



**FORMULATION, DEVELOPMENT, PHARMACOLOGIC EVALUATION AND ASSESSMENT OF THE QUALITY PARAMETERS OF POLY HERBAL FACE CREAM**

**R. Vaidheeswari\* and K. Chandra Prabha**

R. Vaidheeswari\* M. Phil Research Scholar of Biochemistry and K. Chandra Prabha\*\*Assistant Professor of Biochemistry. MSc., M.Phil., PGDCA., M.A., (Ph.D).

\*Corresponding Author: R. Vaidheeswari

M.Phil Research Scholar of Biochemistry..

Article Received on 30/11/2016

Article Revised on 21/12/2016

Article Accepted on 12/01/2016

**ABSTRACT**

Natural cosmetics also called as “herbal cosmetics”. Herbal cosmetics are formulated, using variety of cosmetic ingredients to form the base in which one or more herbal ingredients are used to cure various skin diseases. The cosmetic products used extensively throughout the world for improving and maintaining general appearance of face and other body parts (e.g, face, hand, eye, etc.,). The herbal cosmetics are commonly used and manufactured for daily using purpose. Plants are highly used for development of new drug products for cosmeceutical and pharmaceutical applications. Herbal cosmetics not only used for beauty of the skin but acted as the shield against any kind of external effects for the body. compared to other cosmetic beauty products herbal cosmetic products are very safe to use. These herbal cosmetic products improve the functioning of the skin by boosting collagen growth, maintaining keratin structure, and making the skin healthy. Herbals do not give instant cure. These cosmetics are suitable for all types of skin. The natural cosmetics are herbal and free from all the harmful synthetic chemicals which otherwise may proven to be toxic to the skin. The synthetic cosmetics can cause pimples, rashes, skin lesion, and irritate your skin. Variety of plant parts and plant extracts are used in these herbal product. e.g., leaves of centella asiatica and camellia sinensis, roots of glychrriza glabra, flowers of cassia auriculata, and aloe vera gel. They also consists of natural nutrients like vitamin B 12, Vitamin E, Vitamin C, and folic acid that keeps skin healthy, glowing, and beautiful.

**KEYWORDS:** Cosmetic product, Skin protective, safe.

**INTRODUCTION**

The skin is the largest organ of human body. Its functions are well defined: it provides protection against water loss, microbial infection, and environmental elements. When skin is under attack by microbial agents such as viruses or bacteria, it often reacts by local inflammation. Inflammation can also cause by some internal elements such as autoimmune diseases that are associated with damage to the skin, resulting in skin lesions, rash, and altered appearance (A.J. Ridley J.R. Whiteside *et al*, 2009). UV irradiation also alters immune function and induces skin cell death, further complicating the homeostasis of the skin (A.Fourtanier, D.Moyal *et al*, 2008).

Generally herbal cosmetic products are also referred to as natural cosmetic products. Herbal cosmetics are formulated, using variety of cosmetic ingredients to form the base in which one or more herbal ingredients are used to cure various skin disease. Plants are mainly used for production of new drug products for pharmaceutical and cosmeceutical applications (Joshi H,2012).The natural content in the herbs does not have no side effects

on the human body parts, alternative provide the body with useful nutrients and other useful minerals (Gediya SK *et al*, 2011). Cosmeceuticals are cosmetic-pharmaceutical hybrids intended to improve beauty and health through ingredients that control the skin's biological texture and function (Sharma HD, Paramesh R, 2010).

Compared to other beauty products, natural cosmetics are very safe to use. They are hypo-allergenic and tested and proven by dermatologists to be very safe to use anywhere, anytime. Since they are made of natural ingredients, people never have to worry about getting skin diseases. Such as, skin rashes or experience skin itchiness etc. (Suzuki D, 2010).

Natural cosmetics are suitable for all types of skin. No matter if you are fair or dark, you will find natural cosmetics like foundation, lip stick, and eye shadow which are appropriate not respective of your skin tone. Women with sensitive skin or oily skin can use them and don't have to worry about degrading their skin condition (Winter RA, 2009).

We are selected five medicinal plants. These are, Aloe vera is a unique plant which is a rich source of many chemical compounds and plays an important role in the international market. Chemistry of the plant revealed the presence of more than 200 different biologically active substances including vitamins, minerals, enzymes, sugars, anthraquinones or phenolic compounds, lignin, saponins, sterols, amino acids and salicylic acid. Aloe vera is well known for its marvelous medicinal properties. These plants are one of the richest sources of health for human beings coming from nature. It has been grown as an ornamental plant widely. Products of the plant are used in the treatment of various ailments. Various parts of the plant have different effects on the body. Aloe Vera looks like a cactus but the plant is a member of the lily family which includes garlic and onion. Inside the leaf is a jelly-like substance (Dr. Robert. R and H. Davis, 1998).

Avaram (*Cassia auriculata*), family Caesalpiniaceae, is also known as Avaram tree, The leaves are alternate, stipulate, paripinnate compound, very numerous, closely placed, rachis 8.8-12.5 cm long, narrowly furrowed, slender, pubescent, with an erect linear gland between the leaflets of each pair, leaflets 16-24, very shortly stalked 2-2.5 cm long 1-1.3 cm broad, slightly overlapping, oval oblong, obtuse, at both ends, mucronate, glabrous or minutely downy, dull green, paler beneath, stipules very large, reniform-rotund, produced at base on side of next petiole into a filliform point and persistent. Its flowers are irregular, bisexual, bright yellow and large (nearly 5 cm across), the pedicels glabrous and 2.5 cm long. The racemes are few-flowered, short, erect, crowded in axils of upper leaves so as to form a large terminal inflorescence stamens barren; the ovary is superior, unilocular, with marginal ovules. Avarampoo is wonderful for using in external application and it treats many skin problems. It keeps the skin from infections and the best way to use it for external application is by including it in face wash powder. This face wash powder has been used by Indian women for years and this face wash powder prevents black spots, treats uneven skin tone and regular use keeps the skin blemish free. (Avarampoo Benefits, 2014) Avaram poo (Avaram senna): Keeps the skin glowing and improves complexion when used regularly (Dutta, 1994).

Green tea is non-fermented tea. The tea is an infusion of leaves that has been consumed for centuries as a beverage and is valued for its medicinal properties. The phytochemical screening of tea revealed the presence of alkaloids, saponins, tannins, catechin and polyphenols (Betubara L, *et al.*, 2010). Tea leaves are known for its antimicrobial activity against many microorganisms.

The primary difference between green tea and black tea is in the fermentation process required to produce tea. In case of black tea the leaves and buds are fermented or oxidized after they have been dried. In green tea the

leaves are steamed after they are dried. The phytochemicals present in tea leaves are highly sensitive to oxidation process (Toda. M, *et al.*, 1989). Green, oolong and black teas all come from the leaves of the *Camellia sinensis* plant. Green tea has antioxidants that benefit the body in many ways and can even be used to treat acne. Its one of the most natural ways to help your skin appear brighter and flawless. Green tea is known to be a healthier substitute to normal beverages like coffee and other types of tea, owing to its lower caffeine content. It also contains very strong, natural antioxidants called polyphenols that not only help you attain a healthy body, skin and hair, but also help to block the growth of cancer cells as well (Chiu A.E *et al.*, 2005).

*Glycyrrhiza glabra*, family Leguminosae, is a plant which grows in Egypt and other countries of the world. Its roots possess some nutritive value and medicinal properties. They are widely used as a cold beverage, in preparing some pharmaceutical preparations such as haematinic pills and to disguise the bitter taste of other remedies (Fenwick .T, *et al.*, 1990). *Glycyrrhiza glabra* Linn is one of the most widely used herb from the ancient medical history of Ayurveda, both as a medicine and also as a flavoring herb. It is a very sweet, moist, soothing herb that detoxifies and protects the liver and is also a powerful anti-inflammatory, being used in conditions as varied as arthritis and mouth ulcers. Phytochemical analysis of *Glycyrrhiza glabra* root extract showed that it contains saponin triterpenes (glycyrrhizin, glycyrrhetic acid and liquiritic acid), flavonoids (liquiritin, isoflavonoids and formononetin) and other constituents such as coumarins, sugars, amino acids, tannins, starch, choline, phytosterols and bitter principles (Fukai. T *et al.*, 1998). The extract of liquorice is reported to be an effective pigment lightening agent. It is the safest pigment-lightening agent known with least side effects. Glabridin in the hydrophobic fraction of liquorice extract inhibits tyrosinase activity in cultured B16 murine melanoma cells. It does not affect DNA synthesis. Some other active compounds in liquorice extract like glabrene, Licochalcone A, Isoliquiritin are also responsible for inhibition of tyrosinase activity. Liquiritin present in liquorice extract disperse melanin, thereby inducing skin lightening (Cronin. H, 2010).

*Centella asiatica* commonly known as Indian Pennywort, belongs to the family Apiaceae (previously known as Umbelliferae). *Centella asiatica* is one of the chief herbs for treating skin problems, to heal wounds, for revitalizing the nerves and brain cells, hence primarily known as a "Brain food" in India. The use of *Centella* in food and beverages has increased over the years basically due to its health benefits such as antioxidant, as anti-inflammatory, wound healing, memory enhancing property and many others. The potential of *Centella* as an alternative natural antioxidant especially of plant origin and its protection against age-related changes in brain antioxidant defense system,

have notably increased in recent years (Subathra M and Shila S., 2005). *Centella asiatica* is used in nervous, blood and skin diseases. Plant is antiseptic, diuretic, used in leprosy, psoriasis, syphilitic ulcer, fever, dysentery, Rheumatism and bowel complaints. *Centella asiatica* leaves are tonic, rich in ascorbic acid; accelerate nervous activity, good for increasing memory.

#### AIM AND OBJECTIVES OF THE STUDY

The present study was planned to evaluate the efficacy and safety of the herbal face cream formulated using the (*Cassia Auriculata*, *Centella Asiatica*, *camellia Sinensis*, *Aloe l* and *Glychrriza glabra*).

1. To prepare herbal cream by using medicinal plants like (*Cassia Auriculata*, *Centella Asiatica*, *camellia Sinensis*, *Aloe l* and *Glychrriza glabra*)
2. Evaluate the properties of the formulated cream.
3. Test the safety and efficacy of the formulation on the human volunteer skin.

#### MATERIALS AND METHODS

##### PREPARATION OF EXTRACTS AND CREAM FORMULATION

###### Preparation of extracts

Air dried and coarsely powdered herbs of flowers of *cassia auriculata*, Leaves of *centella asiatica*, leaves of

*camellia sinensis*, roots of *glychrriza glabra* and *Aloe vera*, were placed in maceration flask separately, using ethanol and water (50:50) as a solvent. After forty eight hours of maceration the extracts were filtered. 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-based cream (semisolid formulation) was formulated. The emulsifier (stearic acid) and other oil soluble components (Cetyl alcohol, almond oil) were dissolved in the oil phase (Part A) and heated to 75°C. The preservatives and other water soluble components (Methyl paraban, Propyl paraban, Triethanolamine) The aqueous ethanol extract of *cassia auriculata*, Leaves of *centella asiatica*, leaves of *camellia sinensis*, roots of *glychrriza glabra* were dissolved in the aqueous phase (Part B) and heated to 75°C. After heating, the aqueous phase was added in portions to the oil phase with continuous stirring until cooling of emulsifier took place. The formula for the cream is given in table 1.

##### Formula for the Herbal Cream

S.NO	Ingredients	Formula % w/w
1	Extracts of <i>cassia auriculata</i>	0.50
2	Extracts of <i>centella asiatica</i>	0.75
3	Extracts of <i>camellia sinensis</i>	0.25
4	Extracts of <i>Aloe vera</i>	0.25
5	Extracts of <i>glychrriza glabra</i>	0.50
6	Stearic acid	6
7	Cetyl alcohol	3
8	Almond oil	4
9	Glycerol	3
11	Methyl paraban	0.02
12	Triethanolamine	Qs
13	Water	Qs

#### EVALUATION OF HERBAL COSMETIC CREAM

##### Evaluation of cream pH of the Cream: (Kuchekar B.S, et al., 2012)

The pH meter was calibrated using standard buffer solution. About 0.5 g of the cream was weighed and dissolved in 50.0 ml of distilled water and its pH was measured.

##### Viscosity

Viscosity of the formulation was determined by Brookfield Viscometer at 100 rpm, using spindle no 7.

##### Dye test

The scarlet red dye is mixed with the cream. Place a drop of the cream on a microscopic slide covers it with a cover slip, and examines it under a microscope. If the disperse globules appear red the ground colourless. The

cream is o/w type. The reverse condition occurs in w/o type cream i.e. the disperse globules appear colourless in the red ground.

##### Homogeneity

The formulations were tested for the homogeneity by visual appearance and by touch.

##### Appearance

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

##### Afterc feel

Emolliency, slipperiness and amount of residue left after the application of fixed amount of cream was checked.

**Type of smear**

After application of cream, the type of film or smear formed on the skin were checked.

**Removal**

The ease of removal of the cream applied was examined by washing the applied part with tap water.

**Acid value**

Take 10 gm of substance dissolved in accurately weighed, in 50 ml mixture of equal volume of alcohol and solvent ether, the flask was connected to reflux condenser and slowly heated, until sample was dissolved completely, to this 1 ml of phenolphthalein added and titrated with 0.1N NaOH, until faintly pink color appears after shaking for 30 seconds.

Acid value =  $n \times 5.61/w$

n = the number of ml of NaOH required.

w = the weigh of substance.

**Saponification value**

Introduce about 2 gm of substance refluxed with 25 ml of 0.5 N alcoholic KOH for 30 minutes, to this 1 ml of phenolphthalein added and titrated immediately, with 0.5 N HCL.

Saponification value =  $(b-a) \times 28.05/w$

The volume in ml of titrant = a

The volume in ml of titrate = b

The weigh of substance in gm = w

**Irritancy test**

Mark an area (1sq.cm) on the left hand dorsal surface. The cream was applied to the specified area and time was noted. Irritancy, erythema, edema, was checked if any for regular intervals up to 24 hrs and reported.

**Accelerated stability testing**

Accelerated stability testing of prepared formulations was conducted for 2 most stable formulations at room temperature, studied for 7 days. They were formulation number 4 and 5 at  $40^{\circ}\text{C} \pm 1^{\circ}\text{C}$  for 20 days. The formulations were kept both at room and elevated temperature and observed on 0th, 5th, 10th, 15<sup>th</sup> and 20th day for the following parameters.

**RESULTS AND DISCUSSION****pH of the Cream**

The pH of the cream was found to be 6.7 which is good for skin pH. The formulation of cream was shown pH nearer to skin required i.e 6.5 to 7.5.

**Table: 3 Type of Adverse effect of formulations**

Formulation	Irritant	Erythema	Edema
Cream	Nil	Nil	Nil

**Table 4: Physical parameter of F5 and F6 cream on room and accelerated temperature**

-	Temperature	Parameter Ph	X1	X2	X3	X4	X5	X6
0	RT 40 °C + 1 °C	6.7	**	NCC	**	E	NG	ES
5	RT 40 °C + 1 °C	6.7	**	NCC	**	E	NG	ES

**Viscosity**

The viscosity of cream was 27034cps which indicates that the cream is easily spreadable by small amounts of shear. It shows good spreadable property of formulations.

**Acid value and Saponification value**

The results of acid and saponification value of all formulation of cream are presented and showed satisfactorily values.

**Irritancy test**

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

**Dye test**

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

**Homogeneity**

All formulations produce uniform distribution of extracts in cream. This was confirmed by visual appearance and by touch.

**Appearance**

When formulation were kept for long time, it found that no change in colour of cream.

**After feel**

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

**Type of smear**

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

**Removal**

The cream applied on skin was easily removed by washing with tap water.

**Table No: 2 Analytical Parameters**

S.No	Parameter	Units
1	PH	6.7
2	Viscosity	27034 cps
3	Acid value	5.4
4	Saponification value	21.6

10	RT 40 °C + 1°C	6.7	**	NCC	**	E	NG	ES
15	RT 40 °C + 1 °C	6.7	**	NCC	**	E	NG	ES
20	RT 40 °C + 1 °C	6.7	**	NCC	**	E	NG	ES

X1-Homogeneity, X2-Appearance, X3-Spreadibility, X4-After feel, X5-Type of smear, X6-Removal, \*\*: Good, \*: Satisfactory, E: Emollient, NG: Non greasy, ES: Easy, NCC: Not change in colour.

#### COLLECTION OF PLANT SAMPLES



*Centella asiatica*



*Cassia auriculata*



*Aloe gel*



*Camellia sinensis*



*Glychrriza glabra*



**POLY HERBAL CREAM**

#### REFERENCES

1. A. Fourtanier, D. Moyal et al., "Sunscreens containing the broadspectrum UVA absorber, Mexoryl SX, prevent the cutaneous detrimental effects of UV exposure: a review of clinical study results", *Photodermatol Photoimmunol Photomed.*, Aug, 2008; 24(4): 164-174.
2. A. J. Ridley, J.R. Whiteside et al., "Cellular and sub-cellular responses to UVA in relation to carcinogenesis", *Int J Radiat Biol.*, Mar, 02009: 12: 1-19.
3. Betubara L, Darusmen LK, Mitsunaga T, Rahminiwati and Djauhari E. Potency of Indonesian medicinal plants as tyrosinase inhibitor and antioxidant agent, *Journal of biological sciences*, 2010; 10(2): 138-144.
4. Chiu AE, Chan JL, Kern DG, Kohler S, Rehmus WE, Kimball AB. Double-blinded, placebo-controlled trial of green tea extracts in the clinical

- and histologic appearance of photo aging skin. *Dermatol surg*, 2005; 31(7Pt2): 855-60.
5. Cronin H, Draelos ZD. Top 10 botanical ingredients in 2010 anti-aging creams. *Journal of Cosmetic Dermatology*, 2010; 9(3): 218-225.
  6. Dr. Robert H, Davis, Ph.D. Presented a ground breaking research report to the International Aloe Vera Science Council, *The conductor – orchestra concept of aloe vera*.
  7. Dutta, A.C, Botany for degree students. Oxford university press, london, 1994; 73.
  8. Fukai, T.; Baosheng, C.; Maruno, K.; Migakawa, Y.; Konoshi, M.; Nomura, T. and Cai, B. An isopernylated flavonone from *Glycyrrhiza glabra* and re-assay of liquorice phenols. *Phytochem*, 1998; 49: 2005-2013.
  9. Gediya SK, Mistry RB, Patel UK, Blessy M, Jain HN Herbal plants: used as cosmetics. *J Nat Prod Plant Resour*, 2011; 1: 24-32.
  10. Joshi H Potentials of traditional medicinal chemistry in cosmetology industry; prospectives and perspectives. *Anaplastology an open access journal*, 2012; 1.3
  11. Sharma HD, Paramesh R Trends in aging and skin care: Ayurvedic concepts. *Journal of Ayurveda and Integrative Medicine*, 2010; 1: 110-113.
  12. Subathra, M., Shila, S., Devi, MA. and Panneerselvam, C., Emerging role of *Centella asiatica* in improving age-related neurological antioxidant status. *Exp. Geronto.*, 2005; 40: 707-715.
  13. Suzuki D The “Dirty Dozen” Ingredients Investigated in the David Suzuki Foundation Survey of Chemicals in Cosmetics. *Backgrounder*, 2010; 1-15.
  14. Toda M. Okubo S. Hiyoshi R and Shimamura T. Antibacterial and bactericidal activities of Japanese green tea. *Jpn. J. Bacteriol*, 1989; 44(4): 669-672.
  15. Winter RA Consumers Dictionary of Cosmetic Ingredients (7th edn.) Three Rivers press United states USA, 2009.