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Original Article

Formulation, Optimization, and Standardization of Polyherbal Facial Scrub Containing Coffee Arabica, Walnut Shell Along with Turmeric and Neem

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Abstract

The present study was designed to prepare a polyherbal facial scrub containing coffee arabica, walnut shell, turmeric, neem, honey, and a mixture of pulses. Further, the prepared scrub was optimized using two factors and three central composite experimental design levels. The phytochemical screening and standardization of scrub were accomplished. The extracts were prepared, standardized, and evaluated using smear type, homogeneity, pH, spreadability, acid value, and stability tests. The influence of the concentration of honey (%) and paraffin wax (%) on pH and spreadability was premeditated using response surface methodology. Further, the optimized batch of polyherbal scrub was compared with the marketed formulation of Everyuth scrub containing walnut as the main ingredient, which was almost equivalent in pH, spreadability, acid value, and homogeneity. The study revealed that enhancing the concentration of paraffin wax in polyherbal scrub increases the pH and spreadability. The optimal calculated parameters were the concentration of honey 2.3 (%) and the concentration of paraffin wax 2.1 (%). The optimized batch of polyherbal scrub had a pH of 6.8 and spreadability of 7.3. Thus, the prepared formulations can be effectively used for facial care.

Keywords: Herbal face scrub, Coffee Arabica, Cosmetics, Neem, Phytochemical screening.

1. Introduction

Products meant to be applied to the human body by rubbing, sprinkling, pouring, or spraying are considered cosmetic products. They are used for cleaning, enhancing attractiveness, beautifying, or changing appearance. Cosmetics are widely available in creams, lotions, serums, scrubs, and face packs to produce their subsequent effect on the applied area. Cosmetics are also developed to act against acne, reduce wrinkles, control oil secretion, impart glow to skin, and for many other purposes. These cosmetics have diverse

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properties, such as antiseptic, emollient, anti-inflammatory, antioxidant, anti-keratolytic, anti-drying, and antibacterial [1]. The purpose and function of skin care cosmetics include cleaning the skin, maintaining the skin's moisture balance, stimulating skin metabolism, and protecting the skin from harmful rays and chemicals. Skin care cosmetics maintain the skin's homeostasis, restore skin cell's metabolism, and delay skin aging. One such example of cosmetic skin care is scrub. Facial scrub is a cosmetic item that cleans and exfoliates the skin of the face, providing healthy complexation upon rubbing the skin. The face skin is the most important body part, which indicates an individual's personality, attractiveness, and healthiness. Skincare is an essential part of our daily life. Skincare negligence results in loss of glow and dullness to the skin, which can be overcome by applying the scrub [2].

Skin is classified according to its condition as dry, oily, and sensitive [3]. The continuous use of scrub provides extraneous glow and smoothness to the skin because departed cells of the skin are removed, and ultimately, sensibly new skin cells are exposed. The major key ingredient of facial scrub formulation is a mild abrasive agent. Scrubs can be applied directly or indirectly to the skin with a small cosmetic pad. After applying the scrub, a gentle massage is recommended, which helps the better circulation of blood and makes available a large amount of oxygen to all skin surfaces [4].

Coffee arabica is well known for its cosmetic use and skin benefits. Coffee contains several chemical constituents, such as chlorogenic acid and caffeine, which are flavonoid and phenolic compounds [5]. The anti-oxidant effect of coffee is due to these flavonoids. Flavonoids' anti-oxidant character arises from their ability to share an electron with free radical compounds and exhibit oxidation reactions [6, 7].

Coffee is widely cultivated in Indonesia. Robusta and arabica coffee are the two main varieties of coffee grown in Indonesia. Arabica coffee, or Coffea arabica L., is a type of coffee that comes from Ethiopia's highlands in Africa.

Walnut shell powder (*Juglans* spp.) is a natural eco-friendly exfoliant used in skin care products, particularly face scrub. Exfoliators made of walnut shells gently eliminate pollutants and dry, dull skin, leaving glowing, smooth skin. They help in skin toning by refining skin texture. The chemical constituents of walnut shells contain ash (3.4%), hemicellulose (22.4%), lignin (50.3%), and cellulose (23.9%) [8]. It has anti-oxidant [9], hair-dying agent antimicrobial [10], and anti-radical properties [11]. The primary purpose of cultivating walnuts is for their kernels; other fruit components, like the husk and shell, are created as waste crops when fruit is harvested and processed [12].

Turmeric rhizomes (*Curcuma longa)* are thick and ellipsoid ovate with orange cortex. It is a perennial herb cultivated easily and distributed widely in Thailand and other tropical and sub-tropical countries. It is used in spices in the kitchen and as a coloring agent [13, 14]. The volatile oils in rhizomes are attributed to their anti-inflammatory, antioxidant, antiseptic, and antifungal activity.

The turmeric volatile oil contains active constituents such as turmerone, atlantone, and zingiberone [15, 16].

Azadirachta indica, traditionally named Neem, belongs to the family Meliaceae and is widely used for eras as a source of active chemical ingredients in several skincare and healthcare formulations [17]. Neem can be measured as a natural basis of cosmetic raw material for various preparations. The antiseptic, anti-inflammatory, chemo-preventive, antioxidant, microbicidal, nematicidal, antifungal, and antileishmanial properties of neem have been described [18]. The chief phytochemical compounds are oxidized tetranortriterpenoids, such as azadirachtin azadirachtanin, azadiriadione, azadirachtolide [19].

Herbal formulations have gained huge global demand in the global market, which is continuously increasing [20, 21]. Evidence-based studies indicate that active phytoconstituents smooth the skin to restore its activity and have protective and healing effects [22]. Consequently, the current study is intended to formulate, optimize, and standardize polyherbal scrub comprising coffee arabica walnut shell along with turmeric, neem, a mixture of pulses, and honey as a cost-effective natural scrub for facial skin.

2. Materials and Methods

2.1. Authentication and procurement of raw materials

The ingredients were purchased from the local market of Farrukhnagar, Gurugram, and pulverized later for use. The mixture of pulses includes moong dal, channa dal, Toor/arhar dal (Polished and Unpolished), and masoor dal. The samples were authenticated and identified with the help of previously available specimens in the herbarium. The sample was confirmed over the accessible literature flora of the native place. The vouchers of the samples (GGCP/09/10/11/12) were stored in the Laboratory of Pharmacognosy, Gurugram Global College of Pharmacy, Farrukhnagar, Gurugram.

2.1.1. FRAP assay reagents

a) Acetate buffer (300 mM) pH 3.6: Sodium acetate (3.1g) trihydrate and glacial acetic acid (16 mL) were mixed, and distilled water was added to make 1 L volume.
b) TPTZ (2, 4, 6-tripyridyl-s-triazine): (M.W. 312.34), (10 mM) in 40 mM HCl (M.W. 36.46).
c) $FeCl_3$.6 H2O: (M.W. 270.30), (20 mM). The active FRAP reagent was produced by adding a, b, and c in a 10:1:1 ratio immediately before testing. Ferrous sulfate FeSO4.7 H2O: 0.1 - 1.5 mM in methanol was standard. All reagents were procured from Merck (Germany).

2.2. Preparation of extraction

The extract of the following was prepared and further used in formulation.

2.3. Walnut Shell

The 3 g walnut shell was crushed and passed through sieve #120. The fine particles were soaked in water overnight and used for preparation.

2.4. Neem Leaves extract

The hydroalcoholic extract of neem leaves (150 g) was prepared in 750 ml of a mixture of

alcohol (95% v/v ethanol) and water in a ratio of 1:1 at 70ºC refluxed for 3 hrs. The solvent was evaporated using Rotavapor® R-300 (Buchi) at 50 rpm and 40ºC in different batches using 50 ml of extract, and further, these batches were concentrated before use in preparation.

2.5. Turmeric extract

The fresh turmeric rhizomes were washed, cleaned, and cut into minute pieces. The sliced pieces were dried in a hot air oven at 60–80ºC for 48 hours. The tiny bits were then crushed into moderate powder form. The dried turmeric powder was extracted by maceration using water as a solvent for 7 days, concentrated and stored in closed container protected from light in refrigerated conditions (4oC) until further use. The extract was dried and kept in desiccators for supplementary use. The cold maceration process was used for extract preparation.

Table 1 represents the phytochemical screening of prepared polyherbal scrub containing coffee araba, walnut shell, turmeric, and Neem. The prepared scrub was tested for steroids, glycosides, alkaloids, saponins, flavonoids, tannins, and proteins. The (+) sign indicates the presence of phyto-constituents, while the negative (-) sign indicates the absence of moiety.

Table 1. Phytochemical screening of polyherbal scrub containing Coffee Arabica, Walnut shell, Turmeric, and Neem**.**

Plant constituents	Test Performed	Coffee Arabica	Walnut shell	Turmeric	Neem
Test for steroids	Salkowaski	-	-	+	-
	Liebermann-Buchard	+	-	ND	ND
Glycosides	Balget's	-	+	+	+
	Keller-Killiani	-	+	ND	+
	Legals	-	+	ND	+
	Borntrager's	-	ND	ND	+
Triterpenoids	Salkowaski	ND	-	-	-
	Liebermann-Buchard	ND	-	ND	-
Saponins	Foam	+	ND	+	ND
Carbohydrates	Molisch's	-	-	-	+
	Barfoed's	-	-	ND	+
	Fehling's	-	-	ND	+
	Benedict's	-	-	ND	+
Alkaloids analysis	Mayer's Reagent	-	-	+	+
	Hager's Reagent	-	-	ND	+
	Dragendorff's Reagent	ND	ND	ND	+
Flavanoids	Ferric-chloride	+	-	+	-
	Shinoda	ND	ND	ND	ND
Tannins	$FeCl_3$ Solution Gelatin	+	-	+	+
Proteins	Millon's	-	+	+	-
	Xanthoproteic	+	+	+	-
	Biuret	+	+	+	-
	Ninhydrin	+	+	+	-

Present (+), Absent (-), ND: Not detected

2.6. Method of preparation of facial scrub

The quantity of each ingredient to be incorporated in the formulation has been mentioned in **Table 2.** The exact amount of each ingredient was measured, crushed into a powder form, and passed through sieve #120. All the constituents were mixed and homogenized at 50 rpm and 70°C for one and a half hours. All the constituents were geometrically combined for homogeneous mixing using the serial dilution technique.

Walnut shell was selected due to its exfoliation effect. Coffee arabica was selected because of its unique adsorbent, antioxidant, and cleansing properties. Turmeric was selected due to its protective effect. Turmeric contains polyphenolic chemicals, commonly called curcuminoids, which comprise 3-6% of its chemical makeup. These compounds include curcumin, desmethoxycurcumin, and bisdemethoxycurcumin. Neem was selected due to its antibacterial properties, which treat acne and protect the skin from external aggressors that can damage the skin [23].

Thirteen formulations were equipped with diverse concentrations of main constituents by adjusting the water concentration. Evaluation of all the batches of scrub revealed a minor difference in their physicochemical characteristics.

2.7. Experimental Design

Polyherbal facial scrub was optimized by employing a central composite experimental design with α=0.05 as per normal protocol. Numerous primary tribunals were conducted to choose design variables. The concentration of honey (%) and paraffin wax (%) were selected as independent factors. The factors were determined using three levels: high, medium, and low, which corresponded to values of +1, 0, and -1, respectively, as given in **Table 2**. The analysis of variance was implemented at a 5% level of significance. The model was curtained and analyzed by adjusted R2 value, which has to be less than one.

The variable factors selected based on preliminary trials were pH and spread ability. DE software® (Trial version 13.0., stat-ease Inc., Minneapolis) was employed for statistical analysis and experimental project.

Table 2. Ingredients incorporated in optimizedpolyherbal facial scrub**.**

No	Ingredients	Scientific Name	Category	Quantity (%)
1	Walnut	*Juglans regia*	Anti-aging, anti-oxidant	2.5
2	Coffee	*Coffee arabica*	Adsorbent, anti-oxidant	2.0
3	Mixture of pulses	*Legumes*	Cleansing effect	3.5
4	Honey	*Apis*	Antiseptic, anti-oxidant	3
5	Sandalwood	*Santalum album*	-	0.5
6	Neem	*Azadirachta indica*	Antibacterial	1.5
7	Turmeric	*Curcuma longa*	Antiseptic, Skin conditioner	0.25
8	Paraffin Wax	Paraffin wax	Moisturizer	2.5
9	Sodium benzoate	Sodium benzoate	Preservative	0.9
10	Sodium Lauryl Sulphate	Sodium lauryl sulphate	Foaming agent	1.5
11	Distilled Water	-	Vehicle	Q.S

2.8. Characterization of face scrub

The prepared facial scrub was evaluated employing standard methods. Concise details of the prescribed standard methods used are described below.

2.9. Homogeneity and smear test

The prepared scrub was examined by conducting the test of homogeneity. The test depicts whether the scrub was non-homogeneous or homogeneous. Further, homogeneity was evaluated by physical touch. The test of the smear was carried out to scrutinize the after-feel effect on the skin. Each batch of scrub was applied to the skin and the smear of the scrub. The after-feel effect of the scrub was checked, and it exemplifies its greasiness.

2.10. Spreadability test

Two slides were stacked with 500 mg of the scrub between them. There was a 100g weight on the upper slide. The excess formulation was chipped off, and the weight was taken off. A 20g weight was supplied to the upper slide, secured with a non-flexible rope, while the lower slide remained fixed on the apparatus board. The duration of time the upper slide took to slip off was recorded.

$S = M \times L/T$ (1)

here, S-Spreadability, M-mass tied on an upper glass slide, L is the length of the glass slide, and T-Time was taken. The experiment was replicated three times, and the mean of three measurements was recorded.

2.11. Organoleptic evaluation

2.11.1. pH

The most significant parameter to determine the efficiency of scrub is pH. The pH is calculated by taking 50 mL of deionized water in a beaker, and 0.5g of the formulation is added and stirred thoroughly to prepare a homogeneous solution. A digital pH meter was used to calculate pH, and the readings were recorded in triplicate. Further, organoleptic characteristics like color, odor, texture, and consistency were studied.

2.11.2. Acid value

The scrub's acid value was determined by the scrub's reflux reaction in a mixture of alcohol and ether. Scrub (3g) was added to a mixture of solvents ether (25 mL) and methanol (25 mL), and the mixture was refluxed until the sample dissolved completely. The sample solution was titrated with 0.1 N NaOH solutions. Phenolphthalein (1 ml) was used as an indicator. Titration was carried out until the color pink appeared. The volume of NaOH consumed for titration of the scrub solution was noted down. The acid value of the scrub was premeditated, rendering to the prescribed formula.

Acid value= $V \times 5.6/w$ (2)

Where V = Volume of NaOH consumed in titration, w = weight of sample scrub

2.12. Stability test

The stability studies of scrub samples were conducted by considering both the spreadability and pH of scrub at diverse temperature situations, i.e., putting scrub in refrigerator, oven, and room temperature for one week.

The hot air oven temperature was maintained at 40°C while the refrigerator temperature was kept below 10°C at ambient conditions. Comparison of values at time 0 and after seven days' intervals was considered for evaluating stability studies. The freeze-thaw

and heating-cooling cycles were also followed to check the stability of the prepared formulations.

2.13. Freeze-Thaw Cycle

The test was conducted at temperatures of -20° C and +25° C for at least 48 hours in each state, constituting one cycle. The test ensured the scrub was stable and spontaneously shaped after freezing the water phase at room temperature. The stable batches against freeze-thaw cycles were further employed for studies.

2.14. Heating-Cooling Cycle

The formulations underwent six heating-cooling cycles, with each cycle consisting of exposure to a chilled temperature of 4°C and an oven temperature of 45°C for 48 hours at each temperature, resulting in a total of 48 hours for each cycle. The stable scrub preparations under the abovementioned conditions were further utilized in studies.

2.15. FRAP Assay

A 3.6 mL solution of FRAP was combined with 0.4 mL of distilled water and kept at a temperature of 37˚C for 5 minutes. Further, this solution was combined with polyherbal facial scrub solution (80 mL) and incubated at 37˚C for 10 min. The absorbance of the reaction mixture was measured at a wavelength of 593 nm. The calibration curve was constructed employing standard concentrations of FeSO4, 7H2O (0.1, 0.4, 0.8, 1, 1.12, and 1.5 mM). The absorbance values were evaluated for sample solutions of a polyherbal facial scrub formulation.

2.16. Determination of total phenolic content

The spectrophotometric technique was used to determine the total phenolic content. In brief, a 1 mL sample with a 1 mg/mL concentration was mixed with 1 mL of Folin-Ciocalteu's phenol reagent. After 5 minutes, 10 milliliters of a solution containing 7% Na2CO3 was introduced into the combination. This was then trailed by adding 13 milliliters of deionized distilled water, which was well-mixed with the other components. The solution was incubated without light for 90 minutes at 23 degrees Celsius. Subsequently, the level of light absorption was quantified at a wavelength of 750 nanometers. The total phenolic content was evaluated by extrapolating a gallic acid solution-created calibration curve. The quantification of the phenolic components was performed in triplicate. The total phenolic content was quantified by measuring the gallic acid equivalents (GAE) per gram of dried material.

3. Results and Discussion

3.1. Homogeneity and Smear test

The uniformity of various batches of prepared scrub was confirmed by smear and homogeneity tests. The homogeneity of all the samples was studied at diverse temperatures at zero time and after one week. All the batches of scrub were found to be stable, and there were no changes in the homogeneity at changed temperature circumstances after a week. In the same way, the smear test of the formulations exhibited that all the prepared formulations had a non-greasy nature and were easily absorbed.

3.2. Washability and appearance

The prepared scrub was applied to part of the face, massaged, and washed with water after scrubbing for 10 minutes. The scrub was observed to be easily removed from the face skin by washing it properly with water. Each

scrub of different concentrations showed its characteristic color and odor.

3.3. pH test

The safety and efficiency of facial scrub are determined by measuring the pH of the preparations. The efficiency of the formulation can be determined by considering pH as the most important parameter. The pH values must fall within the appropriate range appropriate for the skin. The pH of the prepared scrub was close to the neutral array of 6.4-7.3 and, therefore, appropriate for the skin. The pH values of set batches of scrub were compared and recorded (**Fig. 1**).

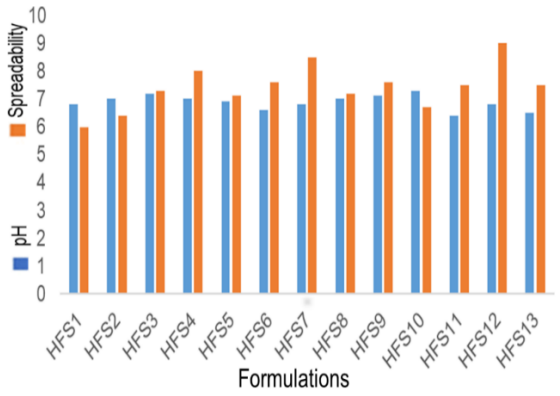

Figure 1. Comparison of pH and spreadability of all batches of herbal facial scrub.

Table 3 illustrates a comparative study of polyherbal face scrub with marketed face scrub, Everyuth Zydus Wellness Ltd. The optimized batch of polyherbal facial scrub was evaluated using numerous parameters such as color, odor, texture, consistency, and pH. Similarly, Everyuth face scrub (Zydus Welness Ltd.), available in the market, was evaluated and compared using the same parameters.

Table 3. Comparative evaluation of polyherbal face scrub with marketed face scrub Everyuth Zydus Wellness Ltd**.**

No	Physicochemical property	Inferences from optimized batch	Inferences of Everyuth Zydus Wellness Ltd.
1	Color	Brown	Pale yellow
2	Odor	Characteristics	Characteristics
3	Texture	Granular	Granular
4	Consistency	Good	Good
5	pH	6.9	7.0
6	Washability	Easily Washable	Easily Washable
7	Spreadability	7.3	8.5
8	Irritation	Non-irritant	Non-irritant
9	Redness	No redness	No redness
10	Swelling	No swelling	No swelling
11	Homogeneity	Homogeneous	Homogeneous
12	Freeze-thaw Cycle	Pass	Pass
13	Heating-cooling Cycle	Pass	Pass

3.4. Spreadability test

The time taken for one glass slide to move over another was noted. Figure 1 illustrates the scrub's spreadability result, which indicates the effect of the scrub's consistency and viscosity on spreadability when a small amount of shear is applied.

3.5. Acid value

All formulations' acid values were determined by the formula in equation (2). **Table 4** represents the result of the pH and spreadability of various batches of polyherbal facial scrubs equipped as per the practice designed. The observations were subjected to model fitting in a variety of multinomial models. The results revealed that response pH (Y1) best fitted into linear response surface model and response spreadability (Y2) was also brought into being best fit into the linear model.

Table 4. pH and spreadability of various batches of polyherbal scrub**.**

No.	Conc. of Honey (%v/v)	Conc. of Paraffin wax (%v/v)	pH	Spreadability (g.cm/s)
1	2(-1)	2.5(-1)	6.8	6
2	2(-1)	2.5(-1)	7	6.4
3	2(-1)	3.5(1)	7.2	7.3
4	3(0)	3(0)	7	8
5	3(0)	3(0)	6.9	7.1
6	3(0)	3(0)	6.6	7.6
7	3(0)	3(0)	6.8	8.5
8	3(0)	3(0)	7	7.2
9	3(0)	3.5(1)	7.1	7.6
10	3(0)	3(0)	7.3	6.7
11	4(1)	2.5(-1)	6.4	7.5
12	4(1)	3.5(0)	6.8	9
13	4(1)	3.5(1)	6.5	7.5

Table 5 displays the polynomial models' ANOVA analysis results. The experimental studies models have a non-significant "lack of fit" ($P > 0.05$) and are significant ($P < 0.05$), according to the results. The model's reliability was attributed to the advanced values of R2 and judiciously decent arrangement between the adjusted and predicted R2 values. Additionally, advanced adequate precision values (>4) exhibit adequate signal and designate that the established models are fit to circumnavigate the design interspace.

The spreadability of the formulations was found to be in the range of 6 to 9. The following polynomial equations describe the link between the formulation and answer variables for the replies Y1 and Y2 in terms of coded values.

$$Y1=6.75-0.2676*A+03.3057*B \quad (3)$$

$$Y2=3.11+0.5754*A+0.8475*B \quad (4)$$

The response Y1 affected the significantly linear effect of the honey concentration and paraffin wax concentration. The Y2 response is affected more significantly by the concentration of paraffin wax rather than honey.

Figure 2a demonstrates the combinatorial effect of honey and paraffin wax concentrations on the pH and spreadability of polyherbal facial scrub. It can be inferred from the plot that the concentration of paraffin wax had a more pronounced effect on pH than the concentration of honey. As the concentration of paraffin wax increases from 2.5–3.5%, the pH enhances significantly. This pH enhancement can be elucidated by the fact that enhancing the concentration of paraffin wax imparts more hydrophobic character of polyherbal scrub formulation, leading to an increase in the concentration of the unionized form of polyherbal scrub upon interaction with water. The concentration of honey has much fewer effects than that of paraffin.

Figure 2b displays the combinatorial effect of honey and paraffin wax on the spreadability of the polyherbal scrub formulation. The effect of paraffin wax concentration on spreadability is more pronounced than the concentration of honey. This consequence of paraffin wax concentration on spreadability could be detailed in a way that is similar to its effect on pH.

As the concentration of paraffin increases, the hydrophobic character of the scrub increases, but on the other hand, due to the high viscosity of honey interacting with water, the spreadability of the formulation increases.

Table 5. Model summary statistics**.**

Response factor	Model							Lack of Fit	
	F-value	p-value	R2	Adj. R2	Pred. R2	Adeq Prec.	C.V (%)	F-value	p-value
Y1	5.15	0.67	0.50	0.40	0.27	8.59	2.96	0.53	0.67
Y2	5.82	0.02	0.53	0.44	0.30	6.92	8.10	0.17	0.90

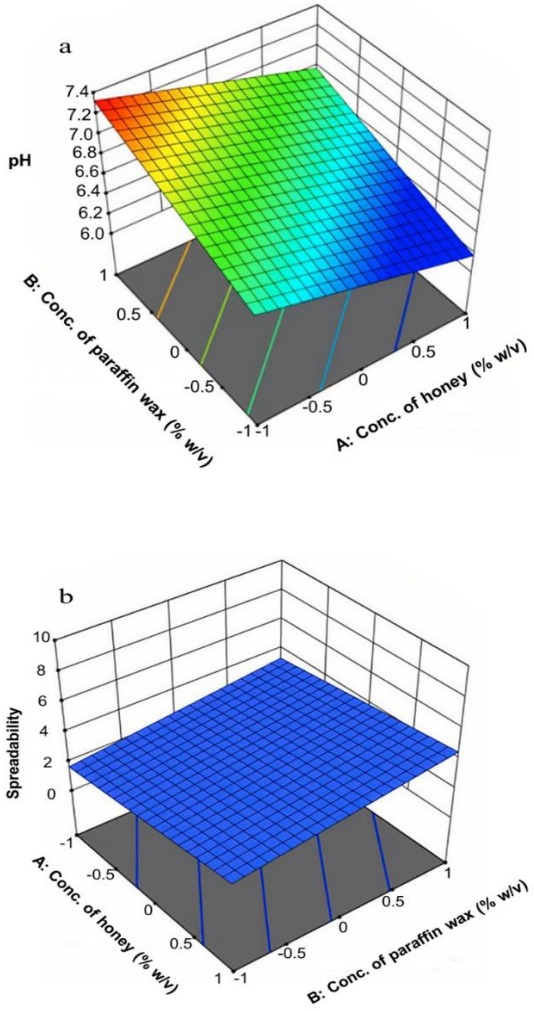

Figure 2. Surface response plot showing the collective effect of concentration of Honey and Concentration of Paraffin wax on pH (a) and spreadability (b) of polyherbal facial scrub.

3.6. Optimized batch selection

The preliminary trials commenced with the abridged typical multinomial equations to narrate the independent and dependent variables; optimization was carried out for all replies. The constraints were applied to the independent variables to get the optimized batch. The widespread grid and possibility search provided by Design Expert software revealed the final optimum experimental parameters. Based on the evaluation test results, the optimum batch was selected. The optimal calculated parameters were the concentration of honey 2.3 (%) and the concentration of paraffin wax2.1 (%). Thus, the optimized formulation had a pH of 6.8 and a spreadability of 7.3. The pH and Spreadability of the optimized batch and marketed formulation (Everyuth) were compared and found to be almost equivalent, with less variation in pH and spreadability [24] (**Fig. 3**).

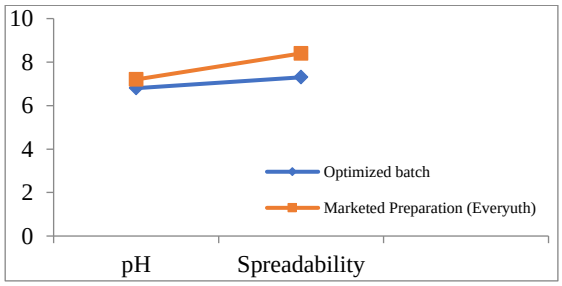

Figure 3. Comparison of pH and Spreadability of Optimized batch and Marketed Formulation (Everyuth).

3.6.1. Total phenolic content

The Folin-Ciocalteu technique was employed to measure the total phenolic content of the formulation. The phenol concentration of the polyherbal facial scrub was 2.12 mg GAE/g. **Figure 4** shows the standard curve for the concentration of formulation vs absorbance at 750 nm, used to calculate concentration from samples. The computed R^2 value was 0.980, with the intercept and slope coefficients being 0.4456 and 0.0159, respectively. Sample concentration has been determined from absorbance using the equation of the least square regression line.

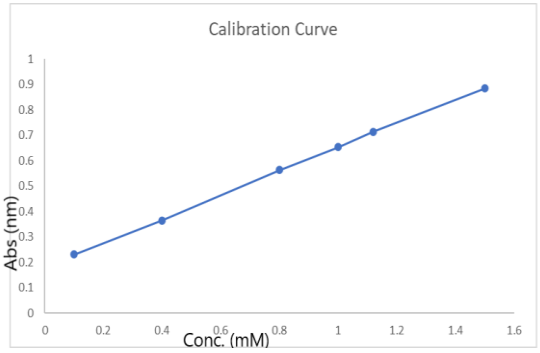

Figure 4. Calibration curve of polyherbal scrub using standard concentrations of FeSO4.7H2O at 593 nm.

4. Conclusion

The polyherbal face scrub containing coffee arabica, walnut shell, turmeric, neem, honey, and a mixture of pulses was formulated successfully. The prepared formulations were optimized using two-factor, three-level central composite experimental designs. The prepared formulation was optimized, evaluated, and compared with the marketed formulation of Everyuth, Zydus Wellness Ltd. It was almost equivalent in pH, spreadability, washability, and foamablity. The FRAP assay assessed the anti-oxidant activity, and its total phenolic content was calculated. Studies have concluded that the prepared formulations can be effectively used for facial care.

Conflict of interest

The authors declare to have no conflict of interest.

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