e-ISSN 3026-2356
p-ISSN 3026-4731
Article Research

Blambangan Journal of Nursing and Health Sciences (BJNHS)
https://blambangan-scholar.com/index.php/BJNHS
Vol. 3 No. 1 (2025): March

Development of Tinted Lip Balm with Various Compositions of Angsana Leaf Extract (Pterocarpus indicus) and Stiffening Agent

Ayu Angger Putri M Soleh[1,*], Dina Trianggaluh[1]

[1]Bachelor Pharmacy Study Program, Faculty of Health Sciences, universitas dr. Soebandi, Jember, Indonesia
*Corresponding Author; E-mail: ayuanggerputri@gmail.com

Abstract

Background: The development of tinted lip balm that combines stiffening agent and angsana leaf extract aims to create a moisturizing lip care product while providing natural color with better durability. Stiffening agent will provide stiffness to the lip balm, making it more durable and not easy to melt, while angsana leaf extract will provide natural color and antioxidant benefits.
Aims: to develop formulas and assess the physical quality of tinted lip balm with various compositions of angsana leaf extract (12%, 17%, and 21%) and stiffening agent.
Methods: The three tinted lip balms were formulated using colorants extracted from Angsana leaves (Pterocarpus indicus) using the maceration method. The contents of the tinted lip balm include Humectants, various compositions of stiffening agents (3:1), Preservatives and Fat bases. All formulations of tinted lip balm were evaluated for organoleptic, homogeneity, pH, spreadability, and adhesion.
Results: The results showed that increasing the composition of angsana leaf extract sharpened the brown color, while variations in the composition of stiffening agents decreased the pH and spreadability of the tinted lip balm. Based on the findings of the research that has been conducted, it can be concluded that the variety of compositions of angsana leaf extract (Pterocarpus indicus) and stiffening agents show good physical quality assessments in F2.
Conclusion: The variety of compositions of angsana leaf extract (Pterocarpus indicus) and stiffening agents have an effect on the physical quality of tinted lip balm.

Keywords: tinted lip balm, natural dye, pterocarpus indicus leaf, stiffening agent

INTRODUCTION

Phytopharmaceutics and natural extracts, including those from plants like angsana, are valuable in cosmetics for their moisturizing and pigment-producing properties. Angsana leaf extract, rich in flavonoids, saponins, tannins, and other compounds, can be a source of pigments used in tinted lip balms. These natural ingredients offer a safer alternative to synthetic dyes and can help maintain lip moisture and protection (Dharmaraj et al., 2021).

Tinted lip balm is a lip care product that combines the benefits of lip balm (moisturizing and protecting the lips) with color, giving the lips a healthy and fresh look. So, in addition to maintaining moisture, tinted lip balm also provides bright color to the lips. Tinted lip balm creates a protective layer over the lips, this layer helps lock in moisture and protects the lips from external factors such as UV exposure (Devi et al., 2022).

Making natural tinted lip balms involves using extracts, oils, emollients, and stiffening agents to provide texture, color, and care benefits. Tinted lip balm formulations require the right blend of butters, oils, waxes, and pigments to make the product effective and attractive. This balance ensures the lip balm moisturizes, provides the desired color, and has a comfortable texture when applied (Ramarao et al., 2024).

For example, cera alba and lanolin act as stiffening agents, but with different roles. Cera alba provides stiffness to the preparation, while lanolin acts as a softener and helps maintain moisture. Glycerol acts as a humectant, attracting and retaining moisture from the air, helping to keep lips hydrated and preventing dryness (Suena et al., 2022).

This study aims to explore the formula of tinted lip balm by assessing the physical quality of tinted lip balm made with various composition of angsana leaf extract and stiffening agent. This study will focus on evaluating the physical properties of lip balm, and determining the best formula that provides the desired quality and performance.

METHOD

The various compositions of stiffening agents in three tinted Lip balm formulas were used to assess the capability of lip moisture, while the various compositions of angsana leaf extracts were intended to assess the capability of lip coloring. The angsana leaf extract was obtained through a maceration extraction procedure using 96% ethanol solvent. The tinted Lip balm formula contains angsana leaf extract, glycerin, cera alba, nipagin, lanolin, and Oleum cacao (Table 1). This study consisted of several steps: making tinted Lip balm and assessing physical quality as follows.

Tinted lip balm formulation

In a tinted lip balm formulation, the proportions of cera alba (beeswax) and lanolin can vary depending on the desired consistency and texture of the balm. Typically, cera alba is used as a structuring agent to provide firmness and shape to the balm, while lanolin adds moisturizing and emollient properties. Common ratios can range from 1:1 to 1:3 (cera alba to lanolin), but these can be adjusted based on the specific formulation and desired outcome (Setyawaty et al., 2018):

Table 1. Formula for tinted lip balm

Ingredient	Function	Composition		
		F 1	F 2	F 3
Angsana leaf extract	Active substance	12	17	21
Gliserin	Humectants	7	7	7
Cera alba	Stiffening agent	12	15	18
Lanolin	Stiffening agent	4	5	6
Nipagin	Preservative	0.2	0.2	0.2
Oleum cacao	Fat base	100	100	100

Table 1 shows three formulas (F1, F2, and F3) with different compositions of cera alba and lanolin. Formula F1 contains 12% cera alba and 4% lanolin. Formula F2 contains 15% cera alba and 5% lanolin. Finally, formula F3 contains 18% cera alba and 6% lanolin. The process of making tinted lip balm begins with heating oleum cacao at a temperature of 31-34°C until it melts. Then, the heated cera alba is put into oleum cacao. After that, nipagin, lanolin, and glycerin are added to the mixture and stirred until evenly mixed. Finally, the angsana leaf extract is added and stirred until completely mixed. The mixture is then placed in a tinted lip balm container at a temperature of 20-25°C until it hardens (Anisa et al., 2019).

Evaluation of physical characteristics of tinted lip balm preparations

The physical characteristics of tinted lip balm are evaluated through several tests: organoleptic, homogeneity, pH, spreadability, and adhesion. These tests assess the product's appearance, color, odor, texture, mixing evenness, acidity/alkalinity, spreadability on the lips, and how well it adheres to the lips.

Homogeneity test is done by observing the sample under a microscope to ensure the mixture is even. Spreadability test is done by measuring the diameter of the sample smear after being given a load. Adhesiveness test measures the time required to release two glass objects that are stuck together after being given a load. Finally, pH test is done by measuring the pH of the sample solution dissolved in water (Ingale et al., 2024).

Data analysis

This study uses descriptive statistical analysis to explain the characteristics of three tinted lip balm formulations. The differences in the formulations lie in the composition of angsana leaf extract (Pterocarpus indicus) and stiffening agent. Descriptive analysis will provide an overview of the data.

RESULTS

Tinted lip balm physical quality test results:

Organoleptic

This Organoleptic testing of tinted lip balm uses sensory evaluation to assess its appearance, including color, shape, texture, and aroma, after formulation. This helps determine if the product meets quality standards by evaluating its sensory characteristics using the five senses (Imani et al., 2022).

Table 2. Organoleptic

Formula	Texture	Color	Aroma
F1	Semi solid	Burnt orange	Earthy
F2	Semi solid	Brick red	Earthy
F3	solid	Reddish-brown	Earthy

Homogeneity

The homogeneity test in the manufacture of tinted lip balm aims to ensure that all components of the ingredients are mixed evenly and form a stable preparation. This test is important to ensure the quality and effectiveness of the product, because imperfect mixing can cause problems such as uneven color, rough texture, or even separation of ingredients during use (Lailatul et al., 2024).

Table 3. Homogeneity

Formula	Homogeneity
F1	Homogeneous
F2	Homogeneous
F3	Homogeneous

pH

Testing the pH of tinted lip balms is important to ensure their safety and effectiveness. A pH that is too acidic or alkaline can cause irritation, dryness, or other skin problems. A pH test helps ensure that the product is within a safe and appropriate range for application to the skin. Tinted lip balms should ideally have a pH value that matches the pH of the lips, which is around 4.5 to 6.5. This pH range is considered physiological for the skin of the lips, and maintaining the right pH balance is important to prevent irritation and maintain healthy lips (Imani et al., 2022). This can be seen in the test results (Table 4).

Table 4. pH

Formula	pH
F1	6,8
F2	6,3
F3	6,1

Adhesion

The goal of an adhesion test for lip balm is to assess how well the product sticks to the lips over time. This involves measuring how long the lip balm remains on the skin

and how effectively it resists being dislodged or worn away. The lower the adhesive value, the less time the lip balm preparation needs to stick to the lips. The optimal combination of lanolin and cera alba in a preparation, such as lip balm or cream, can improve the adhesion and consistency of the preparation. Lanolin and cera alba both have properties that contribute to the stability and texture of the preparation (Ambari et al., 2020). This can be seen in the test results. (Table 5).

Table 5. Adhesion

Formula	Adhesion
F1	5
F2	6
F3	7

DISCUSSION

Organoleptic

Anthocyanin is a natural pigment found in angsana leaf extract. Anthocyanins, which are responsible for red, purple, and blue colors, can actually degrade and turn brown when heated extremely or in alkaline conditions. This degradation is caused by structural changes in the anthocyanin molecule caused by harsh conditions (Jiang et al., 2018).

A higher F3 composition tends to produce a stronger and longer-lasting fragrance, and can change the texture and increase the viscosity. Examined from the product form test of tinted lip balm, it can be seen that the three formulas, in F1 and F2 have a similar consistency, which is semi-solid. Meanwhile, F3 has a solid consistency. This happens because the cera alba content in F3 is higher than F1 and F2. This shows that the level of cera alba in tinted lip balm affects the level of hardness or density of the product. The higher the cera alba content, the denser the texture of the lip balm. Cera alba (beeswax) is a common ingredient in lip balm that functions as a thickening agent and texturizer (Mikhania et al. , 2023).

Homogeneity

This shows that the process of making tinted lip balm has been done well so that all ingredients are mixed evenly and homogeneously. The homogeneity of the tinted lip balm formulation is influenced by the stirring rate. Stirring too fast or too slow can affect the distribution of ingredients in the preparation, thus affecting the level of homogeneity (Lailatul et al., 2024).

Differences in the composition of cera alba in a preparation, such as lip balm, can cause differences in the texture and physical properties of the preparation, even though the goal is to achieve a homogeneous mass. Cera alba itself is a material used to increase viscosity and stabilize the preparation. This is because cera alba has good properties as a binder and wax so that it can produce a homogeneous preparation mass (Mulyati et al. , 2024).

pH

Formula 1 of tinted lip balm has a pH of 6.8. Tinted lip balm with a pH of more than 6.5, especially those containing cera alba (beeswax), can cause negative effects on the skin of the lips. Although cera alba is useful as a binder and emulsifier, the high pH of lip balm can reduce the natural moisture of the lips and cause irritation or dry and chapped lips (Diantoro et al., 2019).

In addition, the structure and type of additives in tinted lip balm preparations can affect their pH value. The pH of tinted lip balm preparations needs to be considered because it can affect the stability, safety, and effectiveness of the product. Cera alba (beeswax) contains fatty acid esters consisting of carboxylic acid functional

groups and various long-chain alcohols. More precisely, cera alba is composed of a mixture of various fatty acid esters and long-chain alcohols. The carboxylic acid functional group (-COOH) is found in the fatty acids that make up the ester. While Lanolin is composed of esters and ketones, but cannot be categorized as acids. The pH value of 4-7 refers to a solution of lanolin in water (10% Aq), and this indicates that lanolin has slightly acidic or neutral properties. Therefore, the combination of cera alba and lanolin generally produces preparations with a slightly acidic to neutral pH. Cera alba and lanolin are both amphoteric materials, meaning they can react with both acids and bases, but naturally, they tend to have a pH that is close to neutral or slightly acidic (pH 6-7) (Eryani, 2024).

Adhesion

The results of this study indicate that the three formulas (F1, F2, and F3) have adhesive power that meets the requirements, which is more than 4 seconds. This indicates that the three formulas have good adhesive power, according to the standards or criteria that have been set. Based on research journals, good adhesive power for gels is generally above 4 seconds. The adhesive power of a preparation can indeed be influenced by the additional substances used, including its physical form.

In this study, cera alba (white wax) in the form of a solid wax plate and lanolin (adeps lanae) in the form of a semi-solid were used as additional substances. This difference in physical form can affect how the substances interact in the preparation and ultimately affect the adhesive power of the preparation. Sukoharjanti et al. (2024) Cera alba (beeswax) is commonly used in lip balms as a thickening and adhesive agent. Increasing the composition of cera alba can enhance the lip balm's adherence to the lips, helping it stay on longer. However, if the composition is too high, the lip balm can become too firm and difficult to spread, reducing its usability.

Aeni et al. (2024), the addition of lanolin can enhance the adhesive properties of certain preparations, particularly those containing requiring a tacky surface. Lanolin, a waxy substance derived from sheep's wool, is known for its emollient and moisturizing qualities, but it also acts as a softening agent and can contribute to the stickiness or "tack" of a substance.

CONCLUSION

Based on the findings of the research that has been conducted, it can be concluded that the variation in the composition level of angsana leaf extract (Pterocarpus indicus) and Stiffening Agent shows a good physical quality assessment of F2 tinted lip balm.

REFERENCES

Ingale, M., et al. (2024). Preparation and Evaluation of Lip Balm. International Journal of Advanced Research in Science, Communication and Technology (IJARSCT), 4(3), 196–199.

Dharmaraj, V., et al. (2021). Phytochemical profiling and GC-MS analysis of Pterocarpus indicus willd. Using ethanolic stem bark and leaves extract. International Journal of Botany Studies, 6(1), 395–399.

Devi, P., et al. (2025). Formulation And Evaluation of Lipbalm with Natural Ingredients. International Journal of Pharmaceutical Science (IJPS), 3(2), 303-310.

Ramarao, I., et al. (2024). Natures Nuance: Formulating Herbal Lip Balm for Optimal Care. International Journal Of Innovative Research In Technology, 11(3), 1537–1547.

Anisa, H., et al. (2019). A simple formulation of lip balm using carrot

extract as a natural coloring agent. Journal of Physics: Conference Series, 1402, 1–5.

Setyawaty, R., et al. (2018). The Usage of Jati Leaves Extract (Tectona grandis L.f) as Color of Lipstick. Traditional Medicine Journal, 23(1), 16-22.

Jiang, T., et al. (2018). Degradation of anthocyanins and polymeric color formation during heat treatment of purple sweet potato extract at different pH. Food Chemistry, 274(4), July 2018.

Imani, C., et al. (2022). Moisture Test Of Aloe Vera (Aloe Vera L.) Leaf Extract Lip Balm. Jurnal Pharma Bhakta, 2(1), 44-51.

Diantoro, M., et al. (2019). Performance of pterocarpus indicus willd leaf extract as natural dye tio2-dye/ito dssc. Materials Today: Proceedings, 17, 1268–1276, Januari 2019.

Ardhana, C., et al. (2024). Uji Stabilitas Fisik Sediaan Pelembab Bibir (Lip Balm) Ekstrak Etanol Buah Tomat (Solanum lycopersicum L.). PHARMACON, 13(1), 438-447.

Eryani, M., et al. (2024). Lip Balm Formulation and Physical Properties Evaluation Of Yellow Pumpkin Fruit (Cucurbita Moschata Duchesne) Ethanol Extract with Cera Alba Variation Concentration. Indo J Pha, 6(3) 128-134.

Sukoharjanti B., et al. (2024). Pengaruh Konsentrasi Variasi Basis Cera Alba Terhadap Uji Evaluasi Mutu Fisik Sediaan Lip Balm Ekstrak Kulit Buah Naga Merah (Hylocereus Polyrhizus). IJF (Indonesia Jurnal Farmasi), 9(1), 44–51

Sarwanda, H., et al. (2021). Formulasi Lip Balm Minyak Almond dan Ekstrak Biji Kesumba Keling (Bixa orellana L.) Sebagai Pewarna Alami Lip. Proceeding of Mulawarman Pharmaceuticals Conferences, 13, 80–84

Aeni, N., et al. (2024). Microbiological and Hedonic Test of Lanolin Listick with the Addition

of Rosella Flower (Hibiscus sabdariffa L) Extract Dye. Jurnal Peternakan Integratif, 12(01), 42–46.

Mikhania, C. E., et al. (2023). Pengaruh Variasi Konsentrasi Cera Alba Terhadap Sifat Fisik Lip Balm Ekstrak Kulit Buah Naga (Hylocereus polyrhizus). Jurnal Ilmiah Farmasi Akademi Farmasi, 6(2), 25–30.

Lailatul, S., et al. (2024). Formulasi Sedian Lip Balm Ekstrak Buah Naga Merah (Hylocereus Polyrhizus) Sebagai Pewarna Alami. Jurnal Ilmiah Farmasi Akademi Farmasi, 7(1), 1-11.

Ambari, Y., et al. (2020). Studi Formulasi Sediaan Lip Balm Ekstrak Kayu Secang (Caesalpinia sappan L.) dengan Variasi Cera Alba. Journal of Islamic Pharmacy, 5(2), 36–45.

Suena, N., et al. (2022.) Formulation and Physical Quality Evaluation of Hylocereus lemairei Rind Extract Lip Balm with Cera Alba Concentration Variations. USADHA: Jurnal Integrasi Obat Tradisional, 2(1), 65–72.

Mulyati, L., et al. (2024). Empowering Natural Medicine: Combining Brotowali Extract (T.Crispa) with Lampung Natural Zeolite to Improve Diabetic Wound Healing. IJNP (Indonesian Journal of Nursing Practices), 8(1), 1–11.

Sholehah, Y., et al. (2022). Formulasi Dan Evaluasi Sediaan Lipbalm Ekstrak Umbi Bit Merah (Beta Vulgaris L.) Sebagai Antioksidan. Journal of Pharmaceutical Care and Sciences, 3(1), 14–26.