

Formulation and Evaluation of Moisturizer Containing Herbal Extracts for the Management of Dry Skin

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ABSTRACT

Background

Formulating a moisturizer using all natural raw materials is a formidable task.

The Objective

present paper focuses on the formulation of completely herbal moisturizers, their evaluation and comparison with commercial moisturizer.

Methods

Three of the herbal moisturizers [M1–M3] formulated by using in varied concentrations [0.139–0.9%w/w] of herbal extracts, juice and gel. Further all of the prepared formulation and selected commercial moisturizer [M4] evaluated for its physicochemical and safety parameters by applying on the forearm of 20 volunteers.

Results

The physicochemical parameters of formulations i.e., pH, acid value, saponification value, viscosity, spreadability, layer thickness, microbial count and skin sensitivity were found to be in the range of 5.19 ± 0.3 – 6.80 ± 0.5 , 6.80 ± 0.5 – 9.2 ± 1.3 , 16.10 ± 1.0 – 23.00 ± 1.4 , 5950 ± 10 – 6600 ± 15 cps, 65 ± 2.0 – $98 \pm 1.5\%$, 28.40 ± 1.5 – 30.00 ± 1.5 m, 31 ± 4 – 48 ± 3 colony forming units. Formulation M1 and M4 shown an increase in percentage of skin hydration, firmness and viscoelasticity after the 3 weeks study period. Comparison study of evaluated parameters justified that formulated herbal moisturizer M1 [$p < 0.01$] possess almost same performance characteristics when compare to M4.

Conclusion

Herbal ingredients are not only efficacious to treat skin dryness as compare to synthetic one but also capable to substitute synthetic base to some extent. It is up to the cosmetologist to motivate and encourage the development and use of truly herbal cosmetics.

Keywords: herbs, extracts, formulation, moisturizer, dry skin, evaluation

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INTRODUCTION

The appearance and function of the skin are maintained by an important balance between the water content of the stratum corneum and skin surface lipids.^[1–2] The skin represents the most superficial layer of the body and so it is constantly exposed to different environmental stimuli.^[3] Exposure to external factors as well as endogenous factors^[4–6] may disrupt this balance. In addition, frequent use of

soaps, detergents and topical irritants such as alcohol and hot water can remove the skin surface lipids.^[7] Disruption of skin barrier led to various type of skin problems most common condition is loss of water content which lead to dryness of skin such as roughness, scaling, cracks, redness and an uncomfortable feeling of tightness, sometimes with itching and stinging.^[8] Treatment with moisturizers aims at maintaining skin integrity and the well-being by providing a healthy appearance of the individual.^[9]

Formulation and Evaluation of Moisturizer Containing Herbal Extracts

Today's skin-care consumer is presented with a wide array of available products to treat dry skin, the choices for the individual consumer seem endless.

The poly herbal cosmetic formulations are popular all over the world, as they convey the better impression of purity, safety and efficacy. Numbers of moisturizers are available under the label of natural, safe, organic, herbal, while the basic properties of humectancy, occlusivity and emolliency are consistent across all moisturizers.^[10] Most of the available moisturizers use synthetic adhesives, emulsifiers, perfuming agents, pigments, surfactants and thickeners to form the base. There is extensive need to replace toxic synthetic agent from base using natural agents.^[11-12] Table I summarized the toxic effects associated with the some of the synthetic ingredients used in commercial moisturizers. Formulating cosmetics using completely natural raw materials is a cumbersome task. Challenge not only lies to substitute synthetic base from naturals but also to get same functional effects acquiring from synthetic one. The selected herbs described in the present investigation have been utilized medicinally in crude aqueous and ethanolic extracts were well described in the literature for their potential cosmetic benefits.^[13-14]

These herbs have been selected on the basis of a traditional system, ethnobotanical survey and scientific justification with modern uses of *Glycerrizha glabra*, *Embllica officinale*, *Cucumis sativus*, *Trigonella foenum graecum*, *Triticum sativum*, *Cocos nucifera*, *Prunus amygdalus*, *Oleum olivae*, *Santalum alba*, *Azadirachta indica* and *Aloe barbadensis*.^[15-18] Therefore, an attempt has been made in the present study to utilize various herbal ingredients' properties for substituting synthetic base [Table II] with functional benefits [Table III]. Our endeavour has been to formulate the almost complete herbal moisturizer with bare use of synthetic ingredients and to evaluate its efficacy and safety parameters as compare to available commercial moisturizer.

MATERIALS AND METHODS

Materials

The plant materials like dried barks of *G. glabra*, *E. officinale*, fruits of *C. sativus*, seeds of *T. foenum graecum*, oils of *T. sativum*, *C. nucifera*, *P. amygdalus*, *O. olivae* and *S. alba* and honey were procured from a local authentic herbal distributor of Raipur, Chhattisgarh [C.G.].

Table I: Synthetic ingredients used in moisturizers

S.no	Ingredients	Side effects	Used as/in
1	Propylene Glycol	Allergic reactions, hives and eczema	Humectant
2	Petrolatum	Dryness and chapping	Emollient and occlusive agent
3	Dimethicone	Harsh to skin or cause tumor	Adhesives and Emollient
4	Paraben	Allergic reactions and skin rashes	Antimicrobial agent
5	Diethanolamine (DEA), Triethanolamine (TEA)	Allergic reactions, eye irritation, dryness of hair and skin	Emulsifiers
6	Diazolidinyl Urea, Imidazolidinyl Urea, benzalkonium chloride	Contact dermatitis	Preservatives
7	Synthetic Colors	Carcinogenic	Colouring agent
8	Synthetic Fragrances	Headaches, dizziness, rash, hyperpigmentation, violent coughing	For fragrance

Table II: List of ingredients used to formulate natural base for herbal moisturizer

S.no	Ingredients	Used as
1	Soy lecithin, Glycerin, <i>Aloe barbadensis</i> (Aloe vera)	Humectant
2	Triple distill water, <i>Triticum sativum</i> (wheat germ) and <i>Trigonella foenum graecum</i> (Methi)	Emollient and occlusive agent
3	<i>Cucumis sativus</i> (Cucumber)	Adhesives or emollient
4	Acacia	Emulsifiers
5	<i>Azadirachta indica</i> (Neem)	Preservatives
7	<i>Santalum Alba</i> (Sandal oil)	For fragrance
8	Rose water	Cooling effect and fragrance

Table III: List of herbs with its chemical constituents and functional properties use to formulate herbal moisturizer

S. no	Herbs	Chemical constituents	Functional properties
1	<i>Aloe barbadensis</i> (Leaf extract)	Barbaloin, aloe-emodin, aloesin, amino acid, enzymes, vitamin	Moisturizing agent and impart elasticity
2	<i>Glycerriza glabra</i> (Bark extract)	Estragole, anethole, flavonoids	Astringent
3	<i>Cucumis sativus</i> (Main fruit juice)	Silica, vitamin C, folic acid	Moisturizing and firming agent
4	<i>Trigonella Foenum Graecum</i> (Seed extract)	Carbohydrates, lipids, flavonoids, free amino acids	Softening and soothing agent
5	<i>Triticum sativum</i> (oil)	Vitamin E, carbohydrate	Nourishing and occlusive agent
6	<i>Cocos Nucifera</i> (oil)	Lauric oils	Soothing agent
7	<i>Prunus Amygdalus</i> (oil)	Amandin, folic acid, alpha tocopherol and zinc	Hydrating and firming agent
8	<i>Oleum olivae</i> (oil)		Prevent drying and chafing
9	<i>Azadirachta indica</i> (Leaf extract)	Nimbin, nimbinin and nimbidin	Rejuvenating and extrafoliating agent
10	<i>Santalum Alba</i> (oil)	Santalol	Alleviate itching and cooling agent
11	<i>Emblica officinale</i>	Vitamin c	Antioxidant

Leaves of *A. indica* and *A. barbadensis* were collected from the medicinal garden of the Institute of Pharmacy, located in Chhattisgarh State, India. All plant materials were identified [from the Herbarium, Dept. of Pharmacognosy of Pt. Ravishankar Shukla University, Raipur, India] and tested for percent purity [99.7%] by microscopic methods Soy lecithin and glycerin was obtained from S.D Fine Chem. Ltd., Mumbai, India. Commercial herbal moisturizer was purchased from cosmetician.

Instruments

Instruments were used for analysis are pH meter [335, Systronic, India], Brookfield viscometer

[DV-I, LV-I spindle, Brookfield Engineering Laboratories, USA], Colony counter [M-37, Rolex, India], Muffle furnace [77 S8HT8, Tempo, India], Homogenizer [R220, Iyca, Japan], Micro centrifuger [RM-12CDX, Remi, India], Deep freezer [RQF 650, Remi, India], Cutometer [MPA 580, Courage and Khazaka, Koln, Germany] and [CASIO, H-21, India].

Preparation of herbal extracts

The ethanolic extracts of herbs were used in the present study due to their acceptability and compatibility with the skin's nature and economy. Plant materials were cleaned to remove the dirt and extra genus material and dried under the shade. The dried barks of *G. glabra*, *E. officinale* and leaves of *A. indica* were ground using a laboratory mill and their coarse powders [particle size ~0.25mm] were passed through a sieve number 20. Exactly 250 grams of

coarse powder of each herb were extracted with a hydro-alcoholic mixture [1000ml, 90:10v/v ethanol:water] at 60–70°C for 24h by a continual hot extraction method^[19], until complete exhaustion of the drug using a soxhlet apparatus. Dried seeds of *T. foenum graecum* [250gm] was extracted with a hydro-alcoholic mixture [1000 ml, 90:10v/v ethanol: water] using a cold maceration process according to the Indian Pharmacopoeia process^[20] for 8 hrs to make concentrated extracts. The obtained extracts were evaporated under reduced pressure [AU 5 psi] at 50 ± 5°C for 5–15 min and concentrated extracts were dried to obtain actual yields. Fruits of *C. sativus* were chopped, weighed [300gm] and grounded through blender and juice was filtered through proper sieves. Obtained juice was kept at refrigerator. Fresh *A. barbadensis* transparent gel was collected from its fresh leaves after the complete removal of epidermis using a stainless steel knife.

Preparation of natural base

Phase inversion technique^[21] was used to prepare natural base [M5]. The internal phase was prepared using ingredients [composition given in Table IV, emulsification was carried out in the mortar pastel. Initially, grated and melted bees wax, natural oil of *T. sativum*, *C. nucifera*, *P. amygdalus*, *O. olivae* and *S. alba* and other ingredients acacia, soy lecithin, glycerin were mixed using an homogenizer at 200±25rpm at 65°-75°C. After the complete homogenous mixing, a 50ml portion of triple distill water [70±2°C] was added at a rate of 45ml/min at increased speed [250±25rpm]. When the temperature of the internal phase was reduced to 50°C, phase inversion

took place and the solution became viscous; half of the total amount of aloe gel and cucumber juice was added. When the temperature was reduced to 40°C, honey [2% w/w] was added to this mixture.

Formulation of herbal moisturizer

Different concentrations i.e. 0.135–0.9% w/w of extracts, juice and gel were prepared in ethanol and incorporated into the natural base formula as summarized in Table IV. M5 was used as the control product. Commercial herbal moisturizer with synthetic base was coded as M4.

Subjects

Total 20 of volunteers, mean age 30±10yrs, with history of dry and itchy skin, were recruited after signing informed consent for the study of 3weeks. All volunteers having history of dry and itchy skin were selected for the subjective study to determine the effectiveness of formulations with regards to their ability to improve the mechanical and hydration properties.^[23]

Study protocol

All volunteers participated were found free from any pathological findings on their arms. All test subjects were informed not to use cleansing or skin care products on

the volar forearms^[24] for 1week prior to and during the study. Volunteers were equally divided into two groups, each consisting of ten volunteers. One group was tested exclusively using the control [M5], just to observe its initial compliance and safety to the skin. The second group was tested with the M5 control and M1 and M4. Volar forearm of each volunteers of second group were divided into three sites, having a 2cm² sample area separated by 0.8cm. Study data were measured six times [n=6]. The measurements were performed in an acclimatized room with a mean relative humidity of 40±3% and a mean room temperature of 23±5°C. They were carried out under standardized conditions as described earlier^[25].

Physicochemical Evaluation

Several physicochemical parameters were determined for M5 [control] and for prepared formulations [M1-M3], also for commercial moisturizer [M4] according to the Indian Standard Bureau methods.^[26-28] These physicochemical parameters provided information regarding formula stability and skin compatibility. The pH, thermal stability (at 20°C, 30°C and 40°C), fatty content and nonvolatile content of the prepared formulations were determined according to Indian standard guideline. Ash examination, saponification values, and acid values were determined according to methods discussed by Lachman *et al.*^[19-20] 1992. The viscosity^[29] was measured using a Brookfield viscometer at 30rpm. The spreadability and layer thickness was evaluated according to Multimer.^[30] Spreadability refers to the % area covered by a fixed amount of cream sample after the uniform spread of sample and layer thickness refers to the thickness of the layer [in microns]. All evaluations were carried out in triplicate presented as mean±standard deviation [SD].

Safety Evaluation

Safety analysis includes determination of microbiological specification and sensitivity profile.

Microbial examination of all herbal sunscreens [1gm/1ml] was tested according to COLIPA guidelines and Indian Standards methods.^[26] Total numbers of viable mesophyllic microorganism were recorded by using a colony counter.^[31-32] Sensitivity study using a patch test design was conducted on each volunteer of two groups. Formulations were applied on the back of volar forearm with the help of surgical gauze (0.5g/cm²) and the score was determined using the scale defined in the Indian Standards.^[14] Each volunteers was observed for any irritation, erythema score [redness], and edema after 24h to ensure that control [M5] and tested moisturizers [M1-M4] did not cause any side effect.^[33]

Table IV: Composition of ingredients used in formulation of herbal moisturizer

Ingredients	Extracts incorporated in w/w %			
	M5	M1	M2	M3
Acacia	3.0	3.0	3.0	3.0
Bees wax(melted)	2.0	2.0	2.0	2.0
Cocos Nucifera oil	4.55	4.55	4.55	4.55
Glycerin	3.5	3.5	3.5	3.5
Soy lecithin	5.0	5.0	5.0	5.0
Santalum Alba oil	2.0	2.0	2.0	2.0
Prunus Amygdalus oil	3.0	3.0	3.0	3.0
Honey	2.0	2.0	2.0	2.0
Oleum olivae oil	1.0	1.0	1.0	1.0
Triticum sativum oil	0.6	0.6	0.6	0.6
Cucumis sativus	--	0.70	0.6	0.9
Glycerriza glabra	--	0.75	0.5	0.9
Emblica officinale	--	0.210	0.135	0.25
Azadirachta indica	--	0.75	0.6	0.9
Trigonella foenum graecum	--	0.583	0.385	0.75
Aloe barbadensis	--	0.78	0.5	0.9
Triple distill water q.s. (100 ml)	q.s	q.s.	q.s.	q.s.

Efficacy Evaluation

This prospective study was conducted from November to January 2008, as per the ethical guidelines of the Declaration of Helsinki, after prior permission from Institutional Ethical Committee. Efficacy evaluation on human volunteers was carried out for 3 weeks. M5 used as the control product and M1 and M4 were used as the test formulations. Twenty subjects were enrolled in the study. Skin viscoelasticity, firmness and hydration parameters were determined by using Cutometer and Multitester respectively.

Skin Viscoelasticity and Firmness

The mechanical properties of the epidermis were determined using a non-invasive, *in vivo* suction skin elasticity meter, Cutometer [MPA 580, Courage and Khazaka, Koln, Germany] equipped with 2mm measuring. The time/strain mode was used with a 5s application of a constant negative pressure of 500mbar, followed by a 5s relaxation period. A typical skin deformation curve is illustrated in Fig. 1. The following parameters were analyzed: U_e , immediate distension; U_v , delayed distension; $[R_0]$ U_f , final distension [skin distensibility]; U_r , immediate retraction; R , residual deformation at the end of measuring cycle [resilient distension]; $[R_2]$ U_a/U_f , gross-elasticity of the skin, including viscous deformation; $[R_5]$ U_r/U_e , neto-elasticity of the skin without viscous deformation; $[R_7]$ U_r/U_f , biological elasticity, i.e., the ratio

of immediate retraction to total distension; $[R_6]$ U_v/U_e , the ratio of viscoelastic to elastic distension; and R_8 , viscopart, i.e., the area under the suction part of the deformation curve. The average values of two measurements were used in subsequent calculations.

Skin hydration

Hydration of the epidermis was determined with a non-invasive using an electronic device, Multitester [CASIO, H-21, India] that measured resistance based on the commonly known fact that hydrated skin has less resistance to current flow than dehydrated skin. The level of stratum corneum hydration was assessed by measurement of the changes in skin resistance and is referred to as the galvanic skin response or electrical skin resistance. The skin resistance reported in ohms with electrodes [size 1 cm²] was measured 30min and 6hr after application of the formulation [continuously upto 3 weeks] at 1000 khz, 10mA, AC current according to the modification of Nicander *et al.*^[34]

Statistical Analysis

Statistical analysis was carried out by using STAT software, obtained values were expressed mean±SD [Standard deviation]. All parameters were statistically analyzed at 99% confidence level in the column. Changes in viscoelasticity, firmness and hydration were expressed in percentage. Analysis of variance ANOVA and Student's

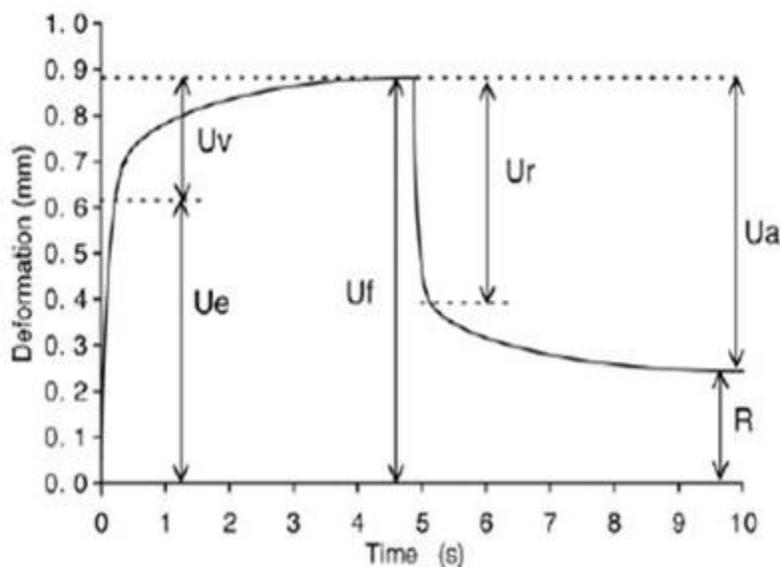


Figure 1: Skin deformation curve obtained with Cutometer

paired *t*-tests were performed. Differences was considered statistically significant if $p < 0.01$.

RESULTS AND DISCUSSION

Natural base M5, formulated moisturizers [M1-M3] containing actives of herbal extracts and commercial moisturizer [M4] was analyzed for their stability at room temperature and physical characteristics.

The pH, erythema score, viscosity and spreadability of M5 was found to be 5.65, 0 erythema score, 5960 ± 30 cps, $97 \pm 2.0\%$ respectively and found to be stable at 20°C, 30°C and 40°C [Table V]. This formulation showed no signs of phase separation at room temperature which indicated that uniform mixing and the desired consistency remained in the control [M5] cream base formula. The concentration of extracts in the M1-M3 formulations were selected after prior optimization of the individual extracts based on literature and available marketed formulations.^[35] Based on the physicochemical parameters shown in Table V, higher acid and saponification values, less thermal stability, more microbial counts and less spreadability resulted in cracking and phase separation of formulations (observed in M3). Key chemical parameters that must be controlled include ash value, acid values [in the range 3.5–6.5], fatty content, nonvolatile content and pH [between 3.5–6.5]. It was observed that formulation M2 and M3 had higher free acid values, which caused more irritation to the skin. This acid value is associated with the free fatty acid and volatile content.

During storage and handling, cosmetic formulation's thermal stability, viscosity and spreadability are the prime parameters which affect the formulation's acceptability. Amongst all of the formulations, the highest fatty content [15.01gm] was found in M3 which accounts for the lowest thermal stability [at 30°C and 40°C, Table V]. Spreadability and layer thickness was found to be in the range of 65–98% and 28.40–30.08µm for formulations M1-M4 [Table V]. The viscosity of all formulations was between 5950–6600cps [Table V].

Microbial examination was conducted for all four herbal formulations [M1-M4] and for the natural control base formula [M5]. The average number of colonies per gm of sample in nutrient medium was calculated. Microbial viable counts were higher in the M3 formulation than in the control cream formula M5 [Table V]. The more microbial counts were observed in M3 indicating these formulations had the highest susceptibility to microbial attack. This microbial growth might be due to the incompatibility of the higher extract content with the base cream.

Table V: Evaluated physicochemical and safety parameters

Formulation Code	pH	Ash Exam	B	CO ₃	Cl	S	Non Volatile (%)	Acid Value	SV*	Fatty Con. (gm)	Thermal Stability			LT** (µm)	Viscosity (Cps)	Microbial Count (CFU /gm)	Erythema Score
											20°C	30°C	40°C				
M5	5.65±0.2	-	+	-	-	-	18.0±2.0	6.0±1.5	16.10±1.0	12.50±2.0	P	P	P	29.00±2.5	5960±30	33±2	0
M1	5.55±0.3	-	-	-	-	-	21.4±2.0	6.0±0.5	19.30±1.6	12.20±1.0	P	P	P	28.60±1.50	5950±10	31 ±4	0
M2	6.70±0.2	-	+	+	-	-	25.4±1.8	9.0±1.0	21.17±1.6	14.25±0.9	P	P	N	29.99±1.8	6565±30	43±3	1
M3	6.80±0.5	+	-	-	-	+	29.2±2.1	9.2±1.3	23.00±1.4	15.01±0.5	P	N	N	30.00±1.5	6600±15	48±3	1
M4	5.19±0.3	-	+	+	+	-	21.0±1.6	6.1±1.0	18.10±1.5	12.69±0.6	P	P	P	28.40±1.5	5995±20	31±5	0

*Saponification value, ** Layer Thickness

All the values are represented as mean ± SD (n=3), $p < 0.01$ shows sufficient significant.

(CFU) denotes colony forming units

(+) denotes absence, (-) denotes presence, (P) denotes stability of formulations, (N) denotes unstability of formulations

Formulation and Evaluation of Moisturizer Containing Herbal Extracts

With respect to safety and the irritant test evaluation, M2 and M3 had shown an erythema score one, indicating the presence of a red spot remaining on the skin. An erythema score of 0 indicates no irritation [no redness] and a score of 1 indicates slight redness of skin. The formulations M1 and M4 were found to be non-irritating, representative by an erythema score of 0. This low erythema score is presumably due to lower pH of these formulations. Based on the results of the physicochemical and stability parameters, formulations M1, which contains the medium amounts of extracts, was the most stable formulation.

M2 and M3 formulations were excluded from *in vivo* efficacy study as they were found to be having erythema score 1 (irritant to skin). Hence, *In-vivo* efficacy studies were carried for M5, M1 and M4. Twenty subjects were enrolled in the study. The panelists communicated

noteworthy improvements in the skin surface morphology [skin smoothness and softness] after only a week's application that continued through the duration of the study period. The improvement in the skin's mechanical and hydration properties were compared to the control [M5]. At the end of the 3rd week, the overall performance of the formulated herbal moisturizer M1, compare with commercial moisturizer M4. Statistical analysis was completed according to intent-to-treat principles. All the physiological positive results were found significant when data of M1 and M4 were compared with the data of M5 [$p < 0.01$] [Table VI]. The moisturizing effect of M1 was found highly significant after one-week of twice daily treatment [$p < 0.001$] as compared to the M5 formulation [Table VI]. Regarding the hydration effect, extensibility and firmness, no significant differences between M1 and M4 were observed [$p < 0.01$]. The results

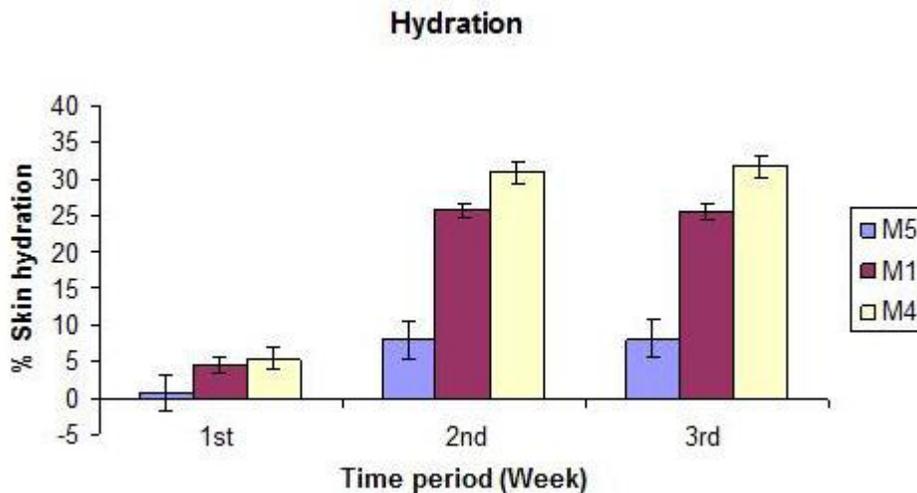


Figure 2: Increase in percentage of skin hydration after 3 week period

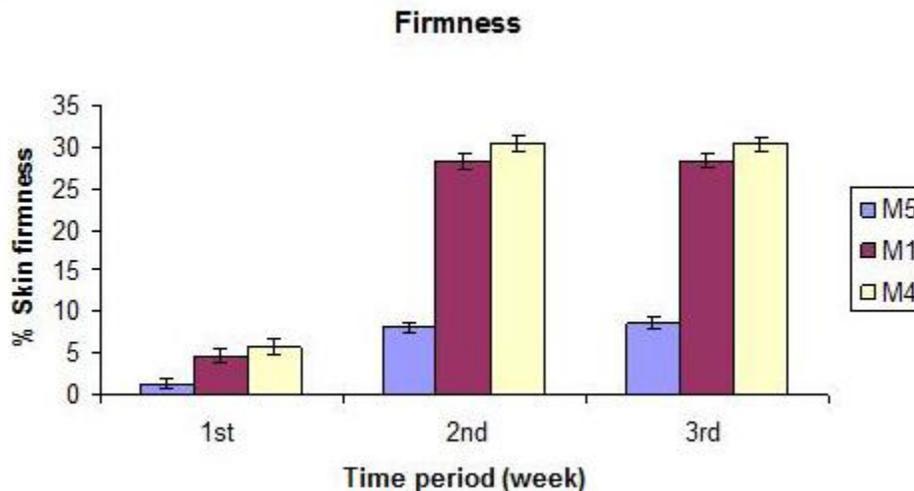


Figure 3: Increase in percentage of skin firmness after 3 week period

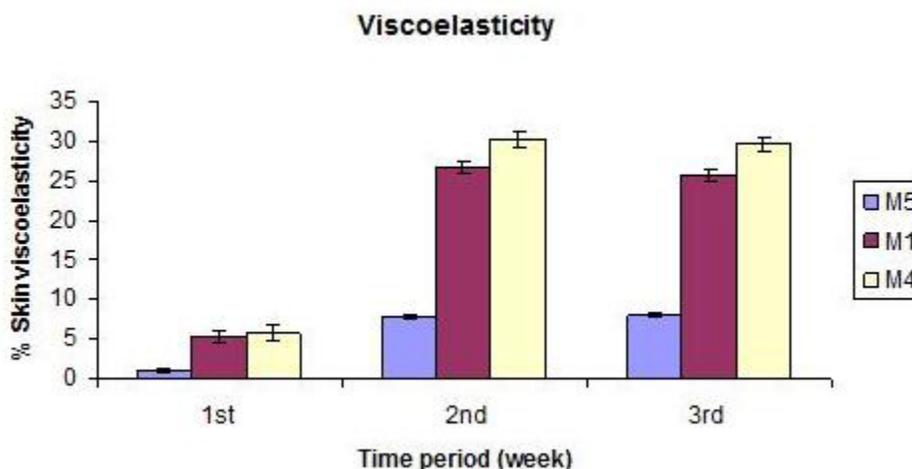


Figure 4: Increase in percentage of skin viscoelasticity after 3 week period

Table VI: Effects of control and tested formulations on the skin physiological properties

Week	% Increase in Skin Physiological Parameters								
	Hydration			Firmness			Viscoelasticity		
	M5	M1	M4	M5	M1	M4	M5	M1	M4
1st	0.69±0.05	7.90±0.51	8.10±1.25	1.27 ± 0.60	8.10 ±0.25	8.63±0.31	0.99±0.28	7.81± 0.55	8.00±0.50
2nd	4.51±2.00	25.85±1.05	25.64± 0.41	4.65 ± 0.30	28.29±0.35	28.36±0.65	5.15± 0.27	26.77± 0.75	25.63±0.92
3rd	5.40±2.51	30.97±0.55	31.77±0.59	5.78 ±0.50	30.46±0.86	30.35±0.91	5.76±0.30	30.27± 0.55	29.69±0.82

All the values are represented as Mean ± SD (n=6), p<0.001; when compared to control (M5)

showed that M1 and M4 had increased skin hydrations levels [30.97±0.55% and 31.77±0.59%] respectively after 3 weeks which were more than the control formulation M5 [5.40±2.51%] [Fig. 2, Table VI]. The improvement in skin firmness was found to increase up to 30.46±0.86% and 30.35±0.91% respectively for M1 and M4 [Fig. 3, Table VI]. The improvement in the skin viscoelasticity was found to be increased for M1, 30.27±0.55%, and M4, 29.69±0.82% as compared to the control product, M5, 5.76±0.30% [Fig 4 and Table VI].

The results revealed that M1 showed remarkable improvements in biomechanical and electrical properties when compare with M4. These improvements may be due to the synergistic effects of active constituents present in the ethanolic extracts of selected herbs. Accurate pathways of these mechanisms are not yet clear, but all these herbal ethanolic extracts possess different kinds of antioxidant, antielastase, photochemoprotective, astringent, face mask toner and anti aging properties due to their chemical constituents [Table III].

Results revealed that it is possible to formulate true herbal cosmetics may be more safe than the synthetic

one. Many of the commercial herbal moisturizers contain synthetic ingredients for the base that may be toxic to skin [Table I]. Instead of synthetic adhesive, humectants, emollients, occlusive agents, emulsifiers, perfumes and preservatives we used the complete herbs which impart functional properties also. We utilize the self preserving property of Neem extract, which not only act as antimicrobial agent also imparts firmness to skin. Aesthetic attributes, such as smoothness, softness, firmness and luster found to be comparable to commercial one. The possible putative active constituents in the ethanolic extracts of selected herbs include flavanoids, glucides, polysaccharides, triterpene saponins, polyphenols and santalol etc. Such proven actives may impart a role in the changes in skin properties such as firmness, improved hydration, improved collagen binding and inhibition of indigenous cellular oxidation.

CONCLUSION

Present work attempts to formulate almost complete herbal moisturizer with same functional potentiality

compare to synthetic one. Study concludes that we are blessed with many of the magical herbals it depends upon us to explore then scientifically to treat skin related problems. Formulators must play an active role to replace dangerous and toxic synthetic chemicals from the dermato-cosmetic products so that consumers can get the maximum benefits of our traditional heritage. It is anticipated, this work will kindle more research and faith towards utilization of herbal active ingredients in cosmetics.

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CONFLICT OF INTEREST

None

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