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# Aroma Guard: A Sustainable, Locally-Rooted Innovation for Perfume Longevity in Indonesia

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## Abstract

Indonesia's tropical climate poses significant challenges for the cosmetics industry, especially when it comes to perfumes. The high temperatures and humidity in the region accelerate the evaporation of fragrance molecules, leading to a quick fading of scents and the need for frequent reapplications, particularly among active individuals such as university students, field workers, and young consumers. While many cosmetics available in Indonesia are formulated for subtropical climates, they often fail to meet the needs of tropical skin, creating a gap in the market, especially with the growing demand for sustainable and natural products. To address this, a team of students from Universitas Al Azhar Medan developed Aroma Guard, a product designed to extend the longevity of perfumes on tropical skin. Aroma Guard is a skin moisturizer in the form of an occlusive cream, featuring local ingredients like beeswax, shea butter, aloe vera, and essential oils such as lemongrass and ylang-ylang. Beeswax forms a protective layer on the skin, slowing the evaporation of fragrance, shea butter acts as a moisturizer, enhances scent longevity, and soothes the skin, while aloe vera provides hydration and soothing benefits, and the essential oils contribute both scent and therapeutic properties. Developed using a Minimum Viable Product (MVP) approach, the product underwent rapid prototyping and incorporated consumer feedback. Early tests indicated strong approval from Gen Z and millennial consumers, particularly due to its eco-friendliness and local identity. Additionally, Aroma Guard supports the Sustainable Development Goals (SDGs) by promoting local economic growth, fostering innovation, and ensuring sustainable production. In catering to the specific needs of tropical climates, Aroma Guard offers a functional, locally-sourced solution within the cosmetics market and exemplifies how student-led innovations can contribute to both local economic growth and global sustainability in the beauty industry.

**Keywords:** *tropical; cosmetics; perfume; innovation*

## 1. Introduction

Indonesia, with its tropical climate, experiences consistently high temperatures, elevated humidity levels, and continuous sun exposure throughout the year. These environmental factors present unique challenges in the use of cosmetic products, particularly perfumes. In such conditions, perfume molecules tend to evaporate faster from the skin due to the heat, which speeds up the volatilization process. As a result, fragrances fade more quickly, requiring frequent reapplication by users. This is a common issue, especially among active groups like university students, field workers, and young consumers who are often engaged in outdoor activities.

However, most cosmetics sold in Indonesia are still based on formulations from subtropical regions, with little adaptation for tropical skin needs. Innovations specifically designed to address perfume longevity in tropical environments remain scarce. This creates a major market opportunity, especially in light of the rising demand for natural cosmetics and the growing preference for sustainable products.

Recognizing this gap, a student team from Al-Azhar University Medan introduced an innovative solution called Aroma Guard. This product is a skin moisturizer in the form of occlusive cream, specially created to enhance the lasting power of perfumes on tropical skin. The formula incorporates Indonesian natural ingredients such as beeswax, shea butter, aloe vera, and local essential oils like lemongrass and lynaec. Beeswax serves to form a protective barrier over the skin, slowing scent

evaporation, shea butter acts as a moisturizer, enhances scent longevity, and soothes the skin, while aloe vera offers hydration and soothing effects. Meanwhile, local essential oils contribute added fragrance and aromatherapy benefits.

The development of Aroma Guard followed a Minimum Viable Product (MVP) strategy typical of startup models, enabling fast and cost-effective product iteration based on direct consumer feedback. Initial prototypes were tested within micro-markets, allowing the team to gather real-time responses. Early feedback from Gen Z and millennial consumers has been overwhelmingly positive, highlighting the product's functionality, eco-friendliness, and celebration of local identity. Moreover, Aroma Guard's development aligns closely with the values of the Sustainable Development Goals (SDGs),

contributing to: SDG 8 (Decent Work and Economic Growth): by supporting local MSME empowerment and job creation, SDG 9 (Industry, Innovation, and Infrastructure): by promoting innovations based on indigenous resources and simple technological models, SDG 12 (Responsible Consumption and Production): through the sustainable use of natural materials, small-scale efficient production, and recyclable packaging.

By blending innovative formulations, an agile development approach, and sustainability principles, Aroma Guard aspires to lead the way in functional tropical cosmetics in Indonesia. It also exemplifies how students, as change-makers, can create locally rooted solutions with the potential for global influence.

## 2. Literature Review

### 2.1 Basic Theory and Related Concepts

Cosmetic products have transformed beyond mere beauty enhancers into multifunctional solutions that cater to users' physiological, psychological, and social needs. In tropical regions like Indonesia, environmental factors such as heat, humidity, and pollution pose significant challenges for consumers when selecting suitable cosmetics. This is particularly evident with perfumes, which evaporate more rapidly on tropical skin, reducing their lasting effect. Therefore, cosmetic formulations intended for tropical climates must consider not only climatic factors but also the specific characteristics of tropical skin [1].

A crucial strategy in developing cosmetics for tropical environments is the incorporation of occlusive agents—substances that form a protective barrier over the skin. The primary role of occlusive ingredients is to prevent transepidermal water loss (TEWL) and slow the evaporation of active components like fragrances. Tiwari et al. (2016) highlight that occlusive materials are essential in modern moisturizers, effectively maintaining skin hydration and enhancing the retention of active substances. Among natural occlusives, beeswax is particularly valued due to its emollient properties, hypoallergenic nature, and stability across different temperature conditions [2] [3].

Complementing beeswax, shea butter, aloe vera, olive oil is another multifunctional ingredient widely utilized in the cosmetics industry. Rich in bioactive compounds such as aloin, proteolytic enzymes, and vitamins A, C, and E, aloe vera provides anti-inflammatory, antibacterial, and regenerative benefits for the skin. In the formulation of Aroma Guard, shea butter helps hydrate the skin, makes the scent last longer, and soothes dry or sensitive skin, aloe vera plays a dual role: moisturizing the skin and strengthening the epidermal layer while olive oil is a natural moisturizer with a mild, earthy scent. Thereby improving the skin's ability to absorb and retain fragrance [4] [5].

The formulation is further enhanced with essential oils, particularly from tropical plants like lemongrass and ylang-ylang. Essential oils not only offer antibacterial and aromatherapeutic benefits but also infuse the product with distinctive local scents. Lemongrass contains citronellal and geraniol, compounds known for their calming and refreshing properties. Meanwhile, ylang-ylang (*Cananga odorata*) delivers a rich floral aroma deeply rooted in Indonesian tradition. The integration of these oils enriches both the fragrance and the ethnobotanical significance of the product, adding a layer of cultural authenticity [6] [7].

From a market perspective, consumer behavior has shifted notably in the post COVID-19 era, with growing attention to sustainability, ingredient safety, and support for local products. Gen Z and millennial consumers emphasize three key principles when selecting products: functionality, sustainability, and a strong digital brand presence [4]. These preferences align closely with the values embedded in Aroma Guard, which is formulated with natural ingredients, packaged minimally, and marketed through digital platforms. In today's marketing landscape, digital branding strategies—such as visual storytelling, social media education, and online community building—are vital tools for fostering brand loyalty and consumer trust [8] [9].

### 2.2 Similar Solutions That Have Been Developed

Some major cosmetic brands have developed technologies to improve the scent resistance of perfumes, such as microcapsule coatings or scented body lotions. However, the products are mostly synthetic chemical-based and have not been designed specifically for tropical consumers. Local innovations in Indonesia are generally still limited to making ordinary oil or

cream perfumes without research on occlusive functions.

Aroma Guard products are one of the earliest examples of innovation that combines occlusive moisturizers with the function of strengthening perfume aromas, based on tropical natural ingredients, and developed directly from the real needs of local consumers.

### 2.3 Relevant Scientific Sources

Some relevant scientific sources such as:

#### 1. Multifunctionality of Cosmetics

- Algin Yapar, E., et al.  
Study: Evaluation of Multifunctionality in Cosmetics (2021)  
Focus: Discusses the types and importance of multifunctionality in modern cosmetic products.  
Source: Research Gate

#### 2. Psychological and Social Functions of Cosmetics

- Dr. Nancy Etcoff  
Study: *The Survival of the Prettiest: The Science of Beauty* (2000)  
Focus: Psychological effects of beauty and cosmetics on human behavior and social interaction.  
Source: Book, but heavily cited in cosmetic psychology studies.
- Nash, R., Fieldman, G., Hussey, T., Leveque, J.L., Pineau, P.  
Study: *Cosmetics: They Influence More Than Caucasian Female Facial Attractiveness* (2006) Focus: Effects of cosmetic use on self-esteem and social perception.  
Source: Pubmed
- Gensler, S., Völckner, F., Liu-Thompkins, Y., & Wiertz, C. Study: *Managing Brands in the Social Media Environment* (2020)  
Focus: Importance of digital brand image in influencing cosmetic consumer behavior post- COVID-19.  
Source: Journal of Interactive Marketing

#### 3. Cosmetic Challenges in Tropical Climates

- Sanna, S., Meloni, M.C., et al.  
Study: *The Skin Barrier and Pollutants* (2017)  
Focus: How environmental factors like heat, humidity, and pollutants damage the skin and influence cosmetic needs.  
Source: MDPI Cosmetics Journal
- Euromonitor International  
Report: *Beauty and Personal Care Post-COVID-19 Global Report* (2023)  
Focus: New trends in cosmetic consumption, particularly increased consumer attention to sustainability, safety, and digital marketing post-pandemic.
- Jessica DeFino (Beauty journalist)  
Article: *How Global Warming Is Changing Your Beauty Products* (2023)  
Focus: Discusses how rising temperatures affect cosmetic product formulation and stability. Source: Fashionista

## 3. Research Method

This study was conducted as part of the early-stage development of the Aroma Guard product, an occlusive moisturizer designed to prolong the longevity of perfume scents on tropical skin. Using a qualitative descriptive method within a case study framework, the research emphasized product formulation, direct field observations, limited-scale surveys, and the documentation of production processes and preliminary market assessments.

### 3.1 Place, Time, and Duration of Research

The research was carried out from February to April 2025 in the city of Medan, North Sumatra. Observation and production were carried out in the team's small formulation room, while market data collection was carried out online and offline in the campus environment.

Main Raw Materials:

- Beeswax (beeswax): An occlusive agent to retain moisture and slow down the evaporation of perfume.
- Shea butter: As a moisturizer, enhances scent longevity, and soothes the skin.
- Natural aloe vera gel: As a moisturizer and skin cooler.
- Lemongrass & Lynage Essential Oil: As a natural and antibacterial scent.
- Vitamin E oil: Acts as an antioxidant and stabilizer of the formula.
- Simple Production Tools:
  - Digital Timbangan
  - Electric stove
  - Measuring Cups
  - Stainless containers for mixing
  - Stirring spatula
  - Packaging tube 30 ml
  - Packaging label stickers

### 3.2 Product Formulation Procedure

Aroma Guard *prototype production steps*:

1. Weighing ingredients based on initial formulation.
2. Melt the beeswax and shea butter over low heat to a temperature of  $\pm 60^{\circ}\text{C}$ .
3. Add the essential oils and stir until evenly distributed.
4. After the temperature drops, aloe vera gel and vitamin E are added.
5. The mixture is poured into a 30 ml tube and cooled.

### 3.3 Production Cost Estimation

Table 1. Estimated Prototype Production Cost (Initial Batch  $\pm 320$  units)

Component	Cost (Rp)
Beeswax, Shea Butter and Aloe Vera	2.500.000
Lemongrass & Lemon Essential Oil	2.000.000
Vitamin E and additives	900.000
Tube packaging + sticker label	3.100.000
Simple production tools	2.000.000
Electricity and operating costs	926.000
Total	11.426.000

Source: Researcher Processed Data

With a selling price of IDR 50,000/unit and an initial production of 320 units, the estimated Break Even Point (BEP) occurred at sales of 128 units. Net profit is projected at IDR 4,574,000 or a margin of 28.6%.

### 3.4 Data Collection and Analysis Techniques

Collection Technique:

- Consumer Survey: Administered to 50 respondents aged 17–35 years, focused on the need for perfume complementary products and preference for local ingredients.

- Informal Interviews: Involve local formulators and supervisors to review the validity of the initial formulation.
- Direct Observation: On the production process and initial testing by the internal team.
- Data Analysis: The survey results are presented in the form of bar charts and descriptive narratives. Triangulation is carried out by comparing the results of surveys, observations, and interviews to ensure the validity of the data and assess the feasibility of innovation at an early stage.

## 4. Results and Discussion

### 4.1 Product Formulation Results

The Aroma Guard product was developed as a multifunctional occlusive cream intended to complement the use of perfumes, particularly in tropical climates such as Indonesia. The core formulation concept focuses on creating a protective barrier on the skin's surface that not only preserves skin moisture but also slows the evaporation of fragrance molecules. This process utilizes the occlusive effect, wherein components like beeswax and natural oils form a thin film, extending the perfume's interaction with the skin and thereby prolonging the scent's longevity.

The initial prototype of Aroma Guard was crafted as a semi-thick, translucent white cream, conveniently packaged in 30 ml tubes. This packaging decision was based on early survey results indicating consumer preferences for portable, practical, and visually appealing cosmetic products. Three scent variants were introduced:

- Floral: Featuring a blend of ylang-ylang oil and jasmine, offering a soft and feminine fragrance.
- Citrus: Combining lemongrass and citrus essential oils for a vibrant and refreshing scent.
- Woody: Incorporating cinnamon and sandalwood to deliver a warm, masculine, and long-lasting aroma.

The formulation relied heavily on local ingredients, consisting of 30% beeswax, 15% shea butter, 25% aloe vera gel, 20% essential oils, and 10% vitamin E oil. Beeswax was selected for its natural occlusive properties, hypoallergenic nature, and temperature stability. Shea butter acts as a moisturizer, enhances scent longevity, and soothes the skin, aloe vera contributed moisturizing and calming benefits, while essential oils provided both fragrance and mild antibacterial effects. Vitamin E oil functioned as an antioxidant and natural preservative to enhance formulation stability.

Product testing involved a small trial group of 10 participants, comprising students and young professionals with active outdoor lifestyles. Testers applied Aroma Guard to areas such as the wrist or neck before spraying their regular perfumes, and they recorded how long the fragrance lasted, alongside their impressions of the product's texture, skin feel, and comfort. The trial results revealed that perfume longevity increased by approximately 2.5 to 3 hours with the use of Aroma Guard compared to perfumes applied directly to the skin. Most users described the product as having a soft texture, easy application, and leaving no sticky or greasy residue. Furthermore, no signs of irritation, redness, or allergic reactions were reported within 24 hours of use, indicating that the formula is safe for normal skin types.

Additionally, several users mentioned that Aroma Guard boosted their confidence throughout the day, particularly during outdoor activities under hot conditions. They also recommended the introduction of larger packaging options and refillable formats to promote sustainability. These findings suggest that Aroma Guard holds significant potential to pioneer a new category in tropical cosmetics natural, safe, and effective "aroma extender" products tailored to local needs.



Figure 1. Aroma Guard Products



Figure 2. Aroma Guard Packaging

#### 4.2 Consumer Survey Results

The survey was conducted on 50 respondents in Medan Johor, with the following characteristics:

- Age 17–35 years old
- 68% women, 32% men
- 92% of active perfume users

Table 2. Consumer Perception Survey Results

Statement	Agree (%)	Disagree (%)
The scent of perfume quickly evaporates in hot weather	84	16
I am interested in trying local perfume accompaniment products	90	10
I love products made from natural and eco-friendly materials	88	12
Ideal price of products below IDR 50,000	76	24

Source: Researcher Processed Data

#### 4.3 Packaging and Distribution Strategy

The product is packaged in a small 30 ml tube with a minimalist design in neutral colors (cream and leaf green), as well as a biodegradable label. The initial distribution strategy is carried out through:

- Pre-order sales via Instagram & Shopee
- Product education through reels, TikTok, and reviews by students

#### 4.4 Financial Analysis

Table 3. Aroma Guard Financial Simulation – Batch 320 Units

Component	Amount (Rp)
Total production capital	11.426.000
Selling price per unit	50.000
Production cost per unit	35.714
Projected sales (320 units)	16.000.000
Gross profit	4.574.000
Break Even Point	128 units

(BEP) Source: Researcher Processed Data

This calculation shows that the product has a profit potential of 28.6% and a realistic BEP for micro scale.

#### 4.5 SWOT Analysis

Table 4. SWOT analysis of Aroma Guards of Products

Strengths	Weaknesses
<ul style="list-style-type: none"> <li>• Innovative &amp; locally sourced</li> <li>• Eco-friendly, affordable price</li> <li>• Perfume durability is significantly increased</li> </ul>	<ul style="list-style-type: none"> <li>• Initial formulation, not yet certified</li> <li>• Production is still small</li> <li>• Limited initial distribution</li> </ul>
Opportunities	Threats
<ul style="list-style-type: none"> <li>• Consumer trends towards natural local products</li> <li>• MSME incubation and funding support</li> </ul>	<ul style="list-style-type: none"> <li>• Competition from big brands</li> <li>• Fluctuations in the price of natural ingredients</li> </ul>

#### 4.6 Relevance to the SDGS

The development of *Aroma Guard* is directly related to:

- SDG 8: Encourage local economic growth through young entrepreneurs
- SDG 9: Encourage innovation based on local ingredients and simple technologies
- SDG 12: Prioritizing sustainable production and consumption

### 5. Conclusion

The development of *Aroma Guard* represents an innovative approach to addressing the challenges faced by consumers in tropical climates like Indonesia, particularly in relation to the rapid evaporation of perfume fragrances due to high temperatures and humidity. By leveraging local, natural ingredients such as beeswax, shea butter, aloe vera, and essential oils, *Aroma Guard* offers a practical solution to extend the lasting power of perfumes on tropical skin.

The product's formulation not only enhances fragrance durability but also aligns with current consumer preferences for multifunctional, eco-friendly, and locally sourced cosmetic products. Early testing and consumer surveys indicate strong market potential, with users appreciating the product's performance and comfort, as well as its alignment with sustainability principles.

*Aroma Guard*'s development process, based on a Minimum Viable Product (MVP) model, demonstrates the importance of rapid iteration and direct consumer feedback in creating effective, market-ready products. Financial analysis suggests that the product has promising profit potential and can be produced efficiently, making it a viable venture for local businesses.

Furthermore, *Aroma Guard* contributes to the achievement of several Sustainable Development Goals (SDGs), such as promoting local economic growth, supporting innovation, and encouraging sustainable production practices. As a result, *Aroma Guard* is positioned to not only meet the specific needs of tropical consumers but also to serve as a model for the future of functional, sustainable cosmetics in Indonesia and beyond.

#### Suggestions

1. **Enhancing Product Formulation:** Further research and development should be conducted to refine the *Aroma Guard* formulation, focusing on optimizing the blend of natural ingredients for better fragrance retention and skin compatibility. Testing with a broader range of skin types and in various tropical climates would help ensure the product's universal appeal and effectiveness.
2. **Scaling Production:** As the demand for *Aroma Guard* grows, scaling up production while maintaining quality and affordability will be crucial. Exploring partnerships with local MSMEs or co-manufacturers could support larger production volumes, streamline the process, and lower costs, while still using locally sourced ingredients.
3. **Expanding Product Line:** In addition to the current three fragrance variants (Floral, Citrus, and Woody), developing more scent options or other variations, such as fragrance-free or hypoallergenic versions, could cater to a wider audience, including individuals with sensitive skin or those seeking alternative scents.
4. **Certification and Quality Assurance:** Obtaining certifications such as halal, organic, or dermatologically tested would add credibility to the product and appeal to a broader customer base. Certification would also help enhance consumer trust, especially in the competitive cosmetics market.
5. **Sustainability Initiatives:** Further emphasize sustainability by exploring eco-friendly packaging solutions, such as biodegradable or recyclable materials, and by offering refillable product options. This will appeal to environmentally-

- conscious consumers, supporting the product's alignment with SDG 12 (Responsible Consumption and Production).
6. Marketing and Brand Awareness: A focused digital marketing strategy utilizing platforms like Instagram, TikTok, and YouTube should be employed to increase brand visibility. Collaboration with local influencers, particularly those focused on sustainability and beauty, can boost brand credibility and reach a larger audience. Additionally, highlighting the local, natural ingredients and eco-friendly nature of the product will resonate with environmentally conscious consumers.
  7. Consumer Education: Conducting educational campaigns about the benefits of occlusive ingredients and how Aroma Guard improves perfume longevity could help differentiate it from other cosmetic products in the market. Providing information about the product's natural ingredients and their positive effects on skin health could create stronger connections with potential customers.
  8. Collaborating with Local Institutions: Partnering with universities and research institutions to conduct more in-depth studies on the effectiveness and long-term benefits of the product will provide valuable insights and help improve the formula. Additionally, these collaborations could offer opportunities for product innovation and business growth through academic support.
  9. Exploring Export Opportunities: Given the unique formulation and market niche, there may be potential for Aroma Guard to expand beyond the Indonesian market into other tropical regions, such as Southeast Asia, South America, and parts of Africa, where similar environmental challenges exist. Conducting market research in these regions could uncover new opportunities for growth.

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