, ROD, FM
Funding Acquisition: NOA, JSS, ROD, FM
Investigation: NOA, FM, ROD, JSS
Methodology: NOA, JSS, FM, ROD
Writing original draft, review and editing: NOA, JSS, ROD, FM

Data Availability Statement

The original contributions presented in the study are included in the article. Further enquiries can be directed to the correspondence author.

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References

Asish, V., Rehana, S., Rajanee, T., Ahuradha, C. & Niranjan, C. (2018). Formulation and Analysis of Herbal Face Wash using Luffia Cylinderia Seeds oil extract as a soap base. *American Journal of PharmTech Research, 8*(4), 247-252.

Bertin, M., Kedar, T. & Masamba, D. (2020). Quality Improvement of Soaps Perfumed with some selected essential oil. *Journal of Scientific and Innovative Research, 9*(1), 11-16.

Faiola, A. (2016). *Pure Soap Making: How to Create Nourishing, Natural Skin Care Soaps*. Storey Publishing.

Kolawole, Y. F. (2021). Environmental and Health Impact of Organic Skin Care Products in Nigeria. https://www.academia.edu/84318

Korac, R. R. & Khambhlja, K. M. (2014). Potentials of Herbs in Skin Protection from Ultra-Violent Radiations. *Pharmacogen Reviews*, 5, 164-173

Nigeria Industrial Standard (NIS). NIS 004 (2006). Federal Ministry of Industries. Standard Organization of Nigeria (SON), Standards for Toilet Soap 004, 1-13

Olutegbe, W. S. & Ayetunmobi, A. (2020). Determinants of Acceptability and Use of Indigenous Cosmetics among Patrons in Ibadan Metropolis, Nigeria: Implication for Rural development. *International Journal of Social Sciences and Perspectives, 7*(2), 89-98

Siyaka, L., Joda, A. E., Yesufu, H. B. & Akinlele, M. O. (2016). Determination of Hydroquinone content in Skin Lightening Creams in Lagos. *The Pharm Innovation Journal, 5*(9), 101-105

Solanki, D., Suraj, D. S., Shrikrushna, S. U., Briyariu, K. R., Quazi, B. & Chittle, M. (2020). Formulation Development and Evaluation of Instant Whitening Face Wash. *World Journal of Pharmaceutical Research, 9*(5), 2541-2556

Sukeksi, L., Iriany, G., & Vira, G. (2021). Characterization of the Chemical and Physical made with Different Concentrations of Bentonite as a filler. *International Journal of Technology, 12(*2), 263-274

Susanti, A. D., Saputro, S., & Wibowo, W. A. (2018). Optimization of Cow's Milk Processing into Milk Soap Bar on Small-Medium-Micro Enterprises (UMKM). *Journal of Chemical Engineering Equilibrium*, *2*(2), 53–57

Tarun, J., Susan, J., Suria, J., Susan, V. J., & Criton, S., (2014). Evaluation of pH of Bathing Soaps and Shampoos for Skin and Hair Care. *Indian Journal of Dermatology, 59*(5), 442–444

Wongthondee, N & Inprakhon, P. (2013). Stability of using Turmeric Constituents in Natural Soap. *Asian Science Journal, 39*, 477-485

Yadav, N., Maury, S., Yadav, P., Kumar, M. Y. & Manish, M. K (2021). A review on Formulation and Development of Face wash. *Journal of Emerging Technology and Innovative Research*, *8*(6), 410-417.

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