

## ELEVATE AND DEVELOPMENT OF MICRO HERBAL LIPSTICK PREPARATION USING *Lactobacillus sp.*

Ananya Routh, Senjuti Mondal, Ittika Karan, Anindita Ghosh, Tithi Das, Srma Patra,  
Paramita Dinda, Manat Chakraborty, Suman Murmu, Tilak Das, Akash Dey, Preetom Datta,  
Raunak Mallik, Dr. Somnath De\*

Department of Biotechnology Panskura Banamali College (Autonomous), West Bengal, India.

Article Received: 11 April 2026 | Article Revised: 02 May 2026 | Article Accepted: 22 May 2026

**\*Corresponding Author: Dr. Somnath De**

Department of Biotechnology Panskura Banamali College (Autonomous), West Bengal, India.

DOI: <https://doi.org/10.5281/zenodo.20444204>

**How to cite this Article:** Ananya Routh, Senjuti Mondal, Ittika Karan, Anindita Ghosh, Tithi Das, Srma Patra, Paramita Dinda, Manat Chakraborty, Suman Murmu, Tilak Das, Akash Dey, Preetom Datta, Raunak Mallik, Dr. Somnath De (2026) ELEVATE AND DEVELOPMENT OF MICRO HERBAL LIPSTICK PREPARATION USING *Lactobacillus sp.* World Journal of Pharmaceutical Science and Research, 5(6), 265-269.



Copyright © 2026 Dr. Somnath De\* | World Journal of Pharmaceutical Science and Research.

This work is licensed under creative Commons Attribution-NonCommercial 4.0 International license (CC BY-NC 4.0).

### ABSTRACT

The increasing demand for natural and safe cosmetic products has led to the development of herbal formulations with added biological benefits. This study focuses on the preparation of a micro herbal lipstick incorporating *Lactobacillus sp.*, aiming to provide moisturizing, antimicrobial, and probiotic effects. Herbal ingredients such as plant-based waxes, oils, and natural pigments were used along with microencapsulated *Lactobacillus* species. The formulation was evaluated for physicochemical properties, stability, spread ability, and microbial safety. Results indicated that the developed lipstick was stable, safe, and showed potential antimicrobial benefits, suggesting its application as a novel functional cosmetic.

**KEYWORDS:** Micro herbal lipstick, phytochemicals, *Lactobacillus spp.*

### INTRODUCTION

The word "cosmetics" is derived from the Greek word "Kosmtikos," which implies "organization, power, and skill in beautifying".<sup>[1]</sup> Cosmetics are formulas used to enhance human beauty. In both established and developing nations, cosmetics such as lipstick, skin care creams, lotions, perfumes, powders, hair colors, nail polish, gels, infant items, and more are in great demand.<sup>[2]</sup> The demand for herbal cosmetics, which are a priceless gift from nature, is rising globally. A wide variety of herbal cosmetics are available to support our beauty regimen.<sup>[3]</sup> Because they are harmless for the skin and don't irritate it or cause other issues, herbal cosmetics are growing in popularity. Herbal cosmetics are sometimes referred to as "natural cosmetics." First, one or more herbal ingredients are carefully blended into a natural basis.<sup>[4-6]</sup>

Cosmetics play a vital role in daily personal care, with lipsticks being one of the most widely used products. Conventional lipsticks may contain synthetic chemicals that can cause adverse effects such as dryness, irritation, or allergic reactions.

According to a recent survey, natural cosmetics are among the most popular skin care products worldwide since they are thought to be safer than their chemical-based counterparts and can shield the skin from damaging UV rays.

Lipstick, sometimes known as crayon lip color, is a cosmetic product that uses pigments, oils, waxes, and emollients to provide the lips color, texture, and protection. One of the most often used cosmetics is lipstick. To keep your lips smooth and shiny, you can use several lip colors as lip balms.<sup>[4]</sup> Herbal lipsticks are gaining popularity due to their natural origin, safety, and therapeutic properties. The incorporation of probiotic microorganisms such as *Lactobacillus sp.* introduces a novel concept in cosmetic science.

## MATERIALS AND METHODS

### Isolation of *Lactobacillus spp.*

The best source of lactobacillus species is curd. in addition to other dairy products like buttermilk and milk. A sterile flask is used to hold the curd. Curd was serially diluted between  $10^{-2}$  and  $10^{-5}$  under aseptic conditions;  $10^{-4}$  was chosen from these dilutions. On MRS medium, the spread plate technique is combined with the streak plate technique. They are kept in an incubator at  $37^{\circ}$  degrees Celsius, which is the ideal temperature for Lactobacillus broth. 24 hours of incubation at  $37^{\circ}$ C. Lactobacillus species growth was observed in broth after 24 to 48 hours, and these species were present after 24 hours. Following the incubation phase, the particular isolated colonies were cultivated. The colonies that were discovered to be Lactobacillus species underwent colony characterisation. One colony completely resembles Lactobacillus acidophilus. Gram stain and biochemical assays were used to identify the isolated colony that developed on the MRS agar plates. In accordance with Bergey's manual of determinative bacteriology, the identification was carried out. For long-term storage, the culture was maintained in an MRS agar slant at  $4^{\circ}$ C.<sup>[7]</sup>

### Biochemical characterization of the isolated bacterial strain

Using the methods outlined in Bergey's Manual of Systematic Bacteriology,<sup>[8]</sup> the isolated bacteria were identified as Lactobacillus species based on their morphological, cultural, physiological, and biochemical traits. Gram staining, Catalase test, Indole test, Methyl Red test, Voges Proskauer test, Starch Hydrolysis test, Milk Coagulation Assay was among the tests performed.

### Preparation of Micro Herbal Lipstick

The micro-herbal lipstick was formulated using a controlled and systematic approach by combining natural herbal ingredients with a probiotic component. Initially, beeswax and shea butter were melted using the water bath method to obtain a smooth and homogeneous base. Coconut oil and castor oil were then added gradually with continuous stirring to ensure proper mixing and to achieve the desired consistency and texture of the formulation.

Beetroot powder was incorporated as a natural colorant and mixed thoroughly to ensure uniform distribution of color throughout the base. Vitamin E was added as a nourishing and antioxidant agent, while rose oil was included to provide a pleasant fragrance and additional soothing properties.

The mixture was then allowed to cool slightly, and when the temperature dropped below 40°C, microencapsulated *Lactobacillus* species were carefully added as a functional probiotic ingredient.

Finally, the prepared formulation was poured into clean and dry lipstick molds and allowed to cool and solidify at room temperature, resulting in a stable, smooth, and well-shaped micro-herbal lipstick suitable for application.<sup>[9,10]</sup>

## RESULTS AND DISCUSSION

The prepared micro-herbal lipstick showed a uniform texture with smooth and easy application. The melting point was found to be within the acceptable range of 60–65°C, indicating good thermal stability, while the pH (~6.5–7) was suitable for safe application on the lips. The formulation exhibited good spread ability without any fragmentation and remained stable under different temperature conditions, with no phase separation or color change observed. The incorporation of *Lactobacillus* species demonstrated mild antimicrobial activity, suggesting its potential role in preventing microbial contamination and promoting lip health by providing a protective barrier. The use of natural ingredients such as beeswax, shea butter, and plant-based additives further ensured better safety and compatibility.

However, maintaining the viability of probiotic organisms during formulation and storage remains a challenge, highlighting the need for proper encapsulation techniques. Further studies are required to evaluate long-term stability and overall effectiveness of the product.

### Identification of *Lactobacillus* spp.

The isolated bacteria were observed by phase contrast microscope. It is clear that the bacteria was gram positive, rod shaped occurring single or in chains forms. The gram staining results indicated that the isolated bacteria could be identified as *Lactobacillus acidophilus*. Hanging drop wet method showed that the isolated bacteria were non motile.

The non motile behaviour is a characteristic of *L.acidophilus*. Therefore the curd sample `bacterium resembles characters similar to *Lactobacillus acidophilus*. The catalase test is one of the most useful diagnostic tests for the recognition of bacteria due to their simplicity. In performing catalase test, no bubble was observed indicating that the isolated bacterium is catalase negative and could not mediate the decomposition of H<sub>2</sub>O<sub>2</sub> to produce O<sub>2</sub>. It is well known that *Lactobacillus* is catalase negative. Thus, the results obtained coincided with *L. acidophilus* strain characteristics. Their distinguishing features are shown in (Table 1 and Figure 1). Their biochemical characters are also shown in the (Table 2).



Fig 1: Microscopic view of *Lactobacillus* sp.

Table 1: Biochemical characterization of the isolated bacterial strain.

Tests	Result
Catalase test	-ve
Indole test	-ve
Methyl red test	+ve

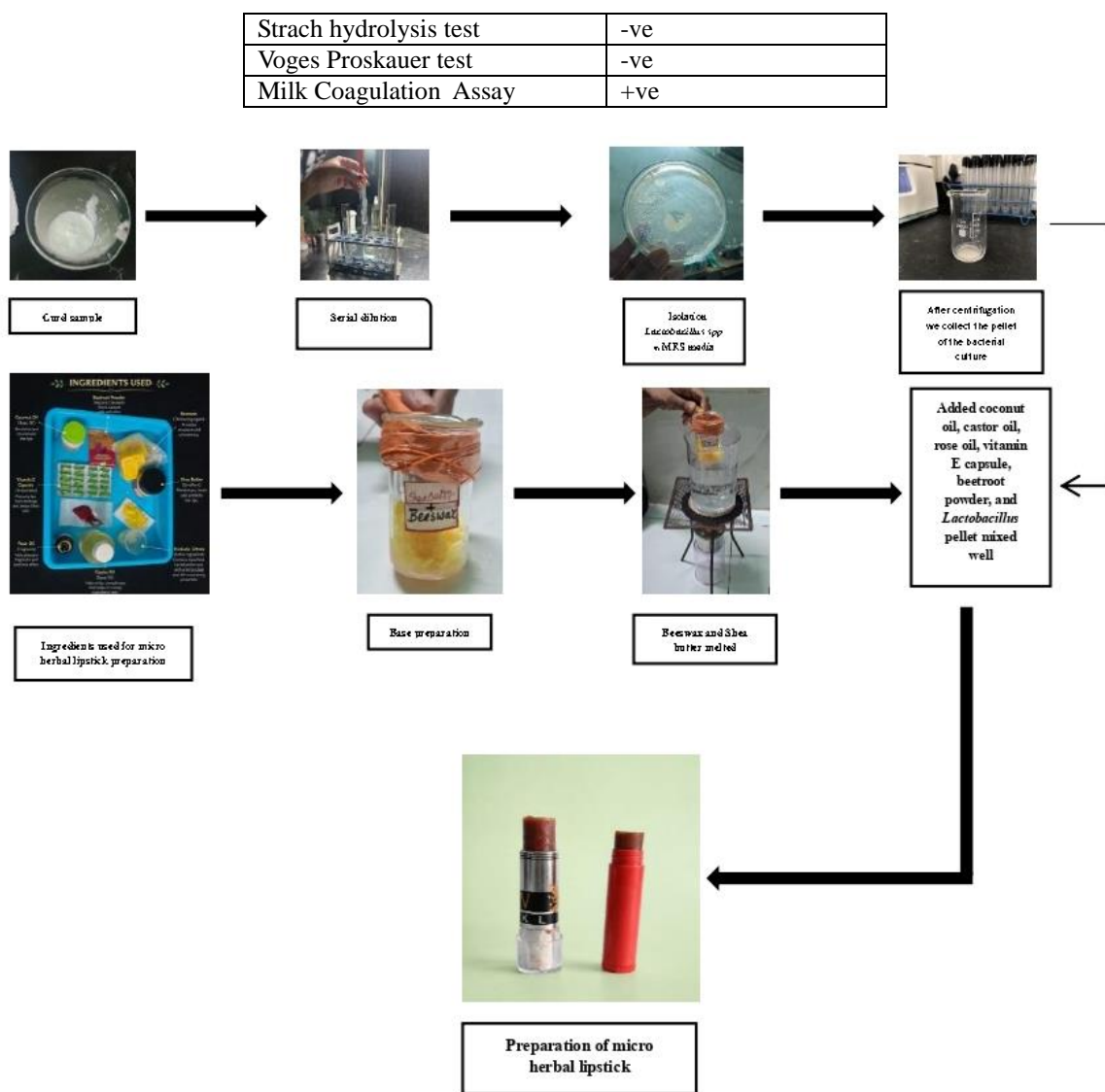


Fig. 2: Preparation of micro herbal lipstick using *Lactobacillus sp.*

**ACKNOWLEDGEMENT**

Authors are thankful to Panskura Banamali College, Karry Mullis Molecular Biology Laboratory (Sponsored by Boost, Government of West-Bengal), India for providing facilities and financial support for the completion of this research work.

**REFERENCES**

1. Priya Patel, Dikshitkumar Modi. Formulation and Evaluation of Herbal Lipstick from Beetroot and Carrot juice. International Journal of Pharmacy and Pharmacy Research, September 2022: 25(2).
2. Rautela Sunil, Tailor Chandra Shekhar, Badola Ashutosh. Formulation and Evaluation of a Herbal Lipstick: A New Approach. International Journal of Pharmaceutical Erudition, May 2013: 3(1): 26-30.
3. Acharya Deepak, Shrivastava Anshu, Indigenous Herbal Medicine, Tribal Formulation and Traditional Herbal Practices, Avishkar Publisher Distributor, Jaipur, India, 2008: 421.
4. Deepika P. Formulation and Evaluation of Herbal Lipstick from the Extract of Papaya. *Int J Pharm Sci Rev Res.*, 2020; 63(1): 107-10. [Google Scholar]

5. Hayati F, Chabib L. Formulation and evaluation of herbal lipsticks from carrot (*daucus carota l*) extract. *Int J Pharm Pharm Sci*, 2016; 8(3): 403-5. [Google Scholar]
6. PP. Formulation and Evaluation of Herbal Lipstick Using Beta Vulgaris and Punica. *Int J Pharma Pharma Res*, 2020; 25(2): 6575-9. [Google Scholar]
7. De man JC, Rogosa M, Sharpe ME. A medium for the cultivation of Lactobacilli. *J. Applied Bacteriol*, 1960; 23: 130-135.
8. Holt JG, Krieg NR, Sneath PHA, Staley JT, Williams ST. *Bergey s manual of determinative bacterial.*, Baltimore, Ninth Edition, Williams And Wilkins, London, UK, 1994; pp 787.
9. Sharma, P. P. (2015). *Cosmetics: Formulation, Manufacturing and Quality Control* (5th ed.). Vandana Publications.
10. Holt JG, Krieg NR, Sneath PHA, Staley JT, Williams ST. *Bergey s manual of determinative bacterial.*, Baltimore, Ninth Edition, Williams And Wilkins, London, UK, 1994; pp 787.