



# Reviving the balm of Gilead: A contemporary formulation inspired by historical wisdom

Sara Gonçalves<sup>1,2,3\*</sup> 

<sup>1</sup>Academic Clinical Center of Trás-os-Montes and Alto Douro: Professor Doctor Nuno Grande – CACTMAD, University of Trás-os-Montes and Alto Douro, 5000-801 Vila Real, Portugal

<sup>2</sup>Department of Genetics and Biotechnology and CECAV, University of Trás-os-Montes and Alto Douro, 5000-801 Vila Real, Portugal

<sup>3</sup>Department of Laboratory for Animal and Veterinary Sciences (AL4Animals), University of Trás-os-Montes and Alto Douro, 5000-801 Vila Real, Portugal

## Abstract

**Background and aims:** The balm of Gilead, steeped in cultural significance, remains enigmatic due to its undefined composition and preparation methods. This study aims to recreate a formulation inspired by this elusive balm, combining historical insights with modern botanical knowledge.

**Methods:** The study employed *Populus balsamifera* seeds infused with organic olive oil, mirroring historical practices. Essential oils—myrrh, frankincense, and cedar—were selected. Evaluation encompassed appearance, texture, aroma, and pH alignment with historical context and dermatological compatibility.

**Results:** The formulated balm exhibited a smooth texture, earthy aroma, and a pH of 5.5, akin to skin's natural acidity. These attributes echoed historical practices and holistic approaches.

**Conclusion:** While the formulation mirrors historical attributes, challenges persist due to the genuine balm's undefined composition. The study highlights the potential of employing *Populus balsamifera* due to limitations. Future directions include chemical analyses and clinical studies to validate therapeutic potential, bridging historical wisdom with contemporary science.

**Keywords:** Essential oil, Cosmetic, Natural ingredient, Balm, Traditional medicine

## \*Corresponding Author:

Sara Gonçalves,  
Email: [sgoncalves@utad.pt](mailto:sgoncalves@utad.pt)

Received: August 31, 2023

Accepted: July 14, 2024

ePublished: July 30, 2024

## Introduction

"Is there no balsam in Gilead?" a poignant question posed by the prophet Jeremiah in ancient times, encapsulates the mystique and allure surrounding the legendary substance known as the balm of Gilead (1). Throughout history, this enigmatic balm has captured the imagination of cultures and civilizations across the globe, invoking visions of healing, luxury, and exoticism. Embedded in the rich tapestry of historical texts and folklore, the balm of Gilead has transcended its physical form to become a symbol of spiritual solace, physical restoration, and botanical intrigue.

Originating from the region of Gilead, an ancient territory spanning parts of present-day Jordan, Israel, and the West Bank, the balm holds a significant place in the historical and cultural narrative of the Middle East (2). Referred to as "*balmon*" in Greek, it is believed to have been derived from the resinous exudates of various plant species, notably *Commiphora* species such as *Commiphora gileadensis* (3). Historical references, including those found in the Bible, highlight the value attributed to this substance. In addition to Jeremiah's lament, the Song of Solomon mentions the balm's alluring scent, and Egyptian and Roman texts extol its medicinal and cosmetic

virtues (2,4,5).

The balm's properties were believed to be wide-ranging, encompassing physical and spiritual realms. Its aromatic profile, often sweet and soothing, made it a prized ingredient in perfumery and cosmetics (5). The substance was sought after for its reputed healing properties, leading to its application in traditional medicine for ailments ranging from wounds and skin conditions to respiratory issues and digestive troubles (2).

While historical accounts have bestowed the balm of Gilead with near-mythical qualities, factual information about its precise composition and preparation methods has yet to be discovered. The scarcity of reliable records has sparked debates and speculation among scholars and enthusiasts alike. Our study explores some of the mysteries surrounding this ancient treasure in this context. By employing botanical knowledge, modern techniques, and a deep respect for the historical and cultural context, we embarked on a journey to recreate a formulation inspired by the balm of Gilead. Guided by historical indications and informed by contemporary botanical wisdom, we aimed to capture the essence of this revered substance while acknowledging the challenges and opportunities presented by the passage of time. Our study is a testament

to the enduring fascination with the balm of Gilead and a tribute to the intersection of nature, history, and scientific inquiry. Through this exploration, we seek to bridge the gap between the past and the present, shedding light on the botanical legacy that has persisted through millennia. This study aims to recreate and evaluate a balm inspired by the historical balm of Gilead, utilizing botanical knowledge and modern techniques.

## Materials and Methods

### Chemicals

Cedar essential oil (INCI: Cedrus Atlantica Wood Oil; CAS: 92201-55-3), Frankincense essential oil (INCI: Boswellia Carterii (Frankincense) Oil; CAS: 89957-98-2), Myrrh essential oil (INCI: Commiphora Myrrha Oil; CAS: 8016-37-3), and Beeswax (INCI: Cera alba; CAS: 8012-89-3) were purchased at Plena Natura (Amadora, Portugal).

Organic olive oil (INCI: Olea Europaea (Olive) Fruit Oil; CAS: 8001-25-0) was obtained from a local organic farmer in July 2023 (Jou, Vila Real, Portugal). *Populus balsamifera* seeds were purchased at Epic of Nature (Grodzic, Poland).

### Infusion of *populus balsamifera* and organic olive oil

To harness the therapeutic potential of *P. balsamifera* seeds, an infusion of its botanical properties in organic olive oil was meticulously prepared. This process involved the deliberate selection of quality ingredients to ensure the extraction of beneficial compounds from the plant material into the carrier oil. The formulation consisted of dried buds of *P. balsamifera* and organic olive oil, each chosen for their distinct attributes. The dried buds were selected for their rich content of resinous compounds and volatile oils that are integral to the plant's therapeutic properties (Figure 1). Organic olive oil, revered for its stability and compatibility with the skin, was chosen as



Figure 1. *Populus balsamifera* buds

the carrier oil to facilitate the extraction and preservation of the active constituents.

The methodology involved a two-step process: coarsely ground dried buds to enhance surface area and then infused in organic olive oil (6). For every 100 g of dried *P. balsamifera* buds, 500 mL of organic olive oil was used, resulting in a 1:5 ratio of plant material to a carrier oil (7). The coarsely ground buds were gently placed into a clean, dry glass jar, and the organic olive oil was poured over them. The jar was tightly sealed to prevent air exposure and contamination. The mixture was then infused for six weeks in a cool, dark place, away from direct sunlight. Throughout the infusion period, the jar was gently shaken every few days to ensure an even distribution of the botanical constituents within the oil.

After the infusion period, the mixture was carefully strained through a fine mesh strainer to separate the infused oil from the plant material residues. The resulting infusion was then stored in sterilized, dark glass bottles to protect it from light and maintain its potency.

### Equipment cleansing and disinfection

Maintaining equipment cleanliness and proper disinfection are vital in product manufacturing and process control. Thorough and systematic cleaning and disinfection procedures are essential to eliminate contaminants, residues, and potential microbial populations that might compromise product quality and safety. Adhering diligently to established protocols, these practices effectively sanitize equipment, thereby minimizing the risks associated with cross-contamination and microbial proliferation. The cleansing phase targets the removal of physical debris and substances, while disinfection aims to eliminate harmful microorganisms. These measures uphold stringent hygiene standards and contribute to equipment's extended longevity and optimal functionality. By executing a well-defined regimen of equipment cleansing and disinfection, the overall integrity of products is safeguarded, process reliability is enhanced, and regulatory requirements are met. This approach cultivates a controlled and secure manufacturing environment conducive to safe and high-quality production.

### Records

A traceability worksheet was meticulously generated for every preparation and presented in Table 1. Serving as an indispensable tool for record-keeping, this worksheet captures vital data that ensures accountability and transparency throughout the entire product lifecycle. It concisely compiles essential information, encompassing the International Nomenclature of Cosmetic Ingredients (INCI) name, batch number, utilized quantities, and respective due dates for each ingredient. Beyond its brevity, this pivotal record is crucial in facilitating the streamlined monitoring of ingredient utilization and bolstering quality control, adherence to regulatory standards, and rapid responsiveness to potential issues.

**Table 1.** Traceability worksheet

Date: 10/08/2023		Final Quantity: 400g		
Ingredient	INCI Name	Quantity (g)	Batch No.	Due Date
Populus balsamifera and organic olive oil infusion	Populus balsamifera seeds and Olea europaea (olive) fruit oil	280	N/S	08/2024
Beeswax	Cera alba	116	CABP009	05/2024
Myrrh essential oil	Commiphora myrrha oil	2	0013797	06/2025
Cedar essential oil	Cedrus atlantica wood oil	1	0011875	05/2024
Frankincense essential oil	Boswellia carterii (Frankincense) oil	1	0012934	01/2025

The systematic documentation of these critical particulars through the traceability worksheet empowers enterprises to promptly evaluate ingredient deployment, authenticate product integrity, and ensure punctual compliance with due dates. This worksheet reinforces the cornerstone of a dependable and well-organized supply chain through its straightforwardness, ultimately fortifying product quality and safety while upholding a methodical and practical production process.

### Balm of Gilead

The exact formulation is described in Table 2.

The preparation of these cosmetic ingredients was as follows:

1. The process was initiated by sterilizing all equipment, containers, and utensils to ensure a clean and hygienic environment for formulation.
2. A stainless-steel bowl (Aromazone, France) was used for phase A, with the ingredients accurately weighed using a digital scale (Plena Natura, 200 g/0,01 g).
3. The Phase A mixture was heated to 75°C using a double boiler until the beeswax had melted completely. The mixture was stirred well to ensure uniform blending of the ingredients (Electric Mini Mixer, Gran Velada).
4. The mixture was allowed to cool down to a suitable temperature (around 40-45 °C).
5. Phase B (essential oils) ingredients were added to the mixture and stirred for two minutes to ensure even distribution.
6. Stirring was continued periodically as the mixture cooled to prevent any separation or settling of ingredients.
7. Once the mixture had cooled significantly (around 30 °C), it was carefully poured into a sterilized aluminium container.
8. The container was sealed and stored in a cool, dark place to preserve its quality.

### Labelling

Creating labels for homemade cosmetics plays a vital role in formulating and sharing personal care items. Although not bound by stringent commercial product regulations, accurate and considerate labelling remains essential. A comprehensive homemade cosmetic label should encompass fundamental particulars, including the product's name, a detailed ingredient list, and clear instructions for usage. Prioritizing transparency becomes

**Table 2.** Balm of Gilead formulation

Phase	Ingredient	%
A	Populus balsamifera and organic olive oil infusion	90
A	Beeswax	9
B	Myrrh essential oil	0.5
B	Cedar essential oil	0.25
B	Frankincense essential oil	0.25

pivotal in highlighting allergens or potential sensitizing components to uphold consumer safety. Moreover, including details such as the creation date or a distinctive batch number contributes to establishing a sense of traceability and accountability. At the same time, the design can reflect the unique style of the creator, ensuring that the label remains easily readable and comprehensible remains imperative.

While this study did not create a specific label design, the principles outlined serve as essential guidelines for anyone looking to produce and share homemade cosmetics responsibly. These recommendations underscore a commitment to responsibility and a profound regard for the well-being of those who engage with the products. Thus, a thoughtfully crafted label highlights a creator's dedication to consumer safety and product quality even without obligatory regulatory guidelines.

### pH Measurement

The pH was measured using pH strips (Aroma-zone, Paris, France). A small amount of the product was diluted in distilled water to create a solution suitable for testing. The pH strip was immersed in the solution, and the resulting colour change was compared against the standard pH scale provided with the strips. This process was repeated three times to ensure the accuracy and reliability of the measurements.

### Evaluation of appearance characteristics

The appearance of the formulated balm of Gilead was evaluated based on several key parameters to ensure consistency, quality, and aesthetic appeal. The following criteria were assessed:

- **Colour:** The colour of the balm was observed and recorded under natural daylight conditions to ensure it met the expected visual standards. Any deviations or inconsistencies in colour were noted.
- **Texture:** The texture of the balm was assessed by

touch and application. The product was tested for smoothness, consistency, and absence of graininess. A small amount of balm was applied to the skin to evaluate how easily it spread and absorbed.

- **Homogeneity:** The homogeneity of the balm was checked by visually inspecting a small sample to ensure that the ingredients were evenly distributed throughout the product. Any signs of separation or uneven mixing were documented.
- **Gloss and Shine:** The gloss and shine of the balm were evaluated by applying a small amount to a surface and observing the finish. The product was checked for the desired level of shine without appearing oily or greasy.
- **Stability:** The stability of the appearance was monitored over time. Samples of the balm were stored at room temperature, and periodic observations were made to check for changes in colour, texture, or separation over several weeks.

#### Testing on different skin types

The balm of Gilead was tested by 30 volunteers with various skin types, including dry, oily, combination, and sensitive skin. Each tester applied the balm to a small area of their skin for one week. Feedback was collected regarding the sensory attributes, adverse reactions, and overall satisfaction with the product.

#### Test conditions and survey design

The testing was conducted under controlled conditions to ensure consistent and reliable results. Each tester was instructed to apply the balm similarly, using a clean fingertip to apply a small amount to a designated skin area. Testers were asked to use the balm twice daily, in the morning and evening.

A standardized survey form was designed to evaluate the appearance and sensory attributes (Supplementary file 1). The survey included specific questions about:

- **Appearance:** Colour, texture, and homogeneity of the balm.
- **Application:** Ease of application, spreadability, and absorption.
- **Sensory attributes:** Initial feel upon application, sensation after absorption, and overall tactile experience.
- **Aroma:** Perception of the balm's scent and its pleasantness.
- **Adverse reactions:** Any signs of irritation, redness, or discomfort.
- **Overall satisfaction:** General feedback on the user experience and any improvements suggested.

Testers were asked to rate each attribute on a scale from 1 to 5, with additional space provided for open-ended comments.

## Results

### Appearance characteristics

This study comprehensively evaluated the appearance,

colour, texture, and sensory attributes of the prepared balm of Gilead. The balm exhibited a smooth and creamy texture with a rich consistency, allowing easy application. Its appearance showcased a pale, slightly opaque hue, reflecting the infusion of the botanical ingredients. The colour was reminiscent of the natural hues of the herbal components, contributing to the product's visual appeal. The balm glided smoothly onto the skin upon application, imparting a velvety sensation. The amalgamation of myrrh, frankincense, and cedar essential oils contributed to a subtle yet distinct aromatic profile described as earthy and soothing. Overall, the sensory attributes of the prepared balm of Gilead synergistically combined to provide users with a pleasurable tactile experience and a pleasing aroma, aligning with the holistic approach of natural and botanical-based personal care products (Figure 2).

### pH Measurement

The pH measurement of the prepared balm of Gilead yielded results within a narrow range of 5.5. This mildly acidic pH level aligns closely with the natural pH of healthy skin, indicating compatibility with the skin's acid mantle. Maintaining this pH range is essential as it helps support the skin's barrier function and microbiome balance. The formulation's pH value falls within an optimal range for skin application, contributing to the overall dermatological compatibility of the balm. This result further underscores the thoughtful formulation approach taken in this study to ensure that the balm not only harnesses the benefits of its botanical constituents but also maintains harmony with the skin's physiological environment.

### User testing results

Feedback from the 30 testers indicated that the balm of Gilead was well-received across different skin types. Testers with dry skin reported enhanced hydration and smoothness, while those with oily skin appreciated the non-greasy finish. Users with sensitive skin reported no adverse reactions; overall satisfaction was high among all



Figure 2. Final balm of Gilead

participants. This diverse feedback supports the balm's versatility and suitability for various skin types.

### Discussion

The need for authentic historical records about the composition and preparation methods of the genuine balm of Gilead presents a notable challenge in contemporary research. While historical references allude to the resinous origin of the balm of Gilead from the species *Commiphora gileadensis*, the unavailability of this particular resin posed a significant limitation in this study (2). In light of this limitation, an alternative approach was undertaken by selecting the resin of *P. balsamifera*, a tree known for its similar botanical characteristics. This selection was driven by its historical usage and shared botanical traits that could yield comparable properties to those attributed to the genuine balm of Gilead.

The meticulous infusion process imparted the botanical essence of *P. balsamifera* was to the carrier oil, creating a potent and versatile infusion formulation that holds promise for various applications in traditional and natural medicine. This infusion offers a holistic approach to harnessing the therapeutic properties of *P. balsamifera*, with the organic olive oil serving as a carrier that preserves and delivers the plant's healing attributes.

In addition to the resin, selecting essential oils was crucial in capturing the balm's potential sensory and therapeutic attributes. Myrrh, recognized for its aromatic richness and traditional use in skincare for its purported wound healing and anti-inflammatory properties, was included in the formulation. Frankincense, known for its spiritually grounding aroma and historical relevance in skincare, was chosen for its potential to enhance the overall sensory experience. Cedar essential oil, renowned for its woody and earthy aroma and potential antibacterial properties, was also selected (5). These essential oils were carefully chosen to mirror the historical context of essential oil use during the balm's creation.

Notably, the chosen essential oils contribute to the balm's sensory appeal and align with historical practices. Myrrh, frankincense, and cedar have all enjoyed historical significance for their potential therapeutic effects, making them fitting candidates for a formulation aimed at emulating the balm's potential benefits. However, it is important to acknowledge that while these essential oils have been traditionally associated with such properties, their precise effects within the specific balm formulation warrant further investigation.

Aromatherapy, a holistic practice rooted in ancient traditions, holds a profound connection between scent, emotions, and overall well-being. In the context of the balm of Gilead formulation, including myrrh, frankincense, and cedar essential oils extends beyond their physical attributes to evoke a multisensory experience. Aromatherapeutic principles suggest that inhaling the delicate aroma of these oils can trigger emotional responses, influencing mood, relaxation, and mental clarity. As users gently apply the

balm to their skin, they engage in a sensorial ritual that invites them to immerse themselves in the calming and grounding scents reminiscent of historical practices. This sensory journey enhances the skin-body connection, where the aromatic cues resonate with emotional states. The balm becomes a conduit for intertwining historical tradition and contemporary well-being, offering users a unique opportunity to experience the harmonious fusion of ancient botanical wisdom and modern aromatherapy practices.

### Conclusion

The pursuit of recreating the balm of Gilead has shed light on the challenges and opportunities presented by the scarcity of historical records and the unavailability of certain key ingredients. The formulation crafted in this study, utilizing an infusion of *P. balsamifera* and a selection of essential oils, is a testament to the intricate interplay between historical knowledge and modern scientific exploration. There needs to be definitive historical information about the balsam's composition and preparation methods to support the need for innovative approaches that bridge the gap between cultural heritage and contemporary research.

The formulation's reliance on *P. balsamifera* as an alternative highlights the flexibility and adaptability of botanical resources in achieving similar therapeutic potentials. While the infusion process allows for extracting the plant's beneficial properties into the carrier oil, further investigations could delve into the precise constituents responsible for the balsam's potential benefits. The deliberate selection of myrrh, frankincense, and cedar essential oils resonates with historical practices. It aims to capture the essence of the balsam's sensory and potential therapeutic attributes.

This study marks a starting point for unravelling the mysteries surrounding the balm of Gilead. It offers a model for researchers seeking to reinterpret ancient remedies within a modern context. The collaborative effort of historical insights and scientific methodologies paves the way for a more comprehensive understanding of botanical traditions. Future research endeavours can extend into exploring the formulation's potential applications and validating its sensory and therapeutic attributes. By embracing the synthesis of historical wisdom and contemporary science, the recreation of Gilead's balm becomes an endeavour to preserve cultural heritage and a catalyst for innovative exploration in natural and botanical-based remedies.

Delving into the chemical profiles of the infused *P. balsamifera* oil and the selected essential oils could offer insights into the mechanisms underlying the potential benefits observed in this formulation. Additionally, comprehensive clinical studies, including dermatological assessments and user trials, are essential to validate the efficacy and safety of the recreated balm. A rigorous investigation of the formulation's impact on wound

healing, skin hydration, inflammation reduction, and overall skin health would provide concrete evidence of its therapeutic potential. Furthermore, exploring the interaction between the balm's aromatherapeutic properties and its effects on emotional well-being could shed light on its holistic experience, bridging the gap between sensory satisfaction and potential therapeutic outcomes. Ultimately, a multidisciplinary approach encompassing botany, chemistry, dermatology, and aromatherapy is essential to unravel the full extent of the balm of Gilead's potential benefits and to establish its place in contemporary skincare and wellness practices.

#### Acknowledgements

The author would like to thank Dinis Gonçalves, an organic farmer, for providing the organic olive oil used in this study. The author would like to thank the Instituto Português de Cosmética Natural (@institutoptcosmeticanatural) for helping in the formulation.

#### Competing Interests

The author declares that the research was conducted without any commercial or financial relationships that could be construed as a potential conflict of interest.

#### Data Availability Statement

Data supporting the findings and conclusions are available upon request from the corresponding author.

#### Ethical Approval

This study did not involve human participants, animal subjects, or procedures requiring ethical approval. Ethical approval was unnecessary as it focused solely on the formulation and labelling guidelines for homemade cosmetics.

#### Funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

#### Supplementary File

Supplementary file. User Survey for Balm of Gilead Evaluation

#### References

1. Watch Tower Bible and Tract Society of Pennsylvania. The New World Translation (Study Edition). NWT Study Bible [Internet]. JW.ORG. 2023. Available from: <https://www.jw.org/en/library/bible/study-bible/books/>. Accessed August 29, 2023.
2. Watch Tower Bible and Tract Society of Pennsylvania. Bálamo, Bálamo de Gileade — BIBLIOTECA ON-LINE da Torre de Vigia [Internet]. 2010. Available from: <https://wol.jw.org/pt/wol/d/r5/lp-t/1200000548?q=b%C3%A1lamo+de+gileade&p=par>. Accessed August 29, 2023.
3. Useful Tropical Plants. Commiphora Gileadensis [Internet]. 2022. Available from: <https://tropical.theferns.info/viewtropical.php?id=Commiphora+gileadensis>. Accessed August 29, 2023.
4. Goldman L. Letter: the balm of Gilead. Arch Dermatol. 1976;112(6):881.
5. Ben-Yehoshua S, Borowitz C, Hanuš LO. Frankincense, myrrh, and balm of Gilead: ancient spices of Southern Arabia and Judea. In: Janick J, ed. Horticultural Reviews. Wiley; 2011. p. 1-76. doi: 10.1002/9781118100592.ch1.
6. Proença da Cunha A, Pereira da Silva A, do Céu Costa M, Rodrigues Roque O, Proença da Cunha H, Proença Portugal M. Manual de Plantas Medicinais: Bases Farmacológicas e Clínicas. Dinalivro; 2017.
7. Green J. The Herbal Medicine-Maker's Handbook [Internet]. 1st ed. USA: Crossing Press; 2000. Available from: [https://books.google.com/books/about/The\\_Herbal\\_Medicine\\_Maker\\_s\\_Handbook.html?hl=pt-PT&id=J\\_LZhWKeHj4C](https://books.google.com/books/about/The_Herbal_Medicine_Maker_s_Handbook.html?hl=pt-PT&id=J_LZhWKeHj4C). Accessed October 27, 2022.

**Cite this article as:** Gonçalves S. Reviving the balm of Gilead: a contemporary formulation inspired by historical wisdom. Future Nat Prod. 2023;9(2):82–87. doi: 10.34172/fnp.2308-1256