

# Polyherbal formulation for wound healing cream

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## ABSTRACT

*Gymnema sylvestre (Asclepiadaceae) also known as 'gurmar or sugar destroyer is a woody, climbing traditional medicinal herb which has many therapeutic applications in Ayurvedic system of medicine. It is used for lowering serum cholesterol, triglycerides and blood glucose level (hypoglycemic or antihyperglycemic), hypolipidaemic, weight loss, stomach ailments, constipation, water retention and liver diseases, either high or low blood pressure, tachycardia or arrhythmias, and used as aperitive, purgative, in eye troubles, anti- inflammatory, smooth muscle relaxant, prevention of dental caries, cataract and as anticancer-cytotoxic agent.*

**Keywords :** Anticancer, Hypoglycemic, Anti-inflammatory.

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## Introduction :

The present study was designed to formulate and evaluate the Wound healing Powder and Wound healing cream from *Gymnema sylvestre* stem powder extract. Based on result and discussion the formulation were stable at room temp. and can be used safely on wet Wound. In *Gymnema Inodorum sylvestre* Plant stem have anti microbial, anti inflammatory and ability to immobile injure body part and help to stop bleeding. It also decrease the pain. *Gymnema Inodorum sylvestre* is a perennial woody native to Asia, Africa, Australia. It has been used as ayurvedic medicine. Common name include *Gymnema*.

Scientific Name: *Gymnema Inodorum sylvestre*.

Hindi Name: Gurmar

Kingdom: Plantae

Order : Gentianales

Family : Apocynaceae

Genus : *Gymnema*

Species: *G.Sylvestre*

- In *Gymnema sylvestre* stem, we found that it has strong ability to cure or treat wet wound.
- It has rapid action related to other . It has anti microbial, anti inflammatory, and help to stop bleeding. It also helps to protect wound from environment .

MOA: When these apply on wet wound firstly it stop the bleeding then it helps to reduce pain and after it helps to recover wet wound. And finally it cure total injured body part . It has rapid action. It is used for lowering serum cholesterol, triglycerides and blood glucose level (hypoglycemic or antihyperglycemic), hypolipidaemic, weight loss, stomach ailments, constipation, water retention and liver diseases, either high or low blood pressure, tachycardia or arrhythmias, and used as aperitive, purgative, in eye troubles, anti-inflammatory, smooth muscle relaxant, prevention of dental caries, cataract and as anticancer-cytotoxic agent.

## Skin structures and skin types :

The skin is the body's largest and primary protective organ, covering its entire external surface and serving as a first-order physical barrier against the environment. Its functions include temperature regulation and protection against ultraviolet (UV) light, trauma, pathogens, microorganisms, and toxins. The skin also plays a role in immunologic surveillance, sensory perception, control of insensible fluid loss, and homeostasis in general. The skin is also highly adaptive with different thicknesses and specialized functions in different body sites. This article will discuss the anatomy of the skin, including its structure, function, embryology, blood, lymphatic, and nerve supply, surgical, and clinical significance

### Epidermis :

The epidermis is the most superficial layer of the skin and provides the first barrier of protection from the invasion of substances into the body.

The epidermis is subdivided into five layers or strata:

stratum basale

stratum spinosum

stratum granulosum

stratum lucidum

stratum corneum

Keratization

The principal cells of the epidermis are keratinocytes. The basal cells or "stem cells" of the epidermis are undifferentiated, proliferating cells that migrate upwards through all the five layers in a process known as keratinization. It takes about 30 days for the cells to migrate from the basal layer to cross the stratum corneum where they are finally shed.

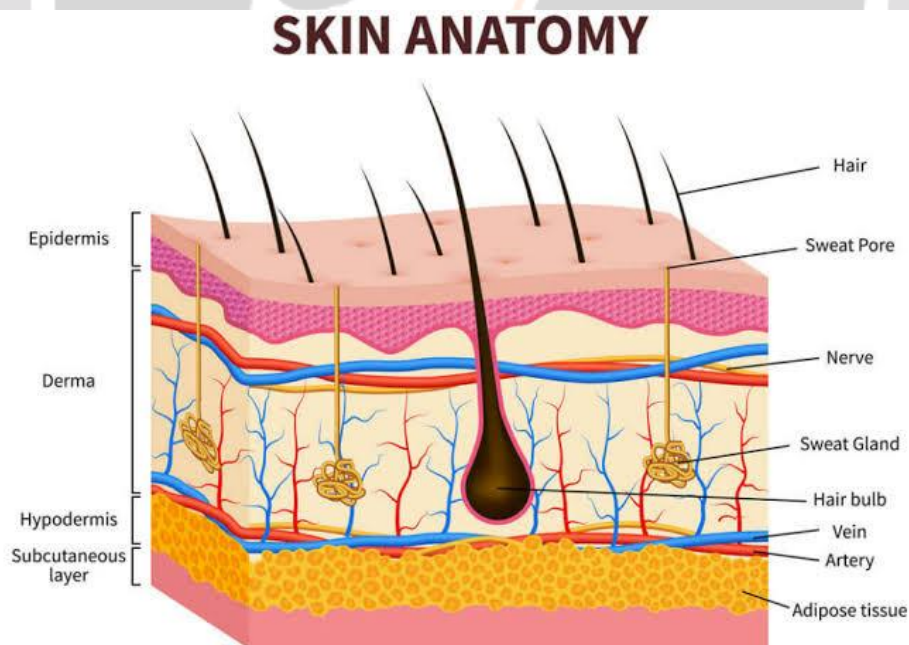


Fig.1 Skin Anatomy

### Thickness :

Epidermis varies in thickness throughout the body depending mainly on frictional forces and is thickest on the palms of the hands and soles of the feet, and thinnest in the face (eyelids) and genitalia. Dermis and Subcutaneous Fat The dermis is a tough but elastic support structure that houses nerves, blood vessels, lymphatics, and cutaneous appendages (pilosebaceous units, eccrine and apocrine sweat glands).

It is thicker (averages 1 to 4 mm) than the epidermis which is about as thin as piece of paper.

The dermis varies in thickness. It is very thick on the back (almost 1 cm); it is very thin on the eyelid.

The dermis has two main zones, the papillary dermis and the reticular dermis.

The subcutaneous fat is an important layer and plays a role in shock absorption, energy storage, and maintenance of body heat. Other cellular components of the epidermis Melanocytes are dendritic, pigment-producing cells located in the basal layer. The pigment they manufacture is called melanin.

Langerhans cells are dendritic cells derived from the bone marrow in the stratum spinosum that have an immunologic function. They are identical to tissue macrophages and present antigens to lymphocytes

## Ingredients :

### Liquid Paraffin :

Liquid paraffin, also known as paraffinum liquidum, paraffin oil, liquid paraffin oil or Russian mineral oil, is a very highly refined mineral oil used in cosmetics and medicine. Cosmetic or medicinal liquid paraffin should not be confused with the paraffin (i.e. kerosene) used as a fuel. The generic sense of paraffin meaning alkane led to regional differences for the meanings of both paraffin and paraffin oil. It is a transparent, colorless, nearly odorless, and oily liquid that is composed of saturated hydrocarbons derived from petroleum.

### History :

Petroleum is said to have been used as a medicine since 400 BC, and has been mentioned in the texts of classical writers Herodotus, Plutarch, Dioscorides, Pliny, and others. It was used extensively by early Arabians and was important in early Indian medicine. Its first use internally is attributed to Robert A. Chesebrough, who patented it in 1872 for the manufacture of a "new and useful product from petroleum." After Sir W. Arbuthnot Lane, who was then Chief Surgeon of Guy's Hospital, recommended it as a treatment for intestinal stasis and chronic constipation in 1913, liquid paraffin gained more popularity



Fig. 2 Paraffin

**Use in medicines :**

Liquid paraffin is primarily used as a pediatric laxative in medicine and is a popular treatment for constipation and encopresis. Because of its ease of titration, the drug is convenient to synthesize. It acts primarily as a stool lubricant, and is thus not associated with abdominal cramps, diarrhea, flatulence, disturbances in electrolytes, or tolerance over long periods of usage, side effects that osmotic and stimulant laxatives often engender (however, some literature suggests that these may still occur). The drug acts by softening the feces and coats the intestine with an oily film. Because of this it reduces the pain caused by certain conditions such as piles (haemorrhoids). These traits make the drug ideal for chronic childhood constipation and encopresis, when large doses or long-term usage is necessary.

Consensus has not been entirely reached on the safety of the drug for children. While the drug is widely accepted for the management of childhood constipation in North America and Australia, the drug is used much less in the United Kingdom. The drug is endorsed by the American Academy of Pediatrics and the North American Society for Gastroenterology and Nutrition, with the latter organization outlining it as a first choice for the management of pediatric constipation. The drug is suggested to never be used in cases in which the patient is neurologically impaired or has a potential swallowing dysfunction due to potential respiration complications. Lipoid pneumonia due to mineral oil aspiration is thus a recognized severe complication of this medication, and there is a need for a heightened awareness among caregivers about the potential dangers of inappropriate mineral oil use. Some go as far as saying that it should never be used with children due to this risk.

Liquid paraffin is also used in combination with magnesium as an osmotic laxative, sold under the trade name Mil-Par (among others).

Additionally, it may be used as a release agent, binder, or lubricant on capsules and tablets.

**Turmeric :**

India is a hub for many herbaceous plant species, which has immense use in the medical field. Turmeric is a very well-known spice used as a dye, flavoring, and it has its importance in the medical field. In India, turmeric is known as “queen spice” because of its sharp flavor and golden yellowish color. The turmeric is scientifically known as *Curcuma longa* L. It belongs to the Zingiberaceae family. It is a perennial herbal plant with a short stem, oblong leaves, and pyriform rhizomes.

The rhizomes or roots are mostly branched, and they appear in brownish yellow color. From ancient times, turmeric is used in marriages for the Haldi ceremony because it provided luster and glow to the skin, helping maintain its vitality. The turmeric benefits are not limited to keeping healthy skin, but also it has other important medicinal properties like antioxidant, anticancer, antimicrobial, etc.



**Fig. 3 Turmeric**

**Sources of Turmeric :**

Turmeric is widely cultivated in India, followed by other countries like Thailand, Indonesia, China, and Africa. There are two main varieties of commercially grown turmeric: "Alleppey" and "Madras" in India. In the United States, "Alleppey-turmeric" is imported as a spice and food colorant.

**Other Names for Turmeric :**

In Sanskrit, it is known as Ameshta, Bhadra, hridayavilasini, jwarantika and suvarnavarna.

In Hindi, it is known as Haldi.

In Marathi, it is known as Halad.

In English, it is known as Indian saffron.

In Kannada, it is known as Arisina and Arishina.

In Tamil, it is known as Manjal.

In Telugu, it is known as Pasupu and Haridra.

In Malayalam, it is known as Manjal.

**Traditional uses of Turmeric :**

Turmeric is used in households for treating cough, anorexia, dysentery, abdominal pain, respiratory ailments, and dental disorder.

It is also used for treating gastrointestinal disorders like liver disease, ulcers, and flatulence.

Macerated rhizomes of turmeric and lime are used to treat inflammation caused by injury and relieve muscle pain.

Freshly prepared turmeric paste is used in a perineal laceration to facilitate the wound healing after the delivery.

The turmeric paste is an excellent antiseptic, and that is why it is applied to the umbilical core of newly born babies.

It is known that turmeric paste is applied to the skin during eye infections, burns, and bites.

The combination of turmeric and neem is very effective in treating chickenpox, smallpox, and measles (rubella).

**Therapeutic uses of Turmeric :**

Turmeric is used to prepare anticancer formulations.

The intake of turmeric and its products can enhance cortisone production in adrenal glands, reducing inflammation by reducing the histamine level.

Turmeric helps to detoxify the body and improve liver health.

Turmeric plays an important role in reducing platelet aggregation, which improves blood circulation and protects against atherosclerosis.

**Beeswax :**

Beeswax (also known as cera alba) is a natural wax produced by honey bees of the genus *Apis*. The wax is formed into scales by eight wax-producing glands in the abdominal segments of worker bees, which discard it in or at the hive. The hive workers collect and use it to form cells for honey storage and larval and pupal protection within the beehive. Chemically, beeswax consists mainly of esters of fatty acids and various long-chain alcohols.





**Fig. 4 Beeswax**

Beeswax has been used since prehistory as the first plastic, as a lubricant and waterproofing agent, in lost wax casting of metals and glass, as a polish for wood and leather, for making candles, as an ingredient in cosmetics and as an artistic medium in encaustic painting.

Beeswax is edible, having similarly negligible toxicity to plant waxes, and is approved for food use in most countries and in the European Union under the E number E901. However, due to its inability to be broken down by the human digestive system, it has insignificant nutritional value.

#### **Physical characteristics :**

Beeswax is a fragrant solid at room temperature. The colors are light yellow, medium yellow, or dark brown and white. Beeswax is a tough wax formed from a mixture of several chemical compounds.

Beeswax has a relatively low melting point range of 62 to 64 °C (144 to 147 °F). If beeswax is heated above 85 °C (185 °F) discoloration occurs. The flash point of beeswax is 204.4 °C (400 °F).

When natural beeswax is cold,[clarification needed] it is brittle, and its fracture is dry and granular. At room temperature (conventionally taken as about 20 °C (68 °F)), it is tenacious and it softens further at human body temperature (37 °C (99 °F)).

#### **Borax :**

Borax (also referred to as sodium borate, tincal (/ˈtɪŋkəl/) and tincar (/ˈtɪŋkər/)) is a salt (ionic compound), a hydrated or anhydrous borate of sodium, with the chemical formula  $\text{Na}_2\text{H}_{20}\text{B}_4\text{O}_{17}$  (also written as  $\text{Na}_2\text{B}_4\text{O}_7 \cdot 10\text{H}_2\text{O}$ ).



Fig.5 Borax

It is a colorless crystalline solid that dissolves in water to make a basic solution. It is commonly available in powder or granular form and has many industrial and household uses, including as a pesticide, as a metal soldering flux, as a component of glass, enamel, and pottery glazes, for tanning of skins and hides, for artificial aging wood, as a preservative against wood fungus, and as a pharmaceutical alkalizer. In chemical laboratories, it is used as a buffering agent. The terms tincal and tincar refer to native borax, historically mined from dry lake beds in various parts of Asia.

**History :**

Borax was first discovered in dry lake beds in Tibet. Native tincal from Tibet, Persia, and other parts of Asia was traded via the Silk Road to the Arabian Peninsula in the 8th century AD.

Borax first came into common use in the late 19th century when Francis Marion Smith's Pacific Coast Borax Company began to market and popularize a large variety of applications under the 20 Mule Team Borax trademark, named for the method by which borax was originally hauled out of the California and Nevada deserts.

**Natural source :**

Borax occurs naturally in evaporite deposits produced by the repeated evaporation of seasonal lakes. The most commercially important deposits are found in: Turkey; Boron, California; and Searles Lake, California. Also, borax has been found at many other locations in the Southwestern United States, the Atacama desert in Chile, newly discovered deposits in Bolivia, and in Tibet and Romania. Borax can also be produced synthetically from other boron compounds.

Naturally occurring borax (known by the trade name Rasorite-46 in the United States and many other countries) is refined by a process of recrystallization.

**Rose oil :**

Rose oil (rose otto, attar of rose, attar of roses, or rose essence) is the essential oil extracted from the petals of various types of rose. Rose ottos are extracted through steam distillation, while rose absolutes are obtained through solvent extraction, the absolute being used more commonly in perfumery. The production technique originated in Greater Iran. Even with their high price and the advent of organic synthesis, rose oils are still perhaps the most widely used essential oil in perfumery.



**Fig. 6 Rose oil**

#### **Nutrition :**

Analysis with GC-MS showed among many others the following major components in oil samples: Vitispiran,  $\alpha$ -E-acaridial, dodecanoic acid, hexadecanoic acid, docosane, ionone, 6-methyl-5-hepten-2-one, 2-heptanone, heptanal, myristic acid, linolic acid. Rose hip seed oil contains significant amounts of the two polyunsaturated essential fatty acids linoleic acid, linolenic acid, as well as of the monounsaturated oleic acid. It also contains antioxidants including  $\delta$ - and  $\gamma$ -tocopherol, carotenoids, and phenolic compounds. The oil does not contain vitamin A directly, however it contains provitamin A (mostly beta-Carotene). It also contains the toxic and teratogenic tretinoin (all-trans retinoic acid).

#### **Use :**

Researchers have tested the efficacy of topical rose hip seed oil together with an oral fat-soluble vitamins on different inflammatory dermatitis such as eczema, neurodermatitis, and cheilitis, with promising findings of the topical use of rose hip seed oil on these inflammatory dermatose. Due its high composition of UFAs and antioxidants, rose hip oil has relatively high protection against inflammation and oxidative stress.

Research on rose hip oil has shown that it reduces skin pigmentation, reduces discolouration, acne lesions, scars and stretch marks, as well as retaining the moisture of the skin and delaying the appearance of wrinkles. Cosmetologists recommend wild rose seed oil as a natural skin-vitaliser.

A 2014 study on the nutritional composition and phytochemical composition of the rose hip seed and the fatty acid and sterol compositions of the seed oil showed that rose hip seed and seed oil were good sources of phytonutrients. Consumption of foods rich in phytonutrients is recommended to reduce the risk of chronic diseases. The nutritional composition and the presence of bioactive compounds make the rose hip seed a valuable source of phytonutrients. The rose hip seed was highly rich in carbohydrates and ascorbic acid, and the rose hip seed oil was highly rich in polyunsaturated fatty acids and phytosterols. The rose hip seed and seed oil proved to have antioxidant activity. The findings of the study indicated that the rose hip seed and seed oil may be proposed as ingredients in functional food formulations and dietary supplements.

#### **Why cream is better at protecting your skin than author creams :**

Barrier creams are used to aid the skin in its most vital function: to keep what's good in and to keep what's bad out," says Dr. Zalka. Dr. Gonzalez explains: "Barrier creams maintain and protect the physical barrier of the skin and prevent the skin from drying out.





**How to use cream for better results :**

Always apply your face cream on damp skin. If you wait for your face to dry off completely, it won't work. Creams are better able to lock in moisture when you apply on damp skin. After you finish, pat your skin dry.

**Do cream have any negative effects on skin :**

Stinging, burning, irritation, dryness, or redness at the application site may occur. Acne, unusual hair growth, small red bumps on the skin (folliculitis), skin thinning/dyscoloration, or stretch marks may also occur. If any of these effects last or get worse, tell your doctor or pharmacist promptly.

**Table component & approximate :**

	 Liquid Paraffin	 Benzene
Formula	$C_{20}H_{42}$ (or above)	$C_6H_6$
Appearance	Colorless, Odorless	Colorless
Boiling Point	$> 300^\circ C$	$80.1^\circ C$
Melting Point	$< -10^\circ C$	$5.5^\circ C$
Solubility in Air	Non Volatile	161 mg/l
Solubility in $H_2O$	Insoluble	1780 mg/l ( $20^\circ C$ )
Viscosity	170 mpa·s	0.647 mpa·s
Hazard Nature	Non Toxic	Toxic
Surface Tension	31.07 mN/m ( $25^\circ C$ )	28.9 mN/m
Interfacial Tension	62.06 mN/m ( $25^\circ C$ )	35.0 mN/m
Specific Gravity	0.87 $g/cm^3$	0.879 $g/cm^3$

**Morphology of skin lotion :**

It is important to understand that morphology in this research is specifically in the context of dermatology. Morphology in dermatology is defined as the general appearance and structure of a particular skin lesion regardless of its function, etiology or pathophysiology. Morphology can be further separated into primary and secondary morphology. According to , skin lesions can be grouped into two categories, primary and secondary morphologies. Primary morphologies differ in color or texture and are either acquired from birth, such as moles or birthmarks, or during a person's lifetime, as in the case of infectious diseases and allergic reactions. Secondary morphologies on the other hand are lesions that result from primary skin lesions, either as a natural progression or as a result of agitating the primary lesion. Because of this distinction, the categorization can be made to only consider primary morphologies. Despite the vast amount of literature discussing skin lesions and morphology, different sources tend to list different sets of morphologies. For instance, the list

presented by is different from the one by and Regardless of these different listings, the description of each morphology is consistent amongst different references, so any of the references can be selected and utilized. For this study, a subset from the set of morphologies as listed and shown in Figure 1 is being used. This subset of morphologies was chosen to maximize the use of the data gathered for the research. provided the following brief description of the primary morphologies listed Bulla - a fluid-filled circumscribed elevation of skin that is over 0.5 cm in diameter Macule - a small flat area with color or texture differing from surrounding skin Nodule - a solid mass in the skin that is palpated or elevated and is, in diameter of both width and dept.

### Formulation of Wound healing cream :

#### Steps :

I) Heat liquid paraffin and beeswax in a borosilicate glass beaker at 75° C and maintain that heating temperature (Oil phase).

II) In another beaker, dissolve borax, turmeric powder in distilled water and heat this beaker to 75 °C to dissolve borax and turmeric powder and to get a clear solution. (Aqueous phase)

III) Then slowly add this aqueous phase to heated oily phase. Then add a *Gymnema inodorum* Sylvester extract and stir vigorously until it forms a smooth cream. Then add few drops of rose oil and coconut oil.

IV) Put this cream on the slab and add few drops of distilled water if necessary and mix all the ingredients properly.



Fig.7 *Gymnema Sylvester*

Tulsi extract	1.5 ml
Liquid paraffin	10 ml
Borax	0.2 g
Methylparaben	0.02 g
Distilled Water	Q. S
Rose oil	Q. S

Fig. Formula

**Evaluation of Cream:**

**Physical properties:** The cream was observed for the color, odor and appearance.

**Washability:** The cream was applied on the hand and observed under the running .

**pH:** The pH meter was calibrated with the help of standard buffer solution. Weigh 0.5 gm of cream dissolved it in 50.0ml of distilled water and its p H was measured with the help of digital pH meter

**Viscosity:** Viscosity of the cream was determined with the help of Brookfield viscometer at 100 rpm with the spindle no.

**Spread ability test :** The cream sample was applied between the two glass slides and was compressed between the two-glass slide to uniform thickness by placing 100 gm of weight for 5 minutes then weight was added to the weighing pan. The time in which the upper glass slide moved over the lower slide was taken as a measure of spread ability.

Spread ability= $m \cdot l/t$

M =weight tight to upper slide

L =length moved on the glass slide

T =time take

**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.

**Test for microbial growth:** Agar media was prepared then the formulated cream was inoculated on the plate's agar media by steak plate method and a controlled is prepared by omitting the cream. The plates were placed in the incubator and are incubated in 37 C for 24 hours. After the incubation period, the plates were taken out and the microbial growth were checked and compared with the control.

**Saponification value:** Take 2 gm of the substance and reflux it with the 25 ml of 0.5 N alcoholic KOH for 30 minutes. Then add 0.1 ml of phenolphthalein as a indicator and titrate it with the 0.5 N HCL.

Saponification value=(b-a) \*28.05/W

A =volume of titrate

B =volume of titrate

W =weight of substances in gr

**Acid value:** Take 10 gm of the cream dissolved in accurately weighed in 50 ml mixture of the equal volume of alcohol and solvent ether. Then attached the flask with the condenser and reflux it with the slow heating until the sample gets completely dissolve then add 1 ml of phenolphthalein and titrate it with 0.1 N NaOH until it gets faint pink color appears after shaking in 20 seconds.

Acid value=n\*5.61/w

W =weight of the substances

N =the number of ml in NaOH required.

**Dye test:** The scarlet red dye is mixed with the cream. Place a drop of the cream on a microscopic slide then covers it with a cover slip, and examines it under a microscope. If the disperse globule appeared the ground colorless. The cream is o/w type. The reverse condition occurs in w/o type cream i.e. the disperse globules appear colorless.

**Homogeneity:** Homogeneity was tested via the visual appearance and test.

## Result and Discussion :

**Physical properties:** The physical properties of formulated cream were judged by color, odor and texture.

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

**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. The herbal formulation was shown pH nearer to skin required i.e pH 6.8.

**Viscosity:** Viscosity of formulated cream was determined by brook field viscometer at 20 rpm using spindle no. LV-4(64). The viscosity of cream was in the range of 499990 to 30000cp which indicates that the cream is easily spreadable by small amount of shear. The formulated cream shows the viscosity within range i.e. 48890cp.

**Spread ability test:** The spread ability test showed that the formulated cream has good spreadable property.

**Irritancy test:** The formulated cream shows no redness, edema, irritation and inflammation during studies. The formulated cream is safe to use.

**Test for microbial growth:** There was no signs of microbial growth after 24 hrs. of incubation at 37°C and it was comparable with the control.

**Saponification value:** The saponification value results of formulated cream was shown in table no. 3 and showed satisfactory values.

**Acid value:** The acid value results of formulated cream was shown in table no. 3 and showed satisfactory values.



**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. The disperse globules appears colorless in the red ground i.e. w/o type cream.

**Homogeneity:** The homogeneity of the formulated cream was judged by the visual appearance and touch. The appearance and touch of the cream were good.

### Conclusion :

From the above results it is concluded that the formulated cream showed good consistency and spread ability, homogeneity, pH, non-greasy and there is no phase separation during study period of research. From the above study it can be concluded that the polyherbal cold cream is safe to use as it is developed from herbal extract. Natural remedies are more acceptable in the belief that they are safer with fewer side effects than the synthetic ones. So, the values of herbs in the cosmeceutical has been extensively improved in personal care system and there is a great demand for the herbal cosmetics nowadays. An herbal cream which is non-toxic, safe, effective and improves patient compliance by the utilization of herbal extracts would be highly acceptable than synthetic ones.

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