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Research Article

DEVELOPMENT AND CHARACTERISATION OF ANTI-SEPTIC CREAM CONTAINING TURMERIC, ALOEVERA AND JATYADI OIL

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ABSTRACT

The need of herbal medicines is increasing rapidly due to their fewer side effects. Herbal drugs constitute a major part in all the traditional system of medicine. Hencean attempt has been made to formulate and evaluate cream for its antiseptic activity against *Propionic* Bacteria. In this context, the study has been conducted to formulate polyherbal cream using turmeric, *Aloe vera* extract and *Jatyadi* oil, all the extracts are obtained by using various extraction techniques such Maceration, Steam distillation and Soxhlet apparatus. Preliminary phytochemical screening was carried out for all the herbal extracts the final formulation was evaluated for different evaluation parameters. The formulation was evaluated for antiseptic activity against *Propionic bacteria* by MIC method.

INTRODUCTION

Creams are the semisolid dosage forms and intended for topical application to the skin, placed on the surface of eye, or used nasally, vaginally or rectally for therapeutic or protective action or cosmetic function. These preparations are used for the localized effects produced at the site of their application by drug penetration into the underlying layer of skin or mucous membrane. These products are designed to deliver drug into the skin in treating dermal disorders, with the skin as the target organ.[1] Creams are mainly in two form such as oil & water, where oil-in-water (O/W) creams are composed of small droplets of oil dispersed in a continuous phase, and water-in-oil (W/O) creams are composed of small droplets of water dispersed in a continuous oily phase. Oil-in-water creams are more comfortable and cosmetically acceptable as they are less greasy and more easily washed off using water. Water-in-oil creams are more difficult to handle but many drugs which are incorporated into creams are hydrophobic and will be released more readily from a water-in-oil creams than an oil-in-water creams. Water-in-oil creams has longer moisturising effect as they create/build an oily barrier which reduces water loss from the stratum corneum, the outermost layer of the skin.[2]

World Health Organization (WHO) as well India has been promoting traditional medicines because they are less expensive, easily available and comprehensive, especially in developing countries.[3] Skin diseases have a wide variety of clinical manifestation, or even treatment must be continued for a very long time. To treat variety of skin conditions such as wounds, acne vulgaris, cracks, psoriasis there is a need for a reliable and effective herbal skin cream. Although various types of creams are considered for wound healing, the pace of tissue regeneration still remains limited. Consequently, following an exclusive analysis of the pathophysiology and several to traditional methods an alternative method/therapy for wound healing has to be use.[3] The basic idea of skin care lies deep in the Rigveda, Yajurveda, Ayurveda, Unani and Homeopathic system of medicine. Modern cosmetic technology is being combined with knowledge and expertise of usage of herbs to formulate/develop remedies that are safe, effective and widely accepted by consumers. [4]

Turmeric is aromatic powder obtained from the rhizome of *Curcumin longa,* which possess many pharmacological properties. Turmeric is a good

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potential agent for wound healing & burn. It helps the area of skin by decreasing the inflammation and oxidation.[5] Aloe Vera shows a beneficial effect by reducing the inflammation significantly. It is responsible for producing a more mature granulation tissue which could accelerate healing of burns.[6] *Jatyadi* oil has cooling, anti-microbial, anti-bacterial and non-irritant effects which has faster healing in effects. It contains the composition of *Haridra, Neem, Patol, Karanja,* and *Yashtimandhu*. It works effectively in speeding up healing process and in fast recovery on burns. [7]

METHODOLOGY

Table 1: Table of Herbal Materials

S.No	Name	Collected from
1	Turmeric Powder	Regions of Belgaum
2	Aloe vera gel	Regions of Belgaum
3	*Jatyadi* oil	KLE Ayurvedic Pharmacy, Belgaum

S.No	Name	Collected from
1	95% ethanol	Seema Chemicals, Bengaluru
2	Tween 80	Burgoyne Burbidge's & co.
3	Span 80	Burgoyne Burbidge's & co.
4	Glycerin	RCCP, Belagavi
5	Rose oil	Spectrum Chemicals
6	Distilled water	RCCP, Belagavi

Collection of Herbal Material

Dried turmeric powder was collected from KLE Society Ayurved Pharmacy. Aloe vera gel was collected from the regions of Belgaum. *Jatyadi oil* is collected from KLE Society Ayurved Pharmacy. All of the plant materials stored at room temperature.

Extraction of Herbal Material

Extraction of Curcumin[13]

The curcumin was extracted by two methods are as follows:

Method 1

About 50g of turmeric was dissolved in 350ml of 70% alcohol. The preparation was left undisturbed for 5 days. The extract was filtered and evaporated and the curcumin paste was collected and stored at room temperature.

Method 2

About 50g of turmeric was dissolved in 270ml of 70% alcohol+80ml distilled water. The preparation was left undisturbed for 5 days. The extract was filtered and evaporated and the curcumin paste was collected and stored at room temperature.

Extraction of *Aloe vera* gel

The leaves of aloe vera were separated from plant, which are thoroughly washed and cut into small pieces. Take 25gm of leaves into 100ml of distilled water boiled for 2hrs at 90℃ The extract was filtered using Whatman filter paper and collected. Finally, the extract was stored at 4℃until the further use.[14]

Preliminary Phytochemical Screening

The component such *Curcuma longa, Aloe vera* gel and *Jatyadi* oil are been tested through various phytochemical tests such test for alkaloids, carbohydrates, flavonoids, tannins, steroids, proteins.[15,16,17]

Ingredients Used in Formulation

Span 80 is a non-ionic surfactant that can be used to form oil-in-water emulsion and in combination with low HLB surfactants can form water-in-oil emulsion. It acts as surfactants and emulsifying agent. Tween 20 is a non-ionic surfactant which is used to prepare stable oil-in-water emulsion. Its stability and relative non-toxicity allow it to be used asdetergent and emulsifying agent in number of domestic applications. Glycerin or glycerol is colorless, odorless, viscous liquid. It benefits the skin barriers by pulling water from the air to keep the skin hydrated and minimize water loss. Rose oil is the essential oil extracted from the petals of various types of rose. Rose oils are still perhaps the most widely used essential oil in perfumery. It is used as quantity sufficient.

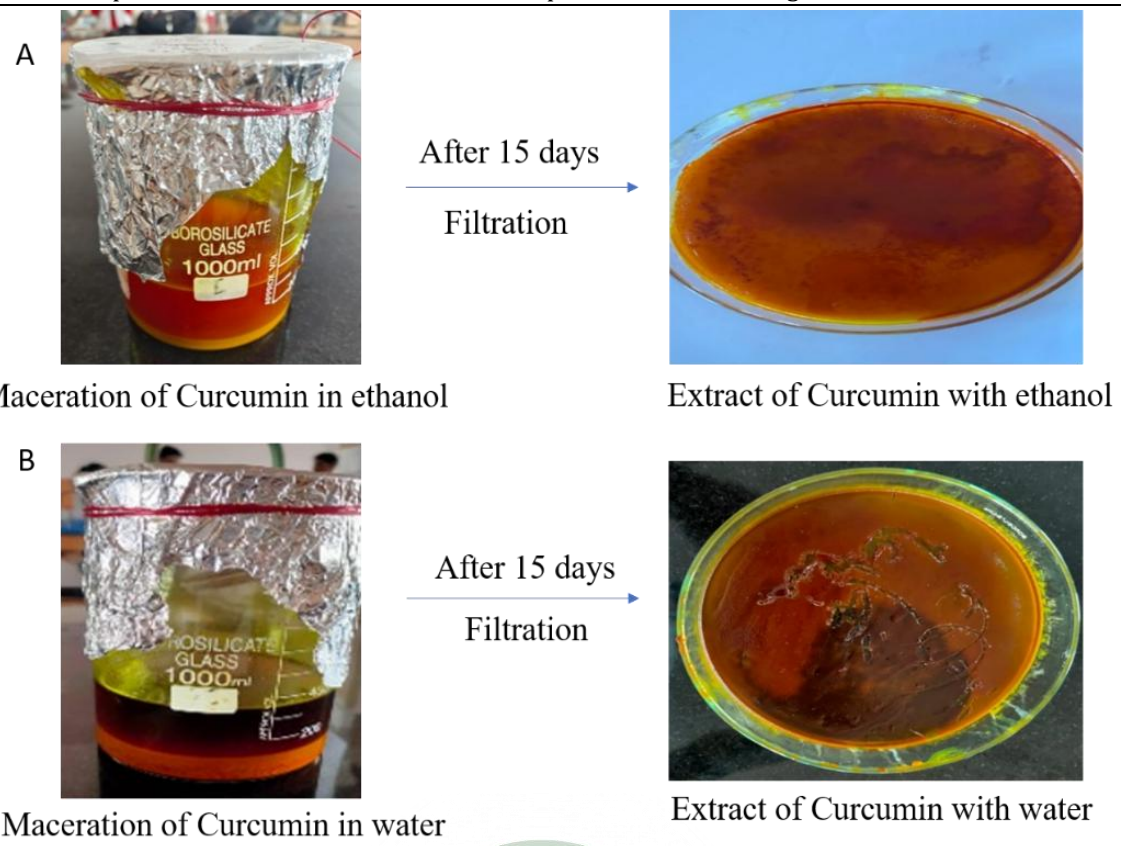


Figure 1: a) Maceration of curcumin with Ethanol b) Maceration of curcumin

Formulation Table of 30g of Cream

Table 2: Formulation Table of Cream

S.No.	Ingredients	F1	F2	F3
1	Curcumin	1gm	1gm	1gm
2	Aloe vera	7ml	7ml	7ml
3	Jatyadi oil	7ml	7ml	7ml
4	Glycerine	1ml	2ml	2ml
5	Tween 20	3ml	3ml	4ml
6	Span 80	4ml	3ml	3ml
7	Rose oil	1ml	1ml	1ml
8	Distilled water q.s.	6ml	6ml	5ml

Preparation of Cream

Oil phase

The oil phase consist of Jatyadi oil and glycerin was weighed according to required quantity and then, transferred into china dish and heated at 50-60℃ Kept on magnetic stirrer at 400 rpm (8ml).

Aqueous Phase

The required quantity of aloe vera, span 80, tween 20 and purified water was mixed together and heated at 50-60℃ and stirred with the magnetic stirrer. Further the prepared mixture was added into oil phase, the final content was mixed thoroughly with constant stirring for 40 min. A few drops of rose oil was added with continuous stirring to obtain smooth consistency of cream. [18]

Evaluation of Cream [11]

Organoleptic Characteristics: Organoleptic characteristics such as colour, odour and texture.

Consistency: The consistency was assessed of formulated cream was determined by applying pinch of a cream on skin and rubbed it with fingers.

pH Evaluation: The pH meter was calibrated using standard buffer solution. About 0.5gm of cream was weighed and mixed with 50ml of distilled water and its pH was measured using digital pH meter.

Viscosity: Viscosity was determined by Brookfield Viscometer II + model using spindle no S – 64 at 20 rpm at 25°C and results were recorded.

Spreadability: The formula was applied in between two glass slides, then pressed to obtain a uniform film thickness. Thereafter a weight (10 g) was added to the pan and the top plate was subjected to pull with the help of string attached to the hook. The time in which the upper glass slide moves over the lower plate to cover a distance of 10cm is noted and calculate the spreadability (S) using the formula.

Extrudability: Test is the major of the force required to extrude the material from a collapsible tube when certain amount of force has been applied on it in the form of weight.

$$\text{Ext} = \frac{\text{Amount of cream extruded from the tube}}{\text{Total amount of cream filled in the tube}} \times 100$$

Stability: The stability of the formulation will be tested by filling the cream in plastic container and placing it in humidity chamber at 45°C and 75% relative humidity. The stability of the formulation was inspected for 3 months at interval of one month each.

MIC Test: Minimum inhibitory concentration (MIC) was carried out as per Clinical and Laboratory Standard Institute (CLSI) guidelines. The stock solution of turmeric extract was prepared in dimethyl sulfoxide (DMSO). Two-fold serial dilutions of turmeric extract in BHI broth were carried out with concentration ranging from 1mg/ml to 0.0019mg/ml. One hundred microliters of an earlier prepared *P. acne* strain were added to all the MIC tubes. The tubes were incubated at 37°C for 48 h in an anaerobic condition. After incubation the bacterial growth was recorded visually. Further to 100µl of incubated broth, and 30µl of resazurin dye incubated for 4h at 37°C. Based on the color change in the well growth of bacteria was noted. The lowest concentration at which no bacterial growth was found, was considered as MIC value[16].

RESULTS AND DISCUSSION

Extraction of curcumin from turmeric rhizome from 100g of crude turmeric powder, 5.6g of curcumin paste was obtained and extraction of aloe vera from 20g of aloe vera leaves, 10ml of extract was obtained.

Preliminary Phytochemical Screening

Phytochemical screening was performed to determine the various phytoconstituents present in tumeric, aloe vera and *Jatyadi* oil represented in table 4.

Table 3: Results of phytochemical screening of extracts

S.No.	Name of test	Ethanolic extract of Turmeric	Ethanolic extract of Aloe vera gel
1	**Test for Alkaloids**		
	Mayer's test	+	+
	Wagner test	+	+
2	**Test for Carbohydrates**		
	Molish test	+	+
	Fehling's test	+	+
3	**Test for Flavonoids**		
	Shinoda test	+	+
	H_2SO_4 Test	+	+
4	**Test for Glycosides**		
	Killer-killiani test	+	+
	Legal 's test	+	+
5	**Test for Steroids**		
	Salkowski Reaction	+	+
	Liberman test	+	+
6	**Test for Proteins**		
	Ninhydrin test	+	+
	Biuret test	--	--
	Million's test	--	--
7	**Test for Tannins**		
	Gelatin test	+	+
	5% $Fecl_3$ test	+	+

Formulation of Cream

Figure 2: Formulation of cream

Evaluation of Cream Formulation

Organoleptic Evaluation: All the three formulations were evaluated for their color, odor and texture.

Physical Appearance: Physical appearance of anti-septic cream. As compared to F2 & F3 formulations, F1 formulation meets expected texture and consistency properties.

Table 4: Physical Appearance

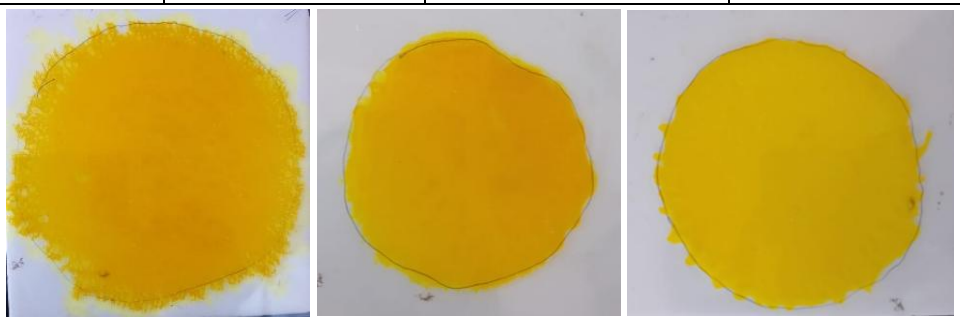
Formulation	F1	F2	F3
Color	Olive yellow	Olive yellow	Olive yellow
Consistency	Very good	Medium	Good
Texture	smooth	smooth	smooth

pH: The pH of formulated cream was determined by using digital pH meter by dissolving 1gm cream in 100ml of water. The pH of the cream was also determined by dissolving the pH paper in to the above solution of cream, According to the results, the pH of all the three formulation that is F1, F2 and F3 were found to be in range of 6.0 to 7.0 which is good for skin.

Spreadability: F1 has good spreadability then other two formulations.

Table 5: Spreadability

Formulation	F1	F2	F3
Spreadability	12.8cm	10.6cm	11.3cm



F1 **F2** **F3**

Figure 3: Spreadability

Viscosity: Viscosity of cream was measured using Brooke field viscometer at the temp of 27°C, at 100 rpm. The viscosity of all the three formulations that is F1, F2 and F3 were found to be decreasing order.

Table 6: Viscosity

Formulation	F1	F2	F3
CP	776	741	641

Extrudability: All three formulations showed good extrudability. Among three formulation F1 formulation shows better extrudability.

Table 7: Extrudability

Formulation	F1	F2	F3
Extrudability(gm/cm²)	84.6	82.2	80.5

Stability: In the months of stability period was found that F1 was more stable then F2 and F3

MIC (Minimum Inhibitory Concentration)

Minimum Inhibitory Concentration (MIC) of turmeric extract against P.acne was found to be 0.25mg/ml as shown.

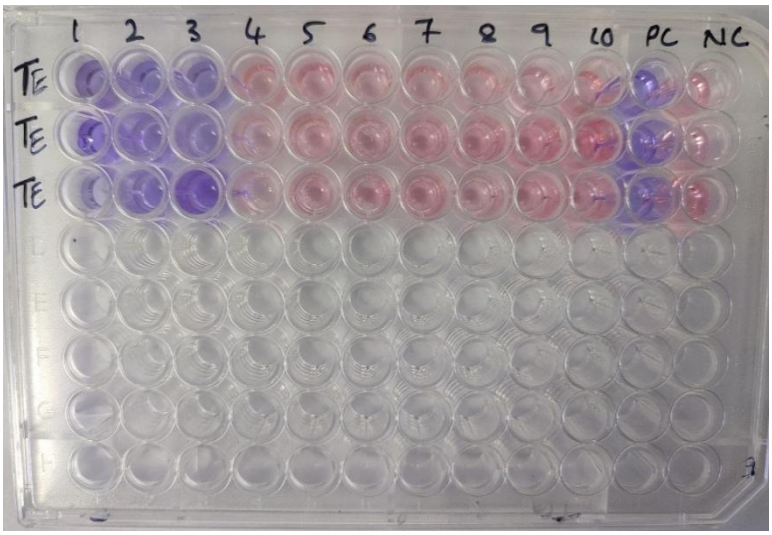


Figure 4: MIC of turmeric extract against *P. acne*

Table 8: MIC

Minimum Inhibitory Concentration												
mg/ml	1	0.5	0.25	0.125	0.00625	0.0312	0.0156	0.0078	0.0039	0.0019	PC	NC
Turmeric	NG	NG	NG	SG	SG	SG	SG	SG	SG	SG	NG	SG
Turmeric	NG	NG	NG	SG	SG	SG	SG	SG	SG	SG	NG	SG
Turmeric	NG	NG	NG	SG	SG	SG	SG	SG	SG	SG	NG	SG

Note: PC- Positive control, NC- Negative control, SG- Significant growth, NG- Negligible Growth, mg/ml- milligrams/milliliter. (E. coli).

CONCLUSION

The idea that natural medicines are safer and have fewer side effects than synthetic ones make them more acceptable. The demand for herbal formulations is rising on the global market. Establishing the herbal anti-septic cream with turmeric and aloe vera extract is a trending approach. Based on the result and discussion, following conclusions were drawn: The prepared formulations were found to be olive yellow in color with smooth texture. All the formulations were shown pH nearer to skin required that is 6.0-7.0 pH. The viscosity of all the three formulation that is F1, F2 and F3 were found to be decreasing in order. Among the three formulations F1 formulation has good spreadability, along with desired extrudability because when desired weight was applied to extruded the cream from the tube, F1 showed smooth extrusion from the tube compared to F2 and F3. The combination of turmeric, aloe vera gel and *Jatyadi* oil may produce an effect to maximize the anti-septic problem. Minimum Inhibitory Concentration (MIC) of turmeric extract against *P. acne* was found to be 0.25mg/ml. Hence it can be concluded that the prepared polyherbal anti-septic cream was stable and safe in order to protect skin against anti-septic activity.

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