

## RESEARCH ARTICLE

## Formulation and Evaluation of Poly Herbal Cream

Pal Arti<sup>1</sup>, Soni Manish<sup>\*2</sup>, Patidar Kalpana<sup>3</sup><sup>1</sup>Mandsaur Institute of pharmacy, Mandsaur-458001 (M.P)<sup>2</sup>Head, Department of Pharmacognosy, Mandsaur Institute of Pharmacy, Mandsaur-458001 (M.P)<sup>3</sup>Head, Department of R & D, Mandsaur Institute of Pharmacy, Mandsaur-458001 (M.P)

Received 24 Apr 2014; Revised 02 Jul 2014; Accepted 14 Aug 2014

**ABSTRACT**

Natural remedies are more acceptable in the belief that they are safer with fewer side effects than the synthetic ones. Herbal formulations have growing demand in the world market. The present work deals with the development and evaluation of the poly herbal cream containing hydro-alcoholic extract of neem leaves (*Azadirachta indica*), turmeric (*Curcuma longa*) and aloe (*Aloe vera*). Although various topical herbal formulations for acne are available in the market, we propose to make use of hydro-alcoholic extract of neem (*Azadirachta indica*) leaves, turmeric (*Curcuma longa*) and aloe (*Aloe vera*). The plants have been reported in the literature having good anti-microbial, anti-oxidant and anti-inflammatory activity.

The present study was to prepare and evaluate the polyherbal cosmetic cream comprising extracts of natural products such as aloe, turmeric and neem. Different types of formulations oil in water (O/W) herbal creams namely F1 to F4 were formulated by incorporating different concentrations of stearic acid and cetyl alcohol. The evaluations of all formulations (F1 to F4) were done on different parameters like pH, spreadibility and stability were examined. Formulations F3 and F4 showed good spreadibility, good consistency, homogeneity, appearance, pH, spreadibility, no evidence of phase separation and ease of removal. The formulation F3 and F4 shows no redness, edema, inflammation and irritation during irritancy studies. These formulations are safe to use for skin. These studies suggest that composition of extracts and base of cream of F3 and F4 are more stable and safe, it may produce synergistic action.

**Key words:** Erythema, Edema, Irritation, Polyherbal cream.

**INTRODUCTION**

Cosmetic products are used to protect skin against exogenous and endogenous harmful agents and enhance the beauty and attractiveness of skin<sup>[1]</sup>. The use of cosmetics not only developing an attractive external appearance, but towards achieving longevity of good health by reducing skin disorders<sup>[2]</sup>. The synthetic or natural ingredients present in skin care formulation that supports the health, texture and integrity of skin, moisturizing, maintaining elasticity of skin by reduction of type I collagen and photo protection etc. This property of cosmetic is due to presence of ingredients in skin care formulation, because it helps to reduce the production of free radicals in skin and manage the skin properties for long time. The cosmetic products are the best choice to reduce skin disorders such as hyper pigmentation, skin aging, skin wrinkling and rough skin texture etc. The demand of herbal cosmetic is rapidly expanding. This expansion is due to the

availability of new ingredients, the financial rewards for developing successful products, consumer demand, and a better understanding of skin physiology<sup>[3-4]</sup>. The plant parts used in cosmetic preparation should have varieties of properties like antioxidant, anti-inflammatory, antiseptic, emollient, antiseborrheic, antikerolytic activity and antibacterial etc. Herbal products claim to have less side effects, commonly seen with products containing synthetic agents. The market research shows upward trend in the herbal trade with the herbal cosmetic industry playing a major role in fueling this worldwide demand for herbals<sup>[5]</sup>.

The *Aloe vera* plant has been known and used for centuries for its health, beauty, medicinal and skin care properties. Aloe vera is a natural product that is now a day frequently used in the field of cosmetology. It can be applied topically as an emollient for burns, sunburn and mild abrasion,

and for inflammatory skin disorders. It has antibacterial, antifungal, antiviral, antioxidant, and anti-inflammatory effects. Aloe vera is used externally for its wound healing properties and is supported by clinical investigation<sup>[6-8]</sup>.

**Turmeric (*Curcuma longa*)** is extensively used as a spice, food preservative and colouring material in India, China and South East Asia. It has been used in traditional medicine as a household remedy for various diseases, including biliary disorders, anorexia, cough, diabetic wounds, hepatic disorders, rheumatism and sinusitis. For the last few decades, extensive work has been done to establish the biological activities and pharmacological actions of turmeric and its extracts. Curcumin (diferuloylmethane), the main yellow bioactive component of turmeric has been shown to have a wide spectrum of biological actions. These include its anti inflammatory, antioxidant, anticarcinogenic, antimutagenic, anticoagulant, antifertility, antidiabetic, antibacterial, antifungal, antiprotozoal, antiviral, antifibrotic, antivenom, antiulcer, hypotensive and hypo cholesteremic activities. Its anticancer effect is mainly mediated through induction of apoptosis. Its anti inflammatory, anticancer and antioxidant roles may be clinically exploited to control rheumatism, carcinogenesis and oxidative stress-related pathogenesis. Clinically, curcumin has already been used to reduce postoperative inflammation. Safety evaluation studies indicate that both turmeric and curcumin are well tolerated at a very high dose without any toxic effects. Thus, both turmeric and curcumin have the potential for the development of modern medicine for the treatment of various diseases.

The **Neem tree (*Azadirachta indica*)** is a tropical evergreen tree native to India. Neem is the most versatile, multifarious tree with immense potential possessing maximum useful non-wood products<sup>[9-10]</sup>, though in the study area Neem remains unutilized. In India, neem is known as “the village pharmacy” because of its healing versatility, and it has been used in Ayurvedic medicine for more than 4,000 years due to its medicinal properties. The tree is found in no less than 78 countries world wide<sup>[11]</sup>. There are over 16.6 millions neem trees in India<sup>[12]</sup>, while in the study area neem is about 3, 95,900 (based on field survey).

## MATERIALS AND METHODS

### Preparation of extracts:

Air dried and coarsely powdered (500 gm) of aloe, turmeric and neem were placed in mechanical

stirrer separately, using petroleum ether and then successively with distill water. 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, Propylene glycol, ethanol extract of aloe, neem and turmeric 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).

## EVALUATION OF CREAM

### pH of the Cream:

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.

### 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 occurs in w/o type cream i.e. the disperse globules appear color less in the red ground. Globules appear red the ground colorless. The cream is o/w type i.e reverse condition.

### 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, roughness and graded.

### After 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.

**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 3 and 4 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, 15th and 20th day for the following parameters<sup>[3,4,13,14]</sup>.

**RESULTS****pH of the Cream :**

The pH of the cream was found to be in range of 5.6 to 6.8 which is good for skin pH. All the formulations of cream were shown pH nearer to skin required i.e pH of F1-5.6, F2-5.8, F3-6.7, F4-6.2.

**Irritancy test:**

The formulation F3 and F4 shows no redness, edema, inflammation and irritation during irritancy studies. These formulations are safe to use for skin (Table 2).

**Dye test:**

This dye confirms that all formulations were o/w type emulsion cream. But formulation (F4) 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 (Table 3).

**Appearance:**

When formulation were kept for long time, it found that no change in colour of cream (Table 3).

**After feel:**

Emolliency, slipperiness and amount of residue left after the application of fixed amount of cream was found (Table 3).

**Type of smear:**

After application of cream of F3 and F4, the type of smear formed on the skin were non greasy (Table 3).

**Removal:**

The cream of F3 and F4 applied on skin was easily removed by washing with tap water (Table 3).

**DISCUSSION**

Aloe, Turmeric and Neem are well known for its medicinal and cosmeceuticals value in Indian traditional system of medicine. Present work, was based on extraction of these herbs and formulate poly herbal cosmetic cream.

The tyrosinase inhibitors substances are used in cosmetic products as skin whitening agent to reduce skin pigmentation by decreasing the melanin production. The aloesin, a C-glycosylated chromone reported to exhibit antityrosinase activity, and also inhibited melanin production in cell culture. It has reported that aloesin are present in Aloe vera extract as bioactive compound. Furthermore Aloe vera has been reported to have a protective effect against damage to skin from ultra violet radiation due to its antioxidant activity. Aloe vera contains mucopolysaccharides help in binding moisture into the skin. Aloe stimulates fibroblast which produces the collagen and elastin fibers making the skin more elastic and less wrinkled. Aloe's benefits can be attributed at least partly to its nutrients, since it contains proteins, carbohydrates (including mucopolysaccharides), vitamins (including B1, B2, B3, B6, C, and folic acid) and minerals. These nutrients, although beneficial individually, may work synergistically to soothe, heal, moisturize and regenerate the skin<sup>[7,15-18]</sup>. From above it concluded that this plant extracts produce excellent whitening, antiwrinkle and sunscreen effect on skin.

The production of free radicals in the body causes oxidative stress and oxidative photo damage of macromolecules and plasma membrane components in the skin. This further leads to premature aging of the skin which is characterized by the rough skin textures and wrinkles.  $\beta$ -carotene is the most abundant and most efficient precursor of vitamin A.  $\beta$ -carotene is a radical scavenger, quenching singlet oxygen and free radicals without damage to cells and tissue, hence it used as UV protection of skin.  $\beta$ -carotene are capable to increase cell turn-over and regeneration in the outer layers of the skin, making it effective for diseases and skin conditions related to epithelium damage. It also enhances the appearance of dry or damaged skin by reducing flaking and restoring suppleness. In skin care

products, beta-carotene is used for its antioxidant properties, its ability to protect the skin from sun damage, and its ability to help even the skin tone, deeming it an active anti-aging ingredient [19-20]. From above discussion it is assumed that  $\beta$ -carotene containing plant as well as antioxidant activity producing plant can be used in face care cream, to produce sunscreen, anti aging and anti wrinkle effects. Hence both extracts of plants are good choice to use as ingredient in face cream. The almond oil increases the glow on skin and has emollient properties.

The prepared poly herbal face cream was O/W type emulsion hence can be easily washed with plane water that gives better customer compliance.

There is a growing demand for herbal cosmetics in the world market and they are invaluable gifts of nature. Therefore, we tried to make a polyherbal face cream containing the extract of Aloe vera, Turmeric and Neem. Our study indicated that the formulation F3 and F4 found to be more stable, while remaining formulations were not stable and resulted in breakdown of the emulsion when stored for long time. These formulations F3 and F4 had almost constant pH, homogeneous, emollient, non-greasy and easily removed after the application. The stable formulations were safe in respect to skin irritation and allergic sensitization.

**Table 1: Composition of Cream**

S. No	Ingredients	F1 Conc. w/w%	F2 Conc. w/w%	F3 Conc. w/w%	F4 Conc. w/w%
1	Turmeric	1	1	1	1
2	Neem	0.5	0.5	0.5	0.5
3	Aloe Vera	0.5	0.5	0.5	0.5
4	Stearic acid	10	12	12	12
5	Triethanolamine	1.35	1.60	1.60	1.60
6	Almond oil	3	3	4	4
7	Mineral oil	3.5	3.5	3	2.5
8	Moisturizer conditioner	10	10	12	12
9	Cetyl alcohol	2.5	2.0	1.5	1.0
10	Methylparaben	0.18	0.18	-	0.18
11	Propylparabens	0.02	0.02	-	0.02
12	Sodium metabisulfide	0.1	-	-	0.1
13	EDTA	0.1	-	0.1	0.1
14	Water	qs	qs	qs	qs

**Moisturizer Conditioner:-** Propylene glycol : Glycerine : Sorbitol  
2 : 1 : 1

**Table 2: Adverse effect of formulation**

S. No	Formulation	Irritant	Erythema	Edema
1	F1	Nil	Nil	Nil
2	F2	Nil	Nil	Nil
3	F3	Nil	Nil	Nil
4	F4	Nil	Nil	Nil

**Table 3 : Physical parameter of F3 and F4 Cream on room and accelerated temperature**

Days	Temperature	Formulation	pH	X <sub>1</sub>	X <sub>2</sub>	X <sub>3</sub>	X <sub>4</sub>	X <sub>5</sub>	X <sub>6</sub>
0	RT 40°C+ 1°C	F3	6.7	**	NCC	**	E	NG	ES
		F4	6.3	**	NCC	**	E	NG	ES
		F3	6.6	**	NCC	**	E	NG	ES
		F4	6.2	**	NCC	**	E	NG	ES
5	RT 40°C+ 1°C	F3	6.5	**	NCC	**	E	NG	ES
		F4	6.4	**	NCC	**	E	NG	ES
		F3	6.8	**	NCC	**	E	NG	ES
		F4	6.2	**	NCC	**	E	NG	ES
10	RT 40°C+ 1°C	F3	6.7	**	NCC	**	E	NG	ES
		F4	6.3	**	NCC	**	E	NG	ES
		F3	6.8	**	NCC	**	E	NG	ES
		F4	6.4	**	NCC	**	E	NG	ES
15	RT 40°C+ 1°C	F3	6.6	**	CC	**	E	NG	ES
		F4	6.1	**	NCC	**	E	NG	ES
		F3	6.7	**	NCC	**	E	NG	ES
		F4	6.4	**	NCC	**	E	NG	ES
20	RT 40°C+1°C	F3	6.8	**	NCC	**	E	NG	ES
		F4	6.2	**	NCC	**	E	NG	ES
		F3	6.7	**	NCC	**	E	NG	ES
		F4	6.3	**	NCC	**	E	NG	ES

## CONCLUSION

Natural remedies are more acceptable in the belief that they are safer with fewer side effects than the synthetic ones. So, a Polyherbal cream which is

non-toxic, safe, effective and improves patient compliance by the utilization of herbal extracts would be highly acceptable.

From the above study we can conclude that on combining the extracts of Aloe, Turmeric and Neem in different ratios to get multipurpose effect such as whitening, antiwrinkle, antiaging and sunscreen effect on skin. As we know that it is not possible to increase the extent of efficiency of medicinal and cosmetic property of single plant extract, but by combining the different plant extracts it can be possible to increase the efficacy of extracts. In this regard, we mixed the extracts of Aloe, Turmeric and Neem to improve as well synergize the cosmetic properties of prepared products compare to individual extracts. Further research will carry out to check scientifically the synergistic action of selected formulation. These studies suggest that composition of extracts and base of cream of F3 and F4 are more stable and safe; it may produce synergistic action.

#### ACKNOWLEDGEMENT

The authors are thankful to the higher authorities of Mandsaur Institute of Pharmacy, Mandsaur (M P) and B. R. Nahata College of Pharmacy, Mandsaur (M P) for providing facilities to complete this project successfully.

#### REFERENCES

1. S. Saraf, C.D. Kaur, Phytoconstituents as photoprotective novel cosmetic formulations, *Pharmacogn. Rev.*, 2010, 4(7), 1-11.
2. H.S. Datta, R. Paramesh, Trends in aging and skin care: Ayurvedic concepts *J. Ayurveda. Integr. Med.*, 2010, 1(2), 110-113.
3. A. Rajvanshi, S. Sharma, S.L. Khokra, R.K. Sahu, R. Jangde, Formulation and evaluation of *Cyperus rotundus* and *Cucumis sativus* based herbal face cream, *Pharmacologyonline*, 2011, 2, 1238-1244.
4. M. Singh, S. Sharma, S.L. Khokra, R.K. Sahu, R. Jangde, Preparation and evaluation of herbal cosmetic cream, *Pharmacologyonline*, 2011, 2, 1258-1264.
5. M.S. Ashawat, M. Banchhor, S. Saraf, S. Saraf, Herbal Cosmetics: "Trends in Skin Care Formulation" *Phcog. Rev.* 2009, 3(5), 82-89.
6. S.M. Moghaddasi, S.K. Verma, *Int. J. Biol. Med. Res.* 2011, 2(1), 466-471.
7. T. Aburjai, F.M. Natsheh, Plants used in cosmetics, *Phytother. Res.* 2003, 17, 987-1000.

8. A. Feil, M.R. Namazi, *Ital. Dermatol. Venereol.* 2009, 144(1), 85-91.
9. Girish K & Shankara B. S, "Neem "C A Green Treasure ", *Electronic Journal of Biology*, 2008, Vol. 4(3): pg102-111.
10. Koul. O & Wahab. S, "Neem: Today and in the New Millennium" , Springer Science, 2004, New York, pg 1, 8.
11. Forster. P, "Status report on global Neem usage" *Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH*, 2000, Germany, II nd edition, pg 7,
12. Neem foundation, [www.Neemfoundation.org/Neem-articles/Neem-updates/vol-v-nol/role-of-small-scale-industriesharnessing-the-true-potential-of-Neem.html](http://www.Neemfoundation.org/Neem-articles/Neem-updates/vol-v-nol/role-of-small-scale-industriesharnessing-the-true-potential-of-Neem.html).
13. R.K. Sahu, A. Roy, P. Kushwah, A. Sahu, Formulation and development of face cream containing natural products, *R.J.T.C.S.*, 2012, 3(1), 16-19.
14. Sahu RK, Roy A, Kushwah P, Khare M, Mudotiya R. Formulation and development of whitening polyherbal face cream. *RJTCS* 2012; 3(1): 23-27.
15. U. Nandal, R.L. Bhardwaj, Aloe vera: A valuable wonder plant for Food, medicine and cosmetic use -A review *Int. Res. J. Plant Sci.*, 2012, 3(3), 38-46.
16. Y.H. Jin, S.J. Lee, M.H. Chung, J.H. Park, Y.I. Park, T.H. Cho, S.K. Lee, Aloesin and arbutin inhibit tyrosinase activity in a synergistic manner via a different action mechanism, *Arch. Pharm. Res.*, 1999, 22, 232- 236.
17. N. Smit, J. Vicanova, S. Pavel, Review The Hunt for Natural Skin Whitening Agents *Int. J. Mol. Sci.*, 2009, 10, 5326-5349.
18. M.B. Mapunya, R.V. Nikolova, N. Lall, Evidence-Based Complementary and Alternative Medicine, 2012, 52, 1-6.
19. H. Kambayashi, M. Yamashita, Y. Otake, K. Takada, Y. Funasaka, M. Ichihashi, Epidermal changes caused by chronic low-dose UV irradiation induce wrinkle formation in hairless mouse, *J. Dermatol. Sci.*, 2001, 27(1), S19-CS25.
20. C. Bayerl. *Acta. Dermatoven. A.P.A.*, 2008, 17(4), 160-166.