

FORMULATION AND EVALUATION OF HERBAL CREAM FOR THE MANAGEMENT OF VERICOUS VEINS BY USING NATURAL INGREDIENTS

Palla Vishwada*¹, Munazza Fatima², Chiningi Ashwini², Kunchala Ramya², Erukala Anjali², Pagindla Manisha², Dr. Suthakaran Raj³

¹Assistant Professor, Department of Pharmacology, Vijaya College of Pharmacy, (v), Munaganoor (v), Hayathnagar(M) Rangareddy (Dt), Telangana (St), India, 501505.

²Under Graduate Pharmacy Scholar, Vijaya College of Pharmacy, Munaganoor (v), Hayathnagar(M) Rangareddy (Dt), Telangana (St), India, 501505.

³Professor and Principal, Vijaya College of Pharmacy, Munaganoor (v), Hayathnagar (M) Rangareddy (Dt), Telangana (St), India, 501505.



*Corresponding Author: Palla Vishwada

Assistant Professor, Department of Pharmacology, Vijaya College of Pharmacy, (v), Munaganoor (v), Hayathnagar(M) Rangareddy (Dt), Telangana (St), India, 501505.

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ABSTRACT

Varicose veins are enlarged, dilated, and tortuous veins caused by venous valve incompetence, leading to pain, swelling, inflammation, and discomfort in the lower limbs. The present study aimed to formulate and evaluate a herbal cream for the management of varicose veins using natural ingredients such as Aloe vera, Horse chestnut, Turmeric, Rosemary oil, Lavender oil, and Neem extract. An oil-in-water (O/W) cream was prepared by incorporating selected herbal extracts into a suitable cream base. The formulated cream was evaluated for physical appearance, pH, viscosity, spreadability, homogeneity, washability, stability, and skin irritation. The results showed that the cream possessed good aesthetic appearance, smooth texture, satisfactory spreadability, and acceptable pH compatible with skin. Stability studies indicated no significant changes in color, appearance, viscosity, or pH during storage. Skin irritation studies revealed no signs of redness, swelling, or irritation. The combined herbal ingredients exhibited anti-inflammatory, antioxidant, venotonic, antimicrobial, and soothing properties, which may help alleviate symptoms associated with varicose veins. The study concludes that the formulated herbal cream is stable, safe, and suitable for topical application and may serve as a natural alternative for the management of varicose veins.

KEYWORDS: Varicose Veins, Herbal Cream, Aloe Vera, Horse Chestnut, Turmeric, Rosemary Oil, Lavender Oil, Neem Extract, Venotonic Activity, Anti-inflammatory, Topical Formulation, Stability Evaluation.

1. INTRODUCTION

Varicose veins are abnormally enlarged, dilated, and tortuous veins that most commonly occur in the lower limbs. They develop as a result of impaired venous return caused by incompetent valves within the veins. Normally, veins contain one-way valves that prevent blood from flowing backward as it returns to the heart. When these valves become weak or damaged, blood begins to pool within the vein, leading to increased pressure, vein dilation, and visible bulging under the skin.

Varicose veins appear as bluish or purple, twisted, and bulging structures, often described as rope-like in appearance. They are more common in individuals who stand for long periods, such as teachers or nurses, and the condition is frequently associated with aging, pregnancy, heredity, obesity, and sedentary lifestyle. Although varicose veins are not always medically serious, they can cause symptoms such as pain, heaviness, swelling, itching, and leg fatigue, and in severe cases may lead to skin changes, ulcer formation, or thrombophlebitis.

Varicose veins represent a major public health issue because they affect quality of life and productivity. They can be diagnosed through physical examination and Doppler ultrasound, and may be managed through conservative measures like compression therapy and exercise, or treated using minimally invasive procedures such as sclerotherapy, endogenous laser treatment, and radiofrequency ablation. Varicose veins are dilated, often palpable subcutaneous veins with reversed blood flow, most commonly found in the legs. Estimates of the prevalence of varicose veins vary. Visible varicose veins in the lower limbs are estimated to affect at least a third of the population. There is little reliable information available in the literature on the proportion of people with varicose veins who progress to venous ulceration. One study reported that 28.6% of those who had visible varicose veins without oedema or other complications progressed to more serious venous disease after 6.6 years. However there was no information about the numbers progressing to ulceration. Other data on the lifetime prevalence of varicose veins estimate that approximately 3–6% of people who have varicose veins in their lifetime will develop venous ulcers. Risk factors for developing varicose veins are unclear although prevalence rises with age and they often develop during pregnancy. In some people varicose veins are asymptomatic or cause only mild symptoms, but in others they cause pain, aching or itching and can have a significant effect on their quality of life.

Varicose veins may become more severe over time and can lead to complications such as changes in skin pigmentation, eczema, superficial thrombophlebitis, bleeding, loss of subcutaneous tissue, lipoeidema to sclerosis or venous ulceration.

There are several options for the management of varicose veins, including

Advice and reassurance
Interventional treatments
Compression hosiery

Interventional treatments include surgery, foam sclerotherapy and endothermal ablation. Surgery is a traditional treatment that involves surgical removal by 'stripping' out the vein or ligation (tying off the vein). In foam sclerotherapy sclerosant foam (irritating agent) is injected into the vein to cause an inflammatory response which consequently closes it. There are two main endothermal methods: radiofrequency and laser ablation, these methods heat the vein from inside causing irreversibly damage to the vein and its lining and closes it off. All treatments may be performed under general or local anaesthesia and do not usually require an overnight stay in hospital.

Epidemiology

Varicose veins are common, with a higher prevalence in women and older adults, affecting an estimated 20–60% of the general population depending on the study. Key

risk factors include age, female sex (especially related to hormonal changes from pregnancy or menopause), obesity, family history, and prolonged periods of standing or sedentary activity.

Prevalence and demographics

Gender: Varicose veins are significantly more common in women than men, with some studies finding prevalence rates in women from 23% to 46.7% and in men from 27.8% to 18%.

Age: The prevalence increases with age, with studies showing significant increases in the 40, 50, and 60-year-old age groups.

Global/Regional variations

Prevalence estimates vary widely based on population, genetics, and study methods. For example, one study in India found that about 3–5% of the total population suffers from venous disease, with 10% of those having varicose veins.

Key contributing factors include

Genetics and Family History: A strong hereditary component is a major factor. The risk of developing varicose veins is around 40% if one parent has them and can escalate to 90% if both parents are affected. Specific gene mutations have been linked to vein wall structure and valve function.

Hormonal Factors: Female hormones can cause vein walls to stretch. Women have a higher risk, especially during pregnancy, while taking birth control pills, or during menopause.

Lifestyle and Occupation: Prolonged standing or sitting decreases circulation and increases pressure in leg veins.

Other Risk Factors

Age: Vein walls lose elasticity and valves weaken as a normal part of aging.

Weight: Excess body weight puts additional pressure on blood vessels.

History of Deep Vein Thrombosis (DVT): Prior DVT can damage valves, leading to secondary varicose veins.

Height: Taller individuals have been shown to have a higher risk.

HERBAL CREAM

Cream and herbal cosmetics has been an increasing demand for herbal medicine, also called botanical medicine or phytomedicine prepared by using any plant's seeds, berries, roots, leaves, bark, or flowers for medicinal purposes. Long practiced outside of conventional medicine, herbalism is becoming more main stream as up-to-date analysis and research show their value in the treatment and prevention of disease. Recently, the World Health Organization estimated that 80% of people worldwide rely on herbal medicines for some aspect of their primary health care. Plant drugs are frequently considered to be less toxic and freer from side effects than the synthetic ones. Along with other dosage

forms, herbal drugs are also formulated in the form of ointment and creams I have developed a very easy method of herbal antiseptic cream Herbal antiseptic cream is a shooting cream enriched with nature it is valuable gift of nature and their demand is increasing in the world market. The herbal antiseptic cream is very effective cream It have no side effect. Antiseptic Cream is a soothing cream enriched with nature's goodness, which accelerates the healing of injured skin. The ingredients in the cream help in healing irritable rashes, sores, eruptions, prickly heat, and mild skin infection.

PLANT PROFILE

Selection of herbal ingredients

Aloe vera



- **Biological Source:** Dried latex/gel from the leaves of *Aloe barbadensis* Miller (synonym: *Aloe vera* (L.) Burm.f.).
- **Kingdom:** Plantae.
- **Order:** Asparagales.
- **Family:** Asphodelaceae (formerly Liliaceae).
- **Species:** *A. vera*.
- **Uses:** Widely used in cosmetics and for wound healing, burns, insect bites, and skin inflammation (psoriasis, eczema). Taken internally for constipation, as a purgative, and to support digestion.
- **Chemical Constituents:** **Anthraquinone glycosides** (Aloin A & B, aloe-emodin), **polysaccharides** (Acemannan), sterols (lupeol), enzymes (bradykinase, superoxide dismutase), and salicylic acid.

Rosemary



- **Biological Source:** Leaves and essential oil of *Salvia rosmarinus* Spenn. (formerly *Rosmarinus officinalis* L.).
- **Kingdom:** Plantae.
- **Order:** Lamiales.
- **Family:** Lamiaceae (mint family).
- **Species:** *S. rosmarinus*.
- **Uses:** Used as a culinary herb, natural antioxidant/preservative (E392), and in aromatherapy to improve memory and digestion. Topically used in haircare to promote growth and treat dandruff.
- **Chemical Constituents:** **Essential oils** (1,8-cineole, camphor, α -pinene), **diterpenes** (carnosic acid, carnosol), and **phenolic acids** (rosmarinic acid).

Horse Chestnut



- **Biological Source:** Seeds, bark, and leaves of *Aesculus hippocastanum* L..
- **Kingdom:** Plantae.
- **Order:** Sapindales.
- **Family:** Sapindaceae (formerly Hippocastanaceae).
- **Species:** *A. hippocastanum*.
- **Uses:** Primarily used to treat chronic venous insufficiency (CVI), heavy legs, varicose veins, and hemorrhoids due to the presence of aescin
- **Chemical Constituents:** **Triterpenoid saponins** (Escin or aescin), coumarins (esculin), and tannins.

Turmeric



- **Biological Source:** Dried rhizomes of *Curcuma longa* Linn. (synonym: *C. domestica* Valetton).
- **Kingdom:** Plantae.
- **Order:** Zingiberales.
- **Family:** Zingiberaceae (ginger family).

- **Species:** *C. longa*.
- **Uses:** Used as a spice, food colorant (curcumin), and for its potent anti-inflammatory, antioxidant, and anti-cancer properties. Used in traditional medicine (Ayurveda) for skin health, digestive issues, and liver health.
- **Chemical Constituents: Curcuminoids** (curcumin, curcumin I, II, III), essential oil (zingiberene, turmerone), and starch.

• **Lavender**



Fig. 5.1.5: Lavender.

- **Biological Source:** Flowers and essential oil of *Lavandula angustifolia* Mill.
- **Kingdom:** Plantae.
- **Order:** Lamiales.
- **Family:** Lamiaceae.
- **Species:** *L. angustifolia*.
- **Uses:** Known for its calming properties used in aromatherapy to reduce anxiety, stress, and insomnia. It also has antimicrobial and antifungal properties used for wound healing and hair growth.
- Aromatherapy (sedative, anxiety reduction), antiseptic for wound healing, topical pain relief, anti-inflammatory, and cosmetic/perfumery ingredients.

• **Chemical constituents**

Linalool and linalyl acetate, along with other terpenes, esters, and phenolic compounds that contribute to its aroma and therapeutic properties.

NEEM



- **Biological source:** includes the fresh or dried leaves and seed oil of the plant
- **Family:** Meliaceae
- **Kingdom:** Plantae
- **Order:** Meliopsida
- **Species:** *Azadirachta indica*
- **Uses:** Used in traditional medicine for its antibacterial and antifungal properties.
- **Pesticide:** Effective against various pests and diseases in agriculture.
- **Cosmetics:** Commonly used in shampoos and creams for skin conditions.

• **Chemical constituents**

Leaves: nimbin, nimbidin, nimbosterol.
 Seeds: limonoids such as azadirachtin, salannin, gedunin
 Bark: nimbidin, nimbin, nimbosterol
 Flowers: flavonoids such as kaempferol.

EXCIPIENT PROFILE

Natural Excipients Profile

Oil Phase Excipients

Excipient	Function
Beeswax	Thickener, stabilizer
Shea Butter	Emollient, skin protection
Sweet Almond Oil	Carrier oil
Jojoba Oil	Skin conditioning
Emulsifying Wax (plant-derived)	O/W emulsifier

Aqueous Phase Excipients

Excipient	Function
Distilled Water	Vehicle
Aloe Vera Gel	Hydrating base
Glycerin	Humectant
Xanthan Gum	Viscosity modifier

Preservation System

Excipient	Function
Potassium Sorbate	Antimicrobial
Sodium Benzoate	Antimicrobial
Vitamin E	Antioxidant

METHODOLOGY
EXTRACTION

Aloe Vera Gel

Mature, healthy and fresh aloe Vera leaves were collected and washed with distilled water. Then after proper drying of leaves in hot air oven, the outer part of

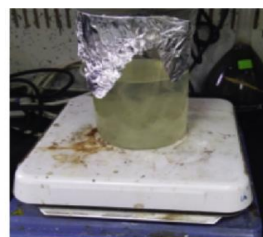
the leaf was dissected longitudinally using a knife. Then aloe Vera gel that is the colourless parenchymatous tissue was removed using the knife. Then it is filtered by using muslin cloth to remove the fibres and impurities. Then the filtrate or the filter product which is a clear aloe Vera gel was used in the preparation.



Aloe vera preparation



Aloe vera gel



Extraction of aloe vera plant



Aloe vera extract filtration using vacuum filter



Reaction of aloe vera extract with precursor



Final product of biosynthesized zinc oxide

Horse chestnut extract

Collect Horse Chestnut seeds when they are mature, typically in the fall. Ensure they are healthy and free from damage.

acid as solvents. The extraction process can be completed within 165 minutes in a pressurizing and normal pressure segmented extraction mode, with the extraction rate of the active ingredient aescin improved to over 75%.

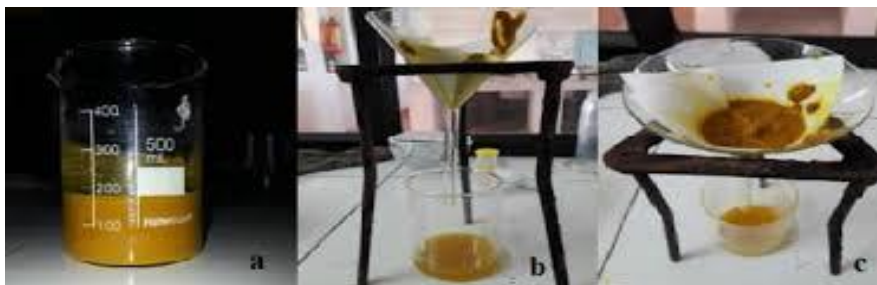
Crush the seeds into a fine powder to increase the surface area for extraction. Use a mixture of ethanol and acetic



Turmeric extract

About 15 g of finely ground turmeric powder was dissolved in 100 ml of 70% alcohol. The preparation was

left undisturbed for 48 hours. The filtrate obtained was used to prepare formulation.



Rosemary oil

The rosemary sample is placed in a thimble inside the Soxhlet apparatus. The solvent is placed in a flask at the bottom of the apparatus. The solvent is heated, and it vaporizes. The vapor rises and enters the condenser, where it is condensed back into a liquid state. The condensed solvent then drips onto the rosemary sample in the thimble. As the solvent fills the thimble, it extracts

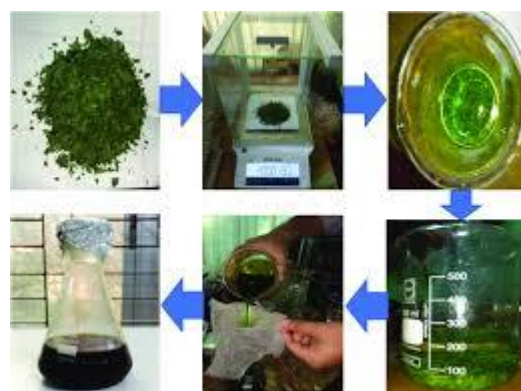
the soluble components from the rosemary. When the level of the solvent in the thimble reaches a certain point, it siphons back into the flask at the bottom. This cycle repeats continuously for a certain number of times until the extraction is considered complete. The extract - containing solvent is then collected and further processed if necessary.



Lavender oil

Extract lavender essential oil using steam distillation, start by harvesting the lavender plants and setting up the distillation equipment. Then, add water to the still and heat the mixture, allowing steam to carry the essential oil vapours from the plant material. Finally, condense and collect the steam to separate it from the essential oil, resulting in a pure extraction of lavender essential oil.

solvent like ethanol. The solvent evaporates, condenses, and passes through the seed material, extracting oil efficiently. This method is precise and allows for controlled extraction of active compounds.



Neem oil

Soxhlet extraction is a laboratory-where powdered seeds are placed in a thimble and repeatedly washed with a

Formulation of Herbal Cream

Type of Cream

Oil-in-Water (O/W) cream (non-greasy, easily washable)

Ingredients (Formula)

Oil Phase

- 1 Stearic acid – 10 g
- 2 Acetyl alcohol – 2 g

3 Liquid paraffin – 5 g

Aqueous Phase

- 1 Distilled water – q.s.
- 2 Glycerine – 5 g
- 3 Triethanolamine – 1 g

Active Herbal Ingredients

- Aloe vera gel – 10 g
- Horse chestnut extract – 5 g
- Turmeric extract – 1 g

- Rosemary oil – few drops
- Lavender oil – few drops

Materials

1. **Apparatus:** Beaker, stirrer, dropper
2. **Chemicals:** Aloe Vera gel, Horse chestnut extract, Turmeric extract, Rosemary oil, Lavender oil, Neem oil, and Vitamin E
3. **Instruments:** Heating mantle, pH meter, Weighing balance.

Formula for 100g herbal cream

Ingredient	Function	% w/w
Aloe vera gel	Soothing, moisturizing	20.0
Horse chestnut extract (standardized)	Veno tonic active	5.0
Neem extract	Anti-inflammatory, antimicrobial	2.0
Rosemary extract	Antioxidant, circulation support	1.0
Lavender essential oil	Fragrance, soothing	0.5
Sweet almond oil	Emollient	8.0
Jojoba oil	Skin conditioning	5.0
Beeswax	Consistency agent	6.0
Emulsifying wax (plant-derived)	Emulsifier	5.0
Shea butter	Moisturizer	5.0
Vegetable glycerin	Humectant	4.0
Xanthan gum	Natural thickener	0.5
Vitamin E (tocopherol)	Antioxidant	0.5
Potassium sorbate	Preservative	0.2
Sodium benzoate	Preservative	0.3
Distilled water	Vehicle	q.s. to 100

Method of Preparation

• Step 1: Preparation of Oil Phase

Take beeswax, stearic acid, and liquid paraffin in a beaker.

Heat the mixture at 70–75°C until melted.

• Step 2: Preparation of Aqueous Phase

Dissolve neem oil and glycerine in distilled water. Heat to the same temperature (70–75°C).

• Step 3: Mixing

Add aqueous phase slowly into oil phase with continuous stirring.

Stir continuously until cream base is formed.

• Step 4: Addition of Herbal Extracts

Add Aloe vera gel, horse chestnut extract, turmeric extract, rosemary oil, and lavender oil.

Mix uniformly.

• Step 5: Packing

Transfer the prepared cream into clean airtight containers.



Evaluation Parameters

1. Physical Appearance

- Colour, Odor, texture, consistency



2. pH Determination

- Ideal range: 5.5 – 7 (skin compatible)



3. Viscosity

- Measured using viscometer

4. Spreadability

- Determines ease of application



5. Homogeneity

- No lumps or phase separation

6. Stability Study

- Store at different temperatures (room temp, 40°C)

7. Skin Irritation Test

- Patch test on volunteers



8. Washability

- Ease of removal with water



RESULTS AND DISCUSSION

Physical Evaluation of Herbal Varicose Vein Cream

Parameter	Observation	Interpretation
Appearance	Smooth, homogeneous cream	Good aesthetic quality
Colour	Pale green	Due to herbal extracts
Odor	Pleasant aromatic odour	Presence of lavender and rosemary oils
Texture	Soft and non-gritty	Uniform distribution of ingredients
Consistency	Semisolid	Suitable for topical application
Phase Separation	Absent	Stable emulsion system
Washability	Easily washable with water	O/W cream characteristics

Discussion

The prepared cream exhibited a smooth and homogeneous appearance without any visible phase separation. The pale green colour and characteristic

odour were attributed to the incorporated herbal extracts and essential oils. The cream spread uniformly on the skin and showed acceptable cosmetic properties.

Physicochemical Evaluation

Parameter	Result	Standard Range
pH	5.3 ± 0.1	4.5–6.5
Viscosity	32,500 ± 250 cP	20,000–50,000 cP
Spreadability	7.8 ± 0.3 g·cm/sec	Good spread ability
Extrudability	91 ± 2 %	>85%
Drug Content Uniformity	98.2 ± 1.5 %	95–105%

Discussion

The pH of the formulation was compatible with normal skin pH, minimizing the risk of irritation. Viscosity and spread ability values indicated easy application and

adequate residence time on the skin. Drug content uniformity confirmed homogeneous distribution of herbal actives throughout the formulation.

Stability Study Results

Parameter	Initial	1Month	2 Months	3 Months
Appearance	Smooth	Smooth	Smooth	Smooth
Colour	Pale green	No change	No change	No change
pH	5.3	5.3	5.2	5.2
Viscosity (cP)	32,500	32,300	32,100	31,950
Phase Separation	Nil	Nil	Nil	Nil

Discussion

The formulation remained stable throughout the storage period. No significant changes in appearance, colour, pH, or viscosity were observed, indicating good physical stability and compatibility of the ingredients.

cream was safe, non-irritant, and effective for topical application.

Skin Irritation Study

Parameter	Observation
Redness	Absent
Swelling	Absent
Itching	Absent
Irritation Score	0

Discussion

No signs of irritation were observed after topical application, indicating that the herbal cream was safe and well tolerated on the skin.

In conclusion, the formulation and evaluation of an herbal cream for managing varicose veins utilizing aloe vera, rosemary, turmeric, and lavender present a promising for natural and effective treatment. By combining the moisturizing properties of aloe vera, and rosemary with the anti-inflammatory and antioxidant benefits of turmeric, and aloe vera, the cream offers a holistic approach to alleviating symptoms associated with varicose veins, such as pain, swelling, and discomfort. Through rigorous evaluation encompassing physical properties, stability, safety, efficacy, user feedback, and regulatory compliance, the cream can be fine-tuned to ensure both safety and efficacy. This process may involve adjustments to ingredient ratios, incorporation of additional active ingredients, or optimization of formulation techniques. Ultimately, the development of a herbal cream for varicose vein management holds the potential to provide individuals with a natural and accessible solution to improve their vascular health and overall well-being. Further research and clinical studies will be valuable in validating its effectiveness and broadening its accessibility to those in need.

CONCLUSION

The present study on the formulation and evaluation of herbal cream for varicose veins demonstrates that herbal ingredients possess significant therapeutic potential in managing venous disorders. The combination of horse chestnut, aloe vera, rosemary, neem, and lavender provide anti-inflammatory, antioxidant, Veno tonic, soothing, and healing effects which help reduce pain, swelling, irritation, and discomfort associated with varicose veins.

The formulated herbal cream showed satisfactory physical characteristics such as good appearance, homogeneity, spread ability, stability, and skin compatibility. The evaluation studies confirmed that the

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