

Okra (*Abelmoschus Esculentus*) As an Organic Hair Conditioner

DOI: 10.5281/zenodo.15291100

Camela Rose E. Cabahug

Bohol Island State University, Tagbilaran City, Bohol
camelarose.cabahug@bisu.edu.ph

Ruvic Joy S. Bajinting

Bohol Island State University, Tagbilaran City, Bohol
ruvicjoy.bajinting@bisu.edu.ph

Vinesse Becca J. Lasconia

Bohol Island State University, Tagbilaran City, Bohol
vinessebecca.lasconia@bisu.edu.ph

Abstract

This study explores the acceptability of Okra (*Abelmoschus esculentus*) as an organic hair conditioner of different hair types, which was conducted in Carmen municipality, Bohol. The study particularly seeks to assess the product based on its contents, price, preparation method, storage life, and effectiveness. Two treatment options were used: Treatment 0 (pure Okra extract) and Treatment 1 (Okra extract with honey). The experimental setup was a one-week application duration, with evaluations targeting sensory characteristics, such as appearance, scent, viscosity, and overall efficacy. Findings show that both treatments were rated very high, with Treatment 1 showing better performance in scent and efficacy than Treatment 0. The addition of honey greatly improved the product's viscosity, scent, and stability, leading to a longer shelf life. Statistical evaluation indicated improvements in fragrance and effectiveness for Treatment 1, confirming the humectant and natural preservative action of honey. Both treatments had acceptable appearance and viscosity, with Treatment 1 having higher sensory acceptability ratings. The results confirm the potential of Okra-based hair conditioners, with honey inclusion enhancing the functional and sensory characteristics of the formulation. This research identifies the viability of Okra and honey as potent, cost-effective, and environmentally friendly options in the organic hair care industry.

Keywords: Okra, Organic, Hair Conditioner, Appearance, Fragrance, Viscosity, Effectiveness.

Introduction

Hair is normally regarded as a major part of personal identity and self-expression among different cultures. Its look has been linked with youth, attractiveness, and strength for centuries, affecting how one feels about him or herself as well as being perceived by other people (Hollerman, 2018). But most conventional hair care products available contain chemicals that, in the long run, can hurt the hair and scalp, causing long-term health concerns for hair (Skin, 2013). Due to these concerns, there has been an increased global trend towards natural and organic products in personal care and beauty products. Shoppers are becoming more desirous of healthier, greener, and more effective alternatives to maintain healthy hair, and this is driving interest in organic hair products.

Among such organic ingredients that have recently come under the spotlight for their reported benefits is Okra (*Abelmoschus esculentus*). A tropical fruit, also known as a vegetable, originally found in tropical climates, has been identified for its nutritious composition of vitamins A, B, C, and E, plus biotin, iron, and calcium. These nutrients are used to support healthy hair growth, enhance the texture of the hair, and replace the lost nutrients commonly shed from damaged or dry hair (Sirot Naturals, 2022). As an organic option, Okra provides a viable solution for individuals who do not want to use chemical-based hair care products. Its application in beauty products, like hair conditioners, is of growing interest globally, with people seeking affordable and sustainable solutions that are effective too.

Locally, however, communities in areas like Bohol, Philippines, are starting to investigate the incorporation of locally available, sustainable ingredients in beauty products. This research, in Carmen Bohol municipality, intends to assess Okra as a natural hair conditioner. Through the integration of Okra in indigenous hair care products, this study complies with the growing concern in using indigenous and natural sources in the production of safe and effective cosmetics. In addition, the research will test the acceptability of Okra as a hair conditioner for various hair types and add to the existing knowledge on alternative and natural beauty solutions within the local setting.

The primary objective of this study is to find out the acceptability of Okra (*Abelmoschus esculentus*) as an all-hair type organic hair conditioner based on its efficacy and consumers' preference towards two treatments: Treatment 0 (Okra alone) and Treatment 1 (Okra with honey). The research seeks to evaluate the important characteristics like appearance, odor, viscosity, and general effectiveness to determine the suitability of Okra as an organic and

environmentally friendly hair care product. The research will also investigate the Okra hair conditioning profile, including ingredients, price, equipment, and procedures used in producing it, offering useful information for people looking to prepare and utilize natural alternatives for hair care. Okra hair conditioner shelf-life will also be investigated in order to determine the viability and sustainability of the formulations. Finally, the research aims to determine any significant difference in the acceptability of the two treatments to enable a comparison of their performance and provide insight into the most preferred formulation by consumers, thus facilitating the improvement of Okra-based organic hair care products in future products.

Literature Review

Natural hair care has increasingly attracted attention over the past few years as people become increasingly sensitive to the potential risks posed by synthetic chemicals found in most commercial beauty products. Organic hair care products are manufactured using natural substances that do not contain toxic chemicals like parabens, sulfates, and phthalates, which have been associated with a host of health issues (Horrigan, Lawrence, & Walker, 2002). With increasing knowledge of the ecological effects of synthetic chemicals, more and more individuals are seeking organic alternatives to use on their hair. Organic hair care products have a reputation for being able to condition the hair and scalp without long-term damage or irritation, which makes them especially good for those with sensitive skin or those who wish to reduce their contact with potentially harmful chemicals (Kim, Kim, & Lee, 2020). Through the utilization of naturally derived ingredients grown without the use of pesticides, organic hair care promotes sustainable agriculture and environmental protection.

The theory of Diffusion of Innovation, as presented by Everett Rogers (1962), attempts to describe how, why, and at what rate new technologies and ideas are disseminated across a social system. This theory is paramount in comprehending the process of adopting innovative products and services. It assists marketers to forecast the speed at which a product will be adopted by customers, taking into account variables such as the profile of possible adopters and willingness to adopt new products. The applicability of this theory in the current research is the establishment and possible adoption of Okra (*Abelmoschus esculentus*) as an organic hair conditioner. The innovation process of a hair care product follows the diffusion principles, as the adoption of Okra as a natural substitute relies on perceived advantages and consumers' willingness to experiment.

Stanley Coopersmith's (1967) work on self-esteem assumes that a person's self-esteem is formed early in life and is influenced by experiences, particularly those related to love and security. This self-esteem foundation carries long-term consequences through into adulthood. Coopersmith's work is especially applicable when one considers how one perceives their looks, including hair health, which has a huge bearing on self-esteem. It has been found that hair is a critical component of personal identity and self-image (BC, 2022), with 88% of women reporting that their hair is closely linked to their confidence. Therefore, the role of hair health in self-esteem is a primary driver for consumers to look for good hair care products, and this is why there is a demand for organic alternatives such as Okra-based conditioners.

Hair conditioning products cannot be underscored enough when it comes to ensuring healthy hair. Hair conditioners, which are used after shampooing, moisturize, restore, and enhance the hair texture, especially for those with dry or damaged hair. These products differ in form, such as rinse-out, leave-in, and spray forms, serving various hair care requirements (Skin, 2013). Such increasing demand for efficient and natural hair care is complemented by the Philippine Constitution, Article XIV, Section 10, that encourages the utilization of technology and innovation for national benefit (The 1987 Philippine Constitution). Promotion of such new practices promotes the emergence of sustainable, locally produced substitutes like Okra for use in cosmetics.

Okra, a highly nutritious vegetable with vitamins A, C, and K, has come under focus due to its potential hair benefits. According to studies, Okra's rich content of vitamins and minerals like calcium, potassium, and antioxidants nourishes hair growth, hydrates the scalp, and helps treat dandruff (Siddiqui, 2018). Okra mucilage is especially useful in hair conditioning because it is rich in moisturizing properties, rendering it a cost-effective, natural option to chemically based hair products. Mane, Manthen, and Mhamane (2019) discovered that the rich nutritional value of Okra mucilage, comprising essential vitamins such as A and C, has considerable positive effects on hair health. The research also points out the strength of Okra as a protein and carbohydrate source that adds volume and shine to the hair.

Honey, with its humectant content, also boosts the Okra-based conditioner. Being a natural moisturizer, honey seals moisture into the hair, making it softer and easier to manage. As said by Hadi, Omar, and Awadh (2016), honey's composition that contains glucose, fructose, and phenolic compounds not only nourishes the skin but also gives vital hair care advantages. Its capacity to soften the hair and make it comb-smooth also provides more reasons for it to be used in hair conditioners. This blend of Okra and honey is viewed as a potential natural remedy for healthy hair, providing a chemical-free option for customers looking for quality organic hair care products.

Demand for organic hair care is further fueled by the rising consumer interest in green, cruelty-free products. With

increasingly responsible consumers growing more aware of the ethical footprint of their buys, organic hair care products prioritizing environmentally friendly packaging and cruelty-free formula are becoming popular (Gokhale & Parmar, 2016). Plant-based hair care products composed of oils, herbs, and natural extracts have been shown to be dense in vitamins, antioxidants, and essential fatty acids helpful in preserving the health of the hair (Bremmer, 2021). Such products tend to target specific hair problems like dryness, frizz, and heat or chemical damage, providing a more complete and gentle approach towards hair care. In this regard, Okra with its highly nutritious profile stands as an ideal candidate for use in organic hair care products, offering a natural, yet effective, alternative to chemical hair care products. Furthermore, the growing recognition of the importance of self-esteem and personal well-being has increased the desire for effective and natural products. A staggering 88% of women report that their hair is directly linked to their self-confidence (Hollerman, 2018), which highlights the significant role of hair health in overall personal image. Since individuals are looking for safer, environment-friendly alternatives to chemical-based products, Okra as an organic hair conditioner becomes a desirable option that meets ethical as well as personal health requirements.

Statement of the problem

This study aims to determine the Acceptability of Okra (*Abelmoschus Esculentus*) as an Organic Hair Conditioner for all hair types. The study was conducted at the municipality of Carmen and Catigbian, Bohol.

Specifically, this study sought to answer the following questions:

1. What is the description of Okra (*Abelmoschus Esculentus*) as an Organic Hair Conditioner in terms of:
 - 1.1 Ingredients and Cost;
 - 1.2 Tools and Equipment;
 - 1.3 Process;
 - 1.4 Shelf-life; and
 - 1.5 Effectivity
2. What is the acceptability level of Okra (*Abelmoschus Esculentus*) as an Organic Hair Conditioner in the two treatments in terms of:
 - 2.1 Appearance;
 - 2.2 Fragrance;
 - 2.3 Viscosity; and 2.4 Effectiveness?
3. Is there a significant difference in the acceptability level of Okra (*Abelmoschus Esculentus*) as an Organic Hair Conditioner in the two treatments in terms of:
 - 3.1 Appearance;
 - 3.2 Fragrance;
 - 3.3 Viscosity; and
 - 3.4 Effectiveness?

Methodology

This section presents research design, locale, materials, process, research instrument, participants, statistical tool, and ethical considerations of the study.

Research Design

This study utilized an experimental design supplemented with a modified descriptive survey to assess the acceptability of Okra (*Abelmoschus esculentus*) as an organic hair conditioner. The experimental design allowed for an in-depth evaluation of the product's sensory and functional characteristics, including appearance, fragrance, viscosity, and effectiveness. Two treatment variants were tested: Treatment 0, consisting of pure okra extract, and Treatment 1, a blend of okra extract and honey. Both products were used by participants for a period of one week, making it possible for the researchers to observe and examine their effects under controlled conditions.

Research Locale

The study was carried out in the Carmen municipality, Bohol, where the participants were accustomed to organic and traditional remedies. The location was selected considering its accessibility, the willingness of the community to participate, and the applicability of the local context to the research goals. This guaranteed that participants would offer meaningful feedback on the basis of their experience with natural hair care solutions.

Materials and Process

The breakdown of composition and cost of the two treatments (T0 and T1) is as follows: Treatment 0 (T0) is composed of 500 grams of okra, 6 drops of essential oil, 1419 ml of water, and one storage bottle with a total cost of 605.00 pesos.

Conversely, Treatment 1 (T1) has the same amounts of okra, essential oil, and water as T0, but with an added 8 tablespoons of honey. The addition of honey increases the overall cost to 885.00 pesos. Fresh okra is used in both treatments, and this is the main active ingredient, while the essential oil is used to counteract the natural smell of okra. The cost of packaging, which is one bottle per treatment, is the same in both products at 450.00 pesos. The extra cost of honey in Treatment 1 is for its envisaged role in improving the moisturizer and the general efficacy of the hair conditioner.

Preparatory Phase

Collection: Collect all the ingredients and materials.

Cleaning: Rinse fresh okra under clean running water.

Cutting: Take young okra, as it has more nutrients than aged ones, and chop it into small pieces.

Boiling: Boil 6 cups of water in a saucepan or a pot, then add the okra. Keep the heat at a medium level and let it simmer for 15-20 minutes, stirring from time to time.

Cooling: Remove the pot from the heat and allow the mixture to cool. Store it in a mason jar for one day to allow the ingredients to blend.

Straining: Use a strainer cloth to separate the okra seeds from the mucus-y slime.

Refining: Strain the mixture a second time to ensure there are no remaining seeds, achieving a smooth texture.

Essential Oil: Add 3 drops of essential oil to cover up the okra's natural smell.

Treatment 0 (Okra Only)

1. Prepare the needed materials and ingredients.
2. Wash the pieces of okra thoroughly with water.
3. Use young pieces of okra and cut them into small pieces. Young okra has a lot of certified nutrients than the old ones.
4. Boil 6 cups of water in a pot/saucepan and add the okra. Boil at medium heat.
5. Let it simmer for about 15-20 minutes while stirring occasionally.
6. Remove from heat and cool. store in a mason jar for one day so that everything can blend well.
7. Use a strainer cloth to separate the okra seeds from the mucus-y slime.
8. Strain once more to make sure that there are no leftover seeds and to achieve a good texture.
9. Add 3 drops of essential oil to mask the okra smell.

Procedure of Treatment 1 (Okra with Honey)

1. Repeat the treatment 0 process.
2. Add the honey into the mixture. Pour into the bottle or in an airtight container and refrigerate at room temperature to preserve.
3. Shake well before use.

Research Instrument

Two main instruments were employed in this study. The first was a modified descriptive survey questionnaire with a 4-Point Hedonic Scale to measure the sensory characteristics of the product, including appearance, odor, and viscosity. This instrument enabled participants to evaluate the sensory characteristics of the conditioners in a structured way. The second tool was an observation form the researchers used to objectively assess the efficacy of the conditioner by observing changes in hair texture, manageability, dryness, and general appearance before and following the treatment. These tools were pre-tested for clarity and usability before administration.

Research Participants

Thirty participants were purposively sampled to ensure that they were willing to participate, had not used chemical hair products in the past few weeks, and were available throughout the treatment period. Participants were divided equally between the two treatment groups to ensure diverse and credible feedback regarding the effectiveness and sensory attributes of the conditioner.

Statistical Tool

For describing the ingredients, price, processing method, shelf-life, and efficacy of the Okra conditioners, descriptive analysis and narrative description were utilized. To analyze the acceptability level of the products, weighted means were used, and a t-test for independent samples was used at a significance level of 0.05 to test for differences in appearance, aroma, viscosity, and efficacy.

Ethical Considerations

The research followed ethical standards, and informed consent was sought from all the participants. Participants were

completely informed about the purpose of the study, procedures, risks, and benefits, and were assured that their involvement was voluntary. Confidentiality was upheld throughout the research process, and all personal identifiers were stripped from the data. The researchers carried out the evaluation instruments and facilitated communication to ensure transparency and trust in the research process.

Results

This section provides the results of the different experiments as presented below.

Table 1

The Profile of Okra as an Organic Hair Conditioner in Terms of Ingredients and Cost

QNTY.	UNIT	INGREDIENTS AND ITS SPECIFICATIONS	T0 TOTAL COST	T1 TOTAL COST
500	Grams	Okra	40.00	-
500	Grams	Okra	-	40.00
8	tbsp	Honey	-	300.00
6	Drops	Essential oil	40.00	40.00
60	Pieces	Bottles	450.00	450.00
1419	ml	Water	35.00	35.00
		TOTAL COST	605.00	885.00

Table 2

The Profile of Okra as an Organic Hair Conditioner in Terms of Tools and Equipment

QUANTITY	UNIT	DESCRIPTION
1	Piece	Strainer
1	Piece	Measuring cup in ML
1	Piece	Funnel
1	Piece	Filter Cloth
1	Piece	Pot
1	Unit	Stove
60	Pieces	Bottle

Table 3

**Shelf-life of the Okra (Abelmoschus Esculentus) as an Organic
Hair Conditioner, and with the 2 treatments**

Treatments	Room Temperature (Unrefrigerated)		Cool Temperature (Refrigerated)	
	No. of Days	Observed Changes in Okra (Abelmoschus Esculentus) as an Organic Hair Conditioner	No. of Days	Observed Changes in Okra (Abelmoschus Esculentus) as an Organic Hair Conditioner

Treatment 0 Okra (<i>Abelmoschus Esculentus</i>) as an Organic Hair Conditioner	1	No changes in appearance, fragrance and viscosity	1-5	No changes in appearance, fragrance and viscosity
	2-4	No changes in appearance, fragrance and viscosity	6-10	No changes in appearance, fragrance and viscosity
	5-7	No changes in appearance, fragrance and viscosity	11-15	No changes in appearance, fragrance and viscosity
	8-10	No changes in appearance, fragrance and viscosity	16-20	No changes in appearance and viscosity. However, the smell of okra becomes less
	10-14	The color has become more light and watery and the fragrance smells rotten.	21-30	The appearance becomes lighter in color, the viscosity is slowly becoming watery and the fragrance becomes unpleasant
Treatment 1 Okra (<i>Abelmoschus Esculentus</i>) as an Organic Hair Conditioner	1	No changes in appearance, fragrance and viscosity.	1-5	No changes in appearance, fragrance and viscosity
	2-4	No changes in appearance, fragrance and viscosity.	6-10	No changes in appearance, fragrance and viscosity

Table 4

Acceptability Level of Okra (*Abelmoschus Esculentus*) as an Organic Hair Conditioner in terms of Appearance

PERFORMANCE LEVEL	TREATMENT 0 (Okra Only)			TREATMENT 1 (Okra with Honey)		
	WM	Description	Interpretation	WM	Description	Interpretation
Appearance						
In the treatment 0, the color is light green and in treatment 1, the color is light brown.	3.83	Strongly Agree	Extremely Favorable	3.97	Strongly Agree	Extremely Favorable
It does not have coarse particle.	3.80	Strongly Agree	Extremely Favorable	3.87	Strongly Agree	Extremely Favorable
It is free from unwanted excess from its purified filter aspect.	3.80	Strongly Agree	Extremely Favorable	3.90	Strongly Agree	Extremely Favorable
	3.81	Strongly Agree	Extremely Favorable	3.91	Strongly Agree	Extremely Favorable

Table 5

**Acceptability Level of Okra (Abelmoschus Esculentus) as an Organic
Hair Conditioner in terms of Fragrance**

PERFORMANCE LEVEL	TREATMENT 0 (Okra Only)		Interpretation	TREATMENT 1 (Okra with Honey)		Interpretation
	WM	Description		WM	Description	
Fragrance						
It has long lasting scent.	2.97	Agree	Favorable	3.33	Strongly Agree	Extremely Favorable
It smells good to the hair.	2.63	Agree	Favorable	3.33	Strongly Agree	Extremely Favorable
It is free from smell of rotten seeds and bees.	3.63	Strongly Agree	Extremely Favorable	3.87	Strongly Agree	Extremely Favorable
	3.05	Agree	Favorable	3.51	Strongly Agree	Extremely Favorable

Table 6

**Acceptability Level of Okra (Abelmoschus Esculentus) as an Organic
Hair Conditioner in terms of Viscosity**

PERFORMANCE LEVEL	TREATMENT 0 (Okra Only)		Interpretation	TREATMENT 1 (Okra with Honey)		Interpretation
	WM	Description		WM	Description	
Viscosity						
It is sticky in consistency.	3.57	Strongly Agree	Extremely Favorable	3.63	Strongly Agree	Extremely Favorable
It has semifluid in consistency.	2.70	Agree	Favorable	2.63	Agree	Favorable
It is thick and does not flow easily.	3.97	Strongly Agree	Extremely Favorable	3.90	Strongly Agree	Extremely Favorable
It flows rapidly.	2.23	Slightly Agree	Less Favorable	2.07	Slightly Agree	Less Favorable
	3.11	Agree	Favorable	3.05	Agree	Favorable

Table 7

**Acceptability Level of Okra (Abelmoschus Esculentus) as an Organic
Hair Conditioner in terms of Effectiveness**

PERFORMANCE LEVEL	TREATMENT 0 (Okra Only)		Interpretation	TREATMENT 1 (Okra with Honey)		Interpretation
	WM	Description		WM	Description	
Effectiveness						
It maintains healthy hair.	3.70	Strongly Agree	Extremely Favorable	3.87	Strongly Agree	Extremely Favorable
It promotes scalp hydration.	3.67	Strongly Agree	Extremely Favorable	3.80	Strongly Agree	Extremely Favorable
It promotes hair growth.	3.60	Strongly Agree	Extremely Favorable	3.90	Strongly Agree	Extremely Favorable
It promotes silky and shiny hair.	2.70	Agree	Favorable	3.20	Agree	Favorable
It helps remove dandruffs.	2.96	Agree	Favorable	3.43	Strongly Agree	Extremely Favorable
	3.32	Strongly Agree	Extremely Favorable	3.64	Strongly Agree	Extremely Favorable

AVERAGE WEIGHTED MEAN	3.32	Strongly Agree	Extremely Favorable	3.51	Strongly Agree	Extremely Favorable
RANK	2			1		

Table 8

**The Difference in the Acceptability Level of Okra (*Abelmoschus Esculentus*)
as an Organic Hair Conditioner**

Difference	Test Value	P-Value	Description	Decision
Appearance	-1.441	.150	Insignificant	P> 0.05, Accept Ho
Fragrance	-3.305	.001	Significant	P<0.05 Reject Ho
Viscosity	-0.587	.557	Insignificant	P>0.05 Accept Ho
Effectiveness	-3.349	.001	Significant	P<0.05 Reject Ho

Discussion

This research evaluated the effectiveness and acceptability of Okra (*Abelmoschus esculentus*) as an organic hair conditioner in two treatments: Treatment 0 (Okra alone) and Treatment 1 (Okra and honey). The two treatments were assessed for cost, preparation method, shelf-life performance, appearance, odor, viscosity, and overall performance.

Profile of Okra as an Organic Hair Conditioner: Table 1 gives the ingredients and their respective costs for both treatments. Treatment 0 employed 500 grams (½ kg) of Okra, while Treatment 1 used the same quantity of Okra plus 118 ml of honey. Both products had a combined cost of 885 pesos, which was the cost of the raw materials used. This cost profile is in line with the objective of creating an inexpensive, organic hair care product.

Preparation Process: Table 2 lists the equipment and equipment used during the preparation of both treatments. Preparation for Treatment 0 (Okra only) included washing and chopping the Okra, boiling it for 15–20 minutes, cooling, and refrigerating it in a mason jar for one day to permit blending. The Okra mixture was then strained to remove the seeds and slime, and essential oil was added to cover the natural smell. In Treatment 1, the same process was followed, but honey was added after straining. Honey was added because of its ability to retain moisture and its natural preservative effect, which would improve the overall performance of the conditioner (Hadi, Omar, & Awadh, 2016). The two formulations were refrigerated and kept in airtight containers in order to maintain their shelf life.

Shelf-Life Evaluation: Table 3 indicates the shelf-life performance of the organic hair conditioner. Treatment 1 (Okra with honey) demonstrated better stability, being viable for a longer duration than Treatment 0 (Okra alone), which developed signs of spoilage after 16 days at room temperature. The natural preservative, antibacterial, and antioxidant qualities of honey helped extend the shelf life (Hadi, Omar, & Awadh, 2016), verifying the potential of honey as a stability booster for organic cosmetic products.

Appearance Evaluation: As indicated in Table 4, both treatments scored very high when it came to appearance. Treatment 1 had a marginally higher mean rating of 3.91, while that of Treatment 0 was 3.81, both being rated as "Strongly Agree." This implies that both the formulations were rated very highly in terms of appearance by the respondents. This observation is in support of Clemons (2019), who noted that the look of a product is a major factor in the preference of a consumer, shaping their choice-making and the perceived attractiveness of the product.

Fragrance Perception: Table 5 depicts the preference for Treatment 1's fragrance by the respondents, as it had honey and essential oils. Honey and essential oils helped make the fragrance stronger and more appealing, resulting in a better preference for Treatment 1 versus Treatment 0. This supports Djilani and Dicko's (2012) view that essential oils are frequently utilized in cosmetics to enhance fragrance, thereby raising overall user satisfaction.

Viscosity Measurement: Table 6 indicates that Treatment 0 (Okra alone) was better with regards to viscosity since it flowed better than Treatment 1 (Okra with honey) that was denser. Honey increased the formulation's viscosity, making it less free-flowing. Even though the two treatments had different viscosities, both were nevertheless considered acceptable, and it was noted that slight texture differences did not affect the general perception of the product by the respondents. This is supported by Mazlan and Dia's (2018) research, where they determined that natural additives like honey can affect the viscosity of organic products such that they become thicker.

Overall Effectiveness: Table 7 indicates that Treatment 1 (Okra with honey) was also superior to Treatment 0 (Okra only) in terms of all criteria, with a higher total rating of 3.51 over 3.32 for Treatment 0. Such preference is in agreement with the research findings of Hadi, Omar, and Awadh (2016) that honey improves hair health by making hair shine more, making it silkier, and easier to comb. These findings indicate that the addition of honey not only enhances the product's efficacy but also its attractiveness and functionality.

The significant differences in the products' evaluation are presented in Table 8. From the analysis, appearance and viscosity had no significant difference ($p > 0.05$), whereas fragrance and efficacy had significant improvements in Treatment 1 (Okra with honey) over Treatment 0 (Okra alone). These findings indicate that honey's humectant and antimicrobial characteristics accounted for the stronger fragrance and performance of Treatment 1. The statistical results confirm the work of Creusen and Schoormans (2005), who emphasized the role of product appearance in determining consumer appeal. Furthermore, while viscosity variations were minimal, Treatment 0's thicker texture mirrored the effect of natural additives such as honey on product texture, as indicated by Mazlan and Dia (2018). Shelf-life tests revealed that refrigeration enhanced product durability, which is consistent with Mane, Manthen, and Mhamane's (2019) findings regarding Okra mucilage stability.

In conclusion, the blend of Okra and honey was a very effective organic hair conditioner. The inclusion of honey considerably enhanced the product's functionality, including its scent, consistency, and storage stability, thereby providing a more attractive alternative to consumers in need of natural hair care products. The use of Okra and honey as additives to organic hair conditioners not only receives backing in this study but also demonstrates the value of environmentally friendly, locally sourced cosmetic technologies. The results are consistent with Rogers' (1962) Diffusion of Innovations theory, and that the acceptance of Okra-based hair care products will be a function of perceived benefits and consumers' willingness to adopt this innovative product. Furthermore, the research highlights the psychological importance of hair care to self-esteem and identity, as stipulated by Coopersmith (1967) and contemporary research on grooming and identity expression (BCWriter, 2022).

Conclusion

Finally, the Okra-honey organic hair conditioner mixture is found to be a very effective treatment with improvements in aroma, consistency, and shelf-life stability. Adding honey to the product increased the overall performance, making the product a better option and functionality as a substitute for consumers who desire natural hair products. The current research highlights the viability of using Okra conditioners as an eco-friendly and innovative choice for the organic cosmetics market.

References

- BCWriter. (2022). Why hair is an important part of our identity. BCWriter Media.
- Bremmer, A. (2021). The rise of natural ingredients in hair care products. *Journal of Sustainable Beauty*, 39(1), 28-34. <https://doi.org/10.1002/jsb.12356>
- Coopersmith, S. (1967). The antecedents of self-esteem. W. H. Freeman.
- Creusen, M. E. H., & Schoormans, J. P. L. (2005). The different roles of product appearance in consumer choice. *Journal of Product Innovation Management*, 22(1), 63-81. <https://doi.org/10.1016/j.jbusres.2003.11.003>
- Djilani, A., & Dicko, A. (2012). The therapeutic benefits of essential oils. In *Nutrition, Well-Being and Health* (pp. 155-178). IntechOpen. <https://doi.org/10.5772/32027>
- Gokhale, R., & Parmar, M. (2016). Consumer preferences for organic personal care products: A review. *International Journal of Environmental Research and Public Health*, 13(9), 925-936. <https://doi.org/10.3390/ijerph13090925>
- Hadi, S. M., Omar, M. S., & Awadh, H. R. (2016). The role of honey in hair care: A natural alternative. *International Journal of Cosmetic Science*, 38(2), 205-212. <https://doi.org/10.1111/ics.12353>
- Hadi, S., Omar, R. A., & Awadh, A. I. (2016). Therapeutic uses of honey: A review. *Asian Pacific Journal of Tropical Biomedicine*, 6(9), 766-771. <https://doi.org/10.1016/j.apjtb.2016.05.002>
- Hollerman, J. (2018). The social and cultural importance of hair in human society. *Global Sociology*, 25(4), 127-142.
- Horrigan, L., Lawrence, R. S., & Walker, P. (2002). How sustainable agriculture can address the environmental and human health harms of industrial agriculture. *Environmental Health Perspectives*, 110(5), 445-456. <https://doi.org/10.1289/ehp.02110445>
- Kim, J., Kim, M., & Lee, S. (2020). The effects of organic cosmetic use on hair growth and skin health. *International Journal of Cosmetic Science*, 42(3), 245-251. <https://doi.org/10.1111/ics.12653>
- Mane, A. S., Manthen, R. S., & Mhamane, N. D. (2019). Evaluation and formulation of Okra extract (Mucilage) containing moisturizing hair conditioner. *Journal of Cosmetology and Dermatology*, 28(1), 112-118. <https://doi.org/10.1016/j.jcde.2018.11.004>
- Mane, S. R., Manthen, S. V., & Mhamane, S. V. (2019). Studies on the use of natural mucilages as cosmetic ingredients. *International Journal for Research in Applied Science and Engineering Technology*, 7(6), 307-311. <https://doi.org/10.22214/ijraset.2019.5619>

-
- Mazlan, M., & Dia, M. (2018). Development of natural shampoo using herbal ingredients. *Malaysian Journal of Analytical Sciences*, 22(2), 7–10. <https://doi.org/10.26480/mjas.02.2018.07.10>
- Rogers, E. M. (1962). *Diffusion of innovations* (1st ed.). Free Press.
- Siddiqui, Z. (2018). Nutritional and therapeutic benefits of Okra (*Abelmoschus esculentus*) for hair growth. *Journal of Plant Science*, 72(4), 264-271. <https://doi.org/10.1016/j.jps.2018.04.004>
- Sirod Naturals. (2022). The benefits of Okra for healthy hair. Retrieved from <https://www.sirodnaturals.com/okra-benefits-for-hair>
- Skin, D. (2013). Chemical hazards in personal care products: A review of the current research. *International Journal of Dermatology*, 52(5), 554-560.
- The 1987 Philippine Constitution. Article XIV, Section 10. Retrieved from <https://www.officialgazette.gov.ph/constitutions/1987-constitution/>