

SHORT COMMUNICATIONS

FORMULATION AND EVALUATION OF COSMETIC PREPARATIONS USING NOVEL NATURAL COLORANT FROM *LANTANA CAMARA* LINN (CHATURANGI) AND *BOMBAX CEIBA* LINN (SHAALMALI)

ABSTRACT

The present work aimed to formulate various cosmetic formulations comprising of extract of *Lantana camara* Linn. and *Bombax ceiba* Linn. as natural coloring agents. Dried and powdered leaves of *L. camara* Linn and dried thorn powder of *B. ceiba* Linn produce red color. The obtained color was used as a natural colorant in the preparation of different cosmetic preparations, namely lipstick, rouge and eye shadow. Different ingredients like bees wax, carnauba wax, white soft paraffin, castor oil and strawberry essence were used to formulate the aforesaid cosmetics using the extracted color. The formulations were evaluated for color, texture, pH, perfume stability, melting point, breaking point, softening point, surface anomalies, aging stability, thixotrophy and patch test depending upon its type. The results revealed that melting points of the prepared lipstick were observed in the range of 62-64 °C. The breaking point of all the lipstick formulations were noted in the range of 31 – 34 g. Force of application was noted to be good for all the formulations. Softening point was found to be in the range of 52.33 to 59.66 °C. Eye shadow and rouge show good adhesion and color dispersion; patch test on volunteers showed no signs of skin irritation. The results verified that the color extracted from the dried leaves of *L. camara* Linn and dried thorn of *B. ceiba* may prove to be a beneficial choice and work as an alternative to synthetic colorants in various cosmetic formulations, which are known to cause allergic reactions and are reported to be carcinogenic.

Keyword: *Bombax ceiba*, *Lantana camara*, Herbal cosmetic, Eye shadow, Lipstick, Rouge

from *L. camara* Linn. (Sanskrit name - Chaturangi) and *B. ceiba* Linn (Sanskrit name – shaalmali).

INTRODUCTION

Now-a-days, the usefulness of herbs in the cosmeceuticals production has extensively increased in personal care system and there is a great demand for herbals¹. In recent years, there has been a gradual revival of interest in the use of medicinal plants in the developing countries, as herbal medicines have been reported to be safe with minimal side effect(s), especially when compared with the synthetic drugs². Ayurveda, the most ancient system of medicine, plays an important role for prevention and cure of diseases and for achieving and maintaining excellent health³. Lipstick is a cosmetic preparation used to color the lips and protect them from external environment. The use of this product has increased and choice of shades of colors, textures, luster, have expanded and become wider⁴. Rouges are designed to enhance rosy cheek color. The dyes that contribute to the color of the cosmetics are very harmful to humans on consumption. Coal tars are the basic ingredients from which synthetic dyes are formed and can cause allergy, nausea, dermatitis, and drying of the skin. In a more severe effect, they can be carcinogenic and even fatal⁵. The present study was therefore undertaken to prepare and evaluate various cosmetics using natural colorant

L. camara Linn. is a flowering ornamental plant belonging to family *Verbenaceae*. *L. camara* is also known as Lantana, Wild Sage, Surinam Tea Plant, Spanish flag and West Indian lantana. Its leaves are used to treat cuts, rheumatism, ulcers, catarrhal infection, tetanus, colds and high blood pressure⁶. *L. camara* has therapeutic potential due to the presence of bioactive compounds viz. flavones, isoflavones, flavonoids, anthocyanins, coumarins, lignans, catechins, isocatechins, alkaloids, tannin, saponins and triterpenoids⁷. In popular medicine, species of *Lantana* are used as carminative, antispasmodic, antiemetic and to treat respiratory disorders as cough, cold, asthma, and bronchitis⁸.

B. ceiba Linn. belongs to the family *Bombacaceae*. According to Ayurveda, it has stimulant, astringent, demulcent, antidiarrhetic, and antipyretic properties⁹. Each part of the tree is of medicinal value and possesses many novel chemical constituents such as shamimicin, bombasin, bombamalone and bombamaloside¹⁰. Medicinal uses include nocturnal emission, semen problems, blood purification and leucorrhoea¹¹. The plant is used in dysentery, menorrhagia, skin troubles and haemorrhoids¹².

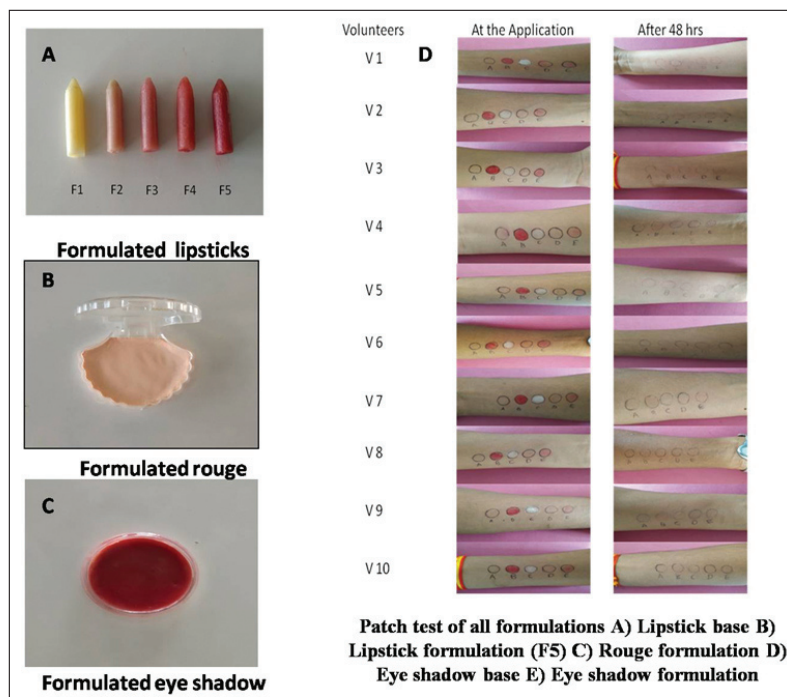


Fig. 1: A) Lipsticks B) Rouge C) Eye shadow D) Patch test

MATERIALS AND METHODS

Materials

Leaves of *L. camara* Linn. and spikes of *Bombax ceiba* Linn were collected from the region of Kasegaon in Maharashtra. The plant material was authenticated from Department of Botany, YC College of Science, Karad, District Satara (MS) where voucher specimens, namely (YC/048/18-19) for *L. camara* Linn and (YC/051/18-19) for *B. ceiba* Linn, are preserved.

Isolation/extraction of color pigments

Dried and powdered leaves of *L. camara* Linn and dried thorn powder of *B. ceiba* Linn produce red color.

The leaves were washed carefully using distilled water and shade dried. The spikes of *B. ceiba* Linn were removed from the stem and dried under shade. The shade dried coarsely powdered leaves of *L. camara* Linn. (25 g) and thorns of *B. ceiba* Linn (25 g) were taken together and the color pigment was extracted by maceration with ethanol (100 mL), and stored in an airtight container till further use.

Preparation of lipstick formulation

The lipstick was formulated as per the general method discussed by Randive D. et al., 2020. Prepared lipsticks are shown in Fig. 1. The prepared lipsticks were fitted in a lipstick container and used for further evaluation⁴ as shown in Fig. 1A.

Preparation of rouge

Perfume (1 g) was mixed properly with rice starch (14.5 g) and the mixture was kept covered for half an hour. The remaining ingredients, namely zinc stearate (14.5 g), and talc (55 g) were mixed thoroughly and sieved through fine muslin. The starch perfume mixture and required color pigment (14 g) were added to this mixture and stored in a suitable container, as shown in Fig. 1B.

Preparation of eye shadow

Pigment color (12 %) was added to zinc oxide 31 % and white petroleum 45 %. The mixture was milled through an ointment mill. Beeswax 5 %, spermaceti 4 % and lanolin 4 % were melted. The color base and perfume (qs) were added to it and the final mixture was milled to obtain an uniform product¹³, as shown in Fig. 1C.

Table I: Evaluation of the prepared formulations on skin (patch test) in human volunteers

Parameter	Average points for A \pm SEM	Average points for B \pm SEM	Average points for C \pm SEM	Average points for D \pm SEM	Average points for E \pm SEM
Ease of application	3.4 \pm 0.2666	3.2 \pm 0.2905	3.4 \pm 0.2211	7.5 \pm 3.9503	3.4 \pm 0.1633
Spreadability	2.7 \pm 0.2333	4 \pm 0.2582	3.3 \pm 0.2134	3.7 \pm 0.1527	3.6 \pm 0.2211
Sense just after application	3.4 \pm 0.400	4.1 \pm 0.2768	3.9 \pm 0.2768	3.8 \pm 0.2494	3.2 \pm 0.1333
Sense on long term	3.6 \pm 0.3055	3.9 \pm 0.1795	3.8 \pm 0.2494	3.8 \pm 0.2905	3.6 \pm 0.1633
Irritation	4.1 \pm 0.1895	4.2 \pm 0.2905	4.1 \pm 0.2333	4.3 \pm 0.2134	4.3 \pm 0.2134
Sense of softness	2.8 \pm 0.2433	4.2 \pm 0.2494	4.3 \pm 0.1522	4.3 \pm 0.1527	3.9 \pm 0.2768

Values are mean \pm SEM of determinations (n=10)

(A: Lipstick base, B: Lipstick formulation (F5), C: Rouge formulation, D: Eye shadow base, E: Eye shadow formulation)

Evaluation of lipstick formulation

Lipstick formulation was evaluated for melting point, breaking point, force of application, surface anomalies, aging stability, pH parameter, perfume stability, softening point, color and texture, solubility test and thixotrophy character as per the standard procedure described^{14,15}.

Evaluation of rouge

Formulated rouge was checked for color and color dispersion by using microscope and pay off test (Adhesion property on skin)¹³.

Evaluation of eye shadow

Formulated eye shadow was checked for color, melting point (capillary tube method) and texture.

Patch test evaluation of volunteers

Skin irritation test

Patch test was performed to check the safety of the formulation and base on human skin. The prepared formulations and base were applied on the forearms of volunteers for 48 h. The observed parameters were ease of application, spreadability, sense just after application and on long term, irritation as well as sense on softness on application of formulations A, B, C, D and E over forearms of volunteers².

RESULTS

Evaluation of lipstick

Melting point

The melting point of formulated lipstick was determined by capillary tube method. The melting points of different formulations were found to be in the range of 62 ± 1 °C to 64 ± 1 °C.

Breaking point

Breaking point was measured to determine the strength of lipstick. It was repeated for 3 times and found to be in the range of 31 ± 10 g to 34 ± 10 g.

Force of application

The pressure reading is an indication of force of application it was found to be good for all prepared formulations.

pH – The pH of all developed lipsticks was in the range of 7.40 ± 0.1254 to 7.71 ± 0.1365 , with stable perfume stability during storage.

Softening point – Softening point of all developed formulations was in the range of 52.33 ± 2.08 °C to 59.66 ± 1.50 °C,

Color- Color of developed batches F1, F2, F3, F4, F5 was white, pale red, crimson red, scarlet red and raspberry red, respectively.

Thixotropic character - It was observed to be between 8.89 ± 0.15 to 9.69 ± 0.4 .

Evaluation of rouge

The prepared rouge was red in color, properly distributed color and pay-off test showed good adhesion.

Evaluation of eye shadow

The developed eye shadow showed red color, having melting point 49.33 ± 1.164 °C and smooth texture.

Patch test evaluation of volunteers

Skin irritation test

The volunteers reported that there was no irritation and redness after application of the prepared formulations. Results of the patch test are shown in Fig. 1D. and Table I.

DISCUSSION

Herbal treatments applied topically have gained popularity due to their widespread use and well-defined benefit/risk ratio¹⁶. In recent years, there has been ongoing revival of interest in the use of herbal plants in the developing countries, as herbal medicines have been found to be safe with negligible side effect(s), especially when compared with the synthetic drugs^{17, 18}. Also, the traditional therapeutic herbal approach amalgamates the combination of different medicinal herbs to achieve additional therapeutic effectiveness¹⁹. Thus, in the current investigation, an attempt was made to formulate and evaluate various cosmetic formulations, namely, lipstick, rouge and eye shadow using colored pigments from the extract *L. camara* Linn. and *B. ceiba* Linn.

CONCLUSION

The results of the present investigation revealed that the colored pigments from the extract of *L. camara* Linn. and *B. ceiba* Linn. can be effectively used as a natural colorant in various cosmetic formulations. To the best of our knowledge, it is the first attempt wherein we have employed colored pigments from the extract of *L. camara* Linn. and

B. ceiba Linn as natural colorants in different cosmetic formulations. The use of a natural colorant will provide a suitable alternative to synthetic colorants. Thus, this colorant which has been derived from the natural origin can be effectively used in various cosmetic preparations and the side effects associated with the use of synthetic colorants can be efficiently minimized.

REFERENCES

1. Mali A., Karekar P. and Yadav A.: Formulation and evaluation of multipurpose herbal cream. **Int. J. Sci. Res.**, 2013, 4, 1495-1498.
2. Bhinge S. D., Bhutkar M. A., Randive D. S., Wadkar G. H., Kamble S. Y., Kalel P. D. and Kadam S. S.: Formulation and evaluation of polyherbal gel containing extracts of *Azadirachta indica*, *Adhatoda vasica*, *Piper betle*, *Ocimum tenuiflorum* and *Pongamia pinnata*, **J. Res. Pharm.**, 2019, 23, 44-54.
3. Randive D. S., Bhinge S. D., Wadkar G. H., Sayyad S. F. and Bhutkar M. A. : Comparative standardization of marketed formulations of fermented biomedicine – Arjunaristha. **Indonesian J. Pharm.**, 2016, 27(4), 220-225.
4. Bhagwat D., Patil N., Patel G., Killedar S. and More H.: Formulation and evaluation of herbal lipstick using lycopene extracted from *Solanum lycopersicum* L. **J. Pharm. Tech.** 2017, 10, 1060.
5. Kothari R., Shukla B., Gautam D., Bagaria M. and Sharma A.: Formulation and evaluation of herbal lipstick from natural edible coloring matter. **Int. J. App. Sci.**, 2018, 10, 17-20.
6. Kalita S., Kumar G., Karthik L. and Rao K.: A Review on medicinal properties of *L. camara* Linn. **Res. J. Pharm. Tech.**, 2012, 5, 711-714.
7. Saxena M., Saxena J. and Khare S.: A brief review on: Therapeutical values of *L. camara* plant. **Int. J. Pharm. Life Sci.**, 2012, 3, 1551-1554.
8. Barreto F., Sousa E., Campos A., Costa J., Rodrigues F.: Antibacterial activity of *L. camara* Linn and *L. montevidensis* Brig Extracts from Cariri-Ceará, **Braz. J. Young Pharm.**, 2010, 2, 42-44.
9. Meena V. and Chaudhary A.: Shalmali (*Bombax ceiba*): Versatility in its therapeutics. **Int. J. Gr. Pharm.**, 2017, 11, S401-S406.
10. Jain V. and Verma S.: Pharmacology of *B. ceiba* Linn. **Springers Brief in Pharmacology and Toxicology** 2012; DOI: 10. 1000/978-3-642-27904:1-2.
11. Verma R., Devre K., Gangrade T., Gore S. and Gour S.: A Pharmacognostic and pharmacological overview on *B. ceiba*. **Sch. Acad. J. Pharm.**, 2014, 3, 100-107.
12. Verma S., Subhani S., Vashishth E., Singh R., Pant P., Padhi M. and Kumar A.: Comparative phytochemical study of stem bark versus small branches of *B. ceiba* Linn using HPTLC- UV detection method. **World J. Pharm. Res.**, 2015, 4, 912-922.
13. Nema R., Rathore K. and Dubey B.: Textbook of cosmetics. 1st ed. CBS Publishers & Distributors; 2009. pp.75-76,171-172.
14. Rajpurohit J., Shaikh S., Valvi P., Jain V. and Pawar S.: Formulation and evaluation of herbal lipstick by using *Bixaorellana* as coloring pigment. **Int. J. Pharm. Chem. Res.**, 2017, 3, 451-455.
15. Rautela S., Tailor C. and Badola A.: Formulation and evaluation of a herbal lipstick: A new approach. **Int. J. Pharm. Erudition** 2013, 3, 26-30.
16. Randive D., Bhinge S., Jadhav N., Bhutkar M. and Shirsat M.: Assessment of antimicrobial efficacy of kohl/kajal prepared by different Indian methods against selected microbial strains., **Int. J. Curr. Pharm. Res.**, 2020, 12(3), 37-44.
17. Randive D., Bhinge S., Bhutkar M., Shejawal K., Mulla A., Thorat M. and Patil P.: Formulation and evaluation of Lipstick, Rouge and Eye shadow using colored pigment from the extract of *Piper betel* and *Acacia catechu*. **Indian Drugs**, 2020, 57(2), 59-66.
18. Bhinge S., Bhutkar M., Randive D., Wadkar G., Todkar S., Kakade P. and Kadam P.: Development and evaluation of antimicrobial polyherbal gel, **Annl. Pharm. Franç.**, 2017, 75(5), 349-358.
19. Randive D., Bhinge S., Bhutkar M., Joshi S., Patil P., Shejawal K., Thorat M. and Mulla A.: Formulation and evaluation of herbal cough remedy from extract of *Calendula officinalis* L., **Indian Drugs**, 2020, 57(4), 52-58.

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