Formulation and Evaluation of Herbal Cream using *Beta vulgaris* and *Aloe barbadensis*

***[1]C. Hemalatha, [1]S. Kokila & [2]V. Abirami**

1. Assistant professor, Department of Clinical Laboratory Technology, Dr. N. G. P. Arts and Science College, Coimbatore.
2. B.Sc., Clinical Laboratory Technology, Dr. N. G. P. Arts and Science College, Coimbatore

ABSTRACT

The demand for herbal cosmetics grows quickly due to their lack of adverse effects. Herbal moisturizer preserves the skin's health texture and appearance without harming the body's stability or ability to function. The formulation ought not to cause adverse skin-related implications. In trials on irritancy, the formulation shows no symptoms of edema, redness, irritation, or inflammation. In addition to its tasks, this form gives UV protection. The purpose of the current investigation was to create and assess an herbal moisturizing cream that included beetroot and aloe vera extracts. Various kinds of oil in water (O/W) herbal moisturizing creams are made by varying the ingredient concentrations. The formulation was assessed using a variety of criteria, including pH, viscosity, and spreadability, to ensure skin safety. Thus, this study suggests that the composition of extract and the base of the cream are more constant and safer, it may produce synergistic action.

Keywords: Herbal moisturizer, Aloe vera, Beetroot, Spreadability, O/W emulsion, Stability

INTRODUCTION

Herbal cosmetics are products that are made with different cosmetic substances as the base, following which one or more herbal compounds are utilized to treat different skin conditions. This allows the skin to remain in contact with its external parts without posing any risks and maintain good texture and appearance to the skin and also protects from UV rays [1]. The vegetable sources used to make the herbal goods include the root, leaf, flower, fruit, plant extract, and even the plant as a whole [2].

Aloe vera, beetroot, and almond oil are the best natural ingredients to use while making herbal creams because of their nutritional and medicinal properties. These substances were selected based on their unique qualities. They are devoid of all harmful synthetic ingredients that are damaging to human skin and also consist of natural nutrients like vitamins and minerals that keep skin healthy, glowing, and lustrous.

For skin, beetroot helps in reducing sun spots, black spots and even acne scars, used as a natural colour in Face creams, body lotions, lip balms, bath salts and bath bombs [3]. Add a small quantity of vegetable glycerine to create an oil with a rich pink to purple hue that can be used to color melt and pour soap. It is therefore the main component of cosmetic creams.

Beetroot (B. vulgaris L.) is a good natural colorant for face creams, body lotions, lip balms, bath soaps, and acne scars. It additionally serves diminish dark spots and nourish skin. The alkaloids, tannins, saponins, flavanoids, steroids, sugar glycosides, and polyphenols belong to the phytochemicals that are found in it [4], Andre Prayoga, 2023). Characterization of beet flour: 0.82% water-soluble extract content, 0.99% total ash content, 9.28% moisture content, and 0.82% acid insoluble ash content [5][6]. According to Mastuti, the pigment betacyanin, that has nitrogen, is responsible for the red color of fresh beets[7].

Aloe vera contains several nutrients like minerals, enzymes, organic acids that dissolve in fat and water, polysaccharides, compounds composed of polysaccharides, B1, B2, B6, B12, C, and has anti-inflammatory qualities and decreases the levels of superoxide and free radicals[8].

Due to the availability of novel ingredients, the financial incentives for creating products that succeed, customer demand, and advances in our understanding of skin physiology, the market for herbal cosmetics is growing quickly. Plant parts that are utilized to prepare cosmetics should possess a range of qualities, such as emollient, antibacterial, anti-inflammatory, and antioxidant. Products made using herbs are said to have fewer adverse effects than those made with synthetic ingredients. The skin of humans is not adversely affected by the herbs that are derived from nature. These days, people utilize cosmetics to look better. Cosmetics are prepared and used to enhance their aesthetic qualities for a range of skin conditions. These include sunscreen, anti-wrinkle,

anti-acne, skin protection, and anti-wrinkle formulations, which can be natural or synthetic[9][10]. The upholding of quality standards is crucial in the creation process of cosmetic formulations [11].

METHODOLOGY:

The research work includes sample identification, sample preparation, plant identification carried out. The materials for this research were beetroot extraction, making extract from aloe vera, phytochemical screening, formulation and organoleptic properties.

Materials

The materials to be used in this research work are as follows: beetroot extract, aloe vera gel, distilled water, 90% ethanol, Stearic acid, Cetyl alcohol , Almond oil, Methyl paraben, Glycerine , Triethanolamine , rose water etc

.

Preparation of Extract: Aloe vera and Beet root were air-dried (500gm) and coarsely powdered and the samples were taken then washed clean, then cut into small pieces and weighed 25g of each sample was dissolved into 250 ml of ethanol, separately. The separated sample is kept in shaker for about 6 hours. Then obtained extracts were filtered using Whatman filter paper no 1 to acquire ethanol extract solution. The extracts were then concentrated to dryness under reduced pressure and controlled temperature, respectively and they were preserved in a refrigerator.

CREAM FORMULATION:

Oil in water (O/W) emulsion, (semisolid formulation) is formulated.

- The Stearic acid, Cetyl-alcohol and Almond oil are dissolved in the oil phase and these are heated to 75°C. this is part A.
- The water-soluble components like methylparaben, triethanolamine, propylparaben, Aloe Vera extract and Beetroot are dissolved in an aqueous phase and it is heated up to 75°C. This is Part B.
- After heating, the aqueous phase was added in portions to the oil phase with Continuous stirring until the cooling of the emulsifier took place.
- The formula for the cream is given in table.

S.NO	INGREDIENTS	FORMULATION	
		F1	F2
1.	Ethanol extract of Aloe vera and Beetroot (each)	0.20ml	0.15ml
2.	Stearic acid	4.0g	4.0g
3.	Cetyl alcohol	2.0g	0.6g
4.	Almond oil	2.0g	2.0g
5.	Glycerine	1.5g	1.0g
6.	Methyl paraben	0.02g	0.02g
7.	Triethanolamine	q. s	q. s
8.	Rose Water	q. s	q. s

Table 1: Formulation for the herbal cream

An herbal cream of the O/W type emulsion is the created formulation, making the cream easily washing with portable water. we tried to create a polyherbal face cream with beetroot and aloe vera extract. According to our research, formulation F1 was shown to be more stable and caused emulsion disintegration when kept for an extended period of time

ORGANOLEPTIC PROPERTIES:

pH:

By using a buffer solution, the pH meter was calculated. The 0.5g of the cream was weighed and dissolved in 50.0ml of distilled water, after the pH measured.

Dye Test:

The red dye is mixed with the prepared cream. Place a drop of the cream on a microslide, cover it with a cover slip and examine under microscope. If the globules appear in red colour, then the background is colorless. The

cream is known as o/w type. If the condition is reversed, then it known as w/o type cream. The disperse globules appear colorless and the background is red in colour.

Homogeneity:

The Homogeneity of a prepared formulation is tested by touch and by appearance [12].

Appearance:

The appearance of the cream was judged by its color, pearlescence, and roughness and graded.

After Feel: The emollient nature and smoothness are checked after application.

Type of smear: The formation of smears after applying to skin is checked.

Removal: The applied cream was observed for removal by using tap water.

Irritancy Test:

Apply prepared cream on the backside of the left hand. Then the area of cream applied and time is taken into consideration. Irritation on applied area, eczema, other rashes are observed within 24 hrs after the application of a cream [13].

Spreadability Test:

The spreadability test was conducted by spreading the Herbal face cream on the top of the glass slide, and any deformation or breakdown that happened was evaluated using naked eyes [14]. This test is important to determine the level of moisturising effect on the user. If the spread ability test gives a bad result (deformation or breakdown that occurred during the test), it means that the Herbal face cream is not able to moisturise the skin anymore. The deformation or break down of the face cream sample can be observed with the sensory (naked eyes).

Stability Testing:

Stability testing is done using two formulations (F1, F2). Testing for stability is done for a minimum of one week. For 28 days, the formulations were stored at $40^{o}C \pm 1^{o}C$. The formulations were monitored on days 0, 7, 14, 21, and 28 while being maintained at both room temperature and a higher temperature. [15][16][17].

RESULT AND DISCUSSION:

Results:

The pH of the cream was found to be in the range of 5.6 to 6.8 which is good for skin pH. All the prepared formulations of cream are nearer to skin pH i.e. pH of F1-6.8 and F2-6.7.

FORMULATION	PARAMETERS
F1	6.8
F2	6.9

Table 2: pH of the Cream

Irritancy test:

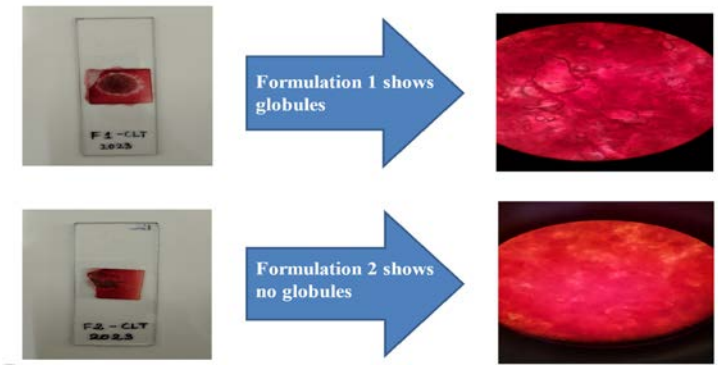
The formulation shows no redness, edema, inflammation, and irritation during irritancy studies. These formulations are safe to use for skin.

FORMULATION	PARAMETERS
F1	NIL
F2	NIL

Table 3: Irritancy effect of formulations

Dye Test:

This dye confirms that all formulation was o/w type emulsion cream. But formulation F1 shows more stable in o/w type emulsion.



Dye Test

Homogeneity:

All prepared formulations produce uniformity of cream. Homogeneity was confirmed by appearance and by touch.

FORMULATION	PARAMETERS
F1	NIL
F2	NIL

Table 4: Homogeneity of formulations

Appearance:

When formulation was kept for a long time, it found that no change in the color of cream

FORMULATION	PARAMETERS
F1	NO CHANGE
F2	NO CHANGE

Table 5: Appearance of formulations

After Feel:

Emolliency, slipperiness and amount of residue left after the application of a fixed amount of cream were found.

FORMULATION	PARAMETERS
F1	EMOLLIENT
F2	EMOLLIENT

Table 6: After feeling of formulations

Type Of Smear:

After application of the cream, the type of smear formed on the skin was non-greasy.

Type Of Smear

Removal:

The cream of F1 and F2 applied on the skin was easily removed by washing with tap water.

FORMULATION	PARAMETERS
F1	GOOD
F2	GOOD

Table 7: Removal of formulations

Spreadability Test:

Excess sample was placed between the two glass slides and 1 g weight was placed on the glass slide for 5 min to compress the sample to a uniform thickness. The time seconds required to separate the two slides was taken as a measure of spreadability. The Herbal face cream was found to have good spreadability with 3.8 cm spread.

Viscosity: Viscosity of the sample was measured 2650 cps.

Phytochemical Screening

Chemical compounds of alkaloids, flavonoids, saponins, and tannins are present in the results of the phytochemical screening test of beta vulgaris beet extract, and flavonoids, saponins, tannins, and terpeneoids are present in the results of the phytochemical screening test of Aloe vera extract.

CONCLUSION:

Aloe vera and beetroot extracts can be combined to produce products with a variety of effects on the skin, including those for whitening, anti-ageing and sunscreen effects. By combining various extracts, the effectiveness of the extracts can be increased in order to boost the cosmetic qualities of prepared products compared to individual extracts, Hence, its concluded on combining the extracts of beetroot and aloe Vera in different compositions to get multipurpose effect on skin and base of F1 formulation have a more stable secure composition with a pH of 6.9 , homogeneous form, non-greasy, good spreadability with 3.8 cm spread, a viscosity of 2650 cps, non-irritating and stable at storage for 28 days.

REFERENCE

1. Pal, A., Soni, M. and Patidar, K., 2014. Formulation and evaluation of polyherbal cream. International Journal Pharmaceutical and Biological Archives, 5, pp.67-71.
2. Ashawat, M.S., Madhuri, B., Shailendra, S. and Swarnlata, S., 2009. Herbal cosmetics:" trends in skin care formulation". Pharmacognosy Reviews, 3(5), pp.72-79.
3. Mishra, A., Verma, A. and Chattopadhyay, P., 2012. Effects of Calendula essential oil-based cream on biochemical parameters of skin of albino rats against ultraviolet B radiation. Scientia pharmaceutica, 80(3), pp.669-684.

4. Siti Maimunah , Andre Prayoga.,2023. Formulation of Red Beet (Beta Vulgaris. L) and Aloe Vera Gel Extracts As Anti-Aging. Jurnal Pembelajaran Dan Biologi Nukleus p-ISSN: 2442-9481 Vol 9 (2): 449-461, July 2023, ISSN: 2442-9481
5. Hasibuan, P. A. Z., Tanjung, M., Gea, S., Pasaribu, K. M., Harahap, M., PeranginAngin, Y. A., Prayoga, A., & Ginting, J. G. (2021). Antimicrobial and antihemolytic properties of a CNF/AgNP-chitosan film: A potential wound dressing material. Heliyon, 7(10), e08197.
6. Marbun, E. D., Prayoga, A., & Sianipar, A. Y. (2022). Edukasi Pemanfaatan Suplemen Kesehatan Di lingkungan SD Negeri 053975 Stabat Lama Kabupaten langkat. 3, 331– 337.
7. Mastuti, Yizhong Cai, Harold Corke. (2010). Identifikasi Pigmen Betasianin Pada Beberapa Jenis Inflorescence Celosia, Jurnal Biologi UGM, 12(2), 669 : 667.
8. Prayoga, A. (2023). Comparison Study of Caffeine Levels of Coffee Bean (Coffea Sp .) and Brands of Coffee Powder Circulate in Banda Aceh City. 3(1), 96–102. https://doi.org/10.37311/ijpe.v3i1.18913.
9. Akhtar, N., Mehmood, A., Khan, B.A., Mahmood, T., Muhammad, H., Khan, S. and Saeed, T., 2011. Exploring cucumber extract for skin rejuvenation. African Journal of Biotechnology, 10(7), pp.1206-1216.
10. Jin, Y.H., Lee, S.J., Chung, M.H., Park, J.H., Park, Y.I., Cho, T.H. and Lee, S.K., 1999. Aloesin and arbutin inhibit tyrosinase activity in a synergistic manner via a different action mechanism. Archives of pharmacal research, 22(3), p.232.
11. Sharmila Dusi, J.Saminathan. Formulation and evaluation of aloe vera and *Dacus carota* herbal cream. International journal of pharmacy research &Technology. (2019); ISSN 2250-1150
12. Chen, M.X., Kenneth, S.A., dan Gabriela, B. (2016). Formulation and Evaluation selama Pengolahan Minuman Lidah Buaya. Agritech. 2012 Februari;32(1):73-78.
13. Kuno, N. and Matsumoto, M., Nisshin Oil Mills Ltd, 2004. Skin-beautifying agent, anti-aging agent for the skin, whitening agent and external agent for the skin. U.S. Patent 6,682,763.
14. Kokil, Suruchi & Kadu, Mayuri & Vishwasrao, Dr & Singh, Dr. (2014). Review on Natural Lip Balm. International Journal of Research in Cosmetic Science. 5. 1.
15. Sahu, R.K., Roy, A., Kushwah, P. and Sahu, A., 2012. Formulation and development of face cream containing natural products. Research Journal of Topical and Cosmetic Sciences, 3(1), pp.16-19. 13.
16. Sahu, R.K., Roy, A., Kushwah, P., Khare, M. and Mudotiya, R., 2012. Formulation and development of whitening polyherbal face cream. Research Journal of Topical and Cosmetic Sciences, 3(1), p.IV
17. Singh, M., Sharma, S., Khokra, S.L., Sahu, R.K. and Jangde, R., 2011. Preparation and evaluation of herbal cosmetic cream. Pharmacologyonline, 2, pp.1258-1264.