

FORMULATION AND EVALUATION WOUND HEALING CREAM OF ACHYRANTHES ASPERA EXTRACT

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Abstract: The developed wound healing cream from achyranthes aspera extract This was extracted developed and evaluated for physical and chemical properties of cream. The plant material of achyranthes aspera was evaluated form a microscopical, and phytochemical analysis. the solid extract material was extracted by Soxhlet extraction procedure using using petroleum ether, methanol and water as a solvent.

Phytochemical analysis of hydroalcoholic extract of Achyranthes Aspera showed the presence of alkaloids, Proteins, carbohydrate, glycoside and proteins. Extract was prepared by continuous heat extraction method and analyzed by DSC analysis and FTIR.

Formulation wound healing cream was carried out by using Achyranthes Aspera extract. The sequential mixing method was used to carry out the formulation. Polymers are appropriate for the Achyranthes Aspera, according to trial batches. Good formulations were created by polymer. Excipients used likes White Petrolatum, Stearyl alcohol, Propylene glycol, Polysorbate 60, Methyl paraben, propyl paraben, Triethanolamine and purified water.

The invitro evaluation of formulated wound healing cream performed. The formulated herbal cream evaluated were further characterized by appearance, pH, specific gravity, homogenisity, water content, spreadibility, viscosity, sterility. Trial batch F8 was found all test parameter satisfactory.

Keywords: Achyranthes asprera, wound healing, Cream, extraction, formulation, Soxhlet , plant material.

Introduction:

A wound is a physical injury that break or tear the skin. Proper wound healing is required to restore the disturbed automatical continuity and functional status of the skin. Wound healing means healing of skin. It is repair process that follows injury to the skin and other soft tissue (1).

There are various medicinal benefits of Achyranthes aspera it is commonly used for asthmatic coughs, snakebites, phobias, urinary stones, rabies, influenza, hemorrhoids, bronchitis, diarrhea, renal edema, gonorrhea, and abdominal pain.

Traditional use-It has been used in traditional medicine to treat wounds, cuts and skin conditions (2).

Bioactive compounds-The plant contains bioactive compounds like alkaloids saponins, flavonoids which possess wound healing properties

Roots.

The root's decoction is used to cure gonorrhoea and amenorrhea. The powdered root is used to treat fevers and dropsy and acts as a diaphoretic, diuretic, stimulant, and demulcent in addition to treating diarrhoea and dysentery.⁸ The roots contain starch. removal of Cu^{2+} , Zn^{2+} , Ni^{2+} , Pb^{2+} , and Co^{2+} from an aqueous solution using acid and garlic (3).

Leaves

Leaves are used to treat malaria and as a diuretic when infused. The smoke produced by the burned leaves is thought to be insecticidal. Freshly crushed leaves are applied topically to ulcers and used in baths to treat rheumatic and arthritis pain. Leaves are used to wrap packages, and the fibre they produce is utilised to make paper. Sucrose inversion, sugar synthesis, and conversion (3).

Flowers

Eye disorders were supposedly treated by the flowers. a flower concoction used to stop bleeding from exterior wounds. It is efficient mild steel corrosion inhibitor in an acidic environment. Tapetum development is invasive but not plasmodial (3).

Seeds

The condition of earaches is treated with seed juice.⁸ The seeds are often used as musical rattles and as beads in jewellery. The seed can be used to create a purple dye (3).

Total plant

Tonsillitis treatment with plant paste. non pharmacological uses. Cannas are fermented to make alcohol in more rural areas of India. n and p provided throughout the facility used as biomass for direct electricity recovery. Air cathode microbial fuel cell seeded with rumen microbes. In a hydroponic system, triazophos is being phyto remediated (3).

Objective:

- 1.To collect and authenticate the plant and evaluate physical, organoleptic and microscopic properties of herbal plant as *achyranthes aspera*.
- 2.To carry out extraction of *achyranthes aspera* by suitable extraction technique and preliminary phytochemical analysis of *achyranthes aspera*.
- 3.To characterize extract using different standard protocols such as UV-Visible Spectroscopy, FTIR Spectroscopy.
- 4.Formulation of Cream using green chemistry approach.

Plant Profile:

Binomial name	<i>Achyranthes aspera</i>
Synonym	Pricklychaff flower
Kingdom	Plantae
SubKingdom	Tracheobionta
Class	Mangoliophyta
Order	Caryophyllales
Family	Amaranthaceae
Genus	<i>achyranthes</i>
Species	<i>Aspera</i>



Fig: *Achyranthes aspera* (4)

METHODOLOGY :

Collection and Authentication of Plant Material

Achyranthes aspera belonging to the family Amaranthaceae is found as a weed throughout the India and in other countries such as Africa, Australia, America and Asia. It grows as a wasteland herb everywhere. *A. aspera* is known as chirchita in Hindi, apamarga in Sanskrit, aghada in Marathi and prickly chaff flower in English. There are various medicinal benefits of *Achyranthes aspera* it is commonly used for asthmatic coughs, snakebites, phobias, urinary stones, rabies, influenza, hemorrhoids, bronchitis, diarrhea, renal edema, gonorrhea, and abdominal pain (5).

Method of extraction of *Achyranthes Aspera* – Plant collection:

The 80% methanol leaf extract of *A. aspera* was fractionated with chloroform, n-butanol and water. Wound healing and anti-inflammatory activities were evaluated using excision and incision wound models, rat paw edema and cotton pellet-induced granuloma models, respectively. For wound healing activity, fractions were evaluated at 5 and 10% ointments (6).

The medicinal plant *Achyranthes Aspera* (300 gm) was collected. After cleaning, plant part were dried under shade at room temperature for 5 days and then in oven dried at 45°C till complete dryness. Dried plant part was stored in air tight glass containers in dry and cool place to avoid contamination and deterioration (7).

Authentication of selected traditional plant - Medicinal plant *Achyranthes Aspera* was authenticated by a plant taxonomist in order to confirmed its identity and purity. Preparation of Extract was achieved by extracting the

powdered of *Achyranthes Aspera* with ethanol using Soxhlet apparatus. Filtrate was subjected to concentrate under reduced pressure. Residue was dried and used for the evaluation and activities (8).

Extraction of *Achyranthes Aspera* plant by Soxhlet apparatus.

Material and methods:

1.Dispense all the material.
2.Preparation of extract phase Transfer propylene glycol in suitable SS container then add methyl paraben and propyl paraben into propylene glycol and stir for 10-15 min to form a clear solution. Add slowly extract into propylene glycol phase under stirring and continue stirring for 15-20 min to form a uniform dispersion.
3.Preparation of Oil phase Transfer stearyl alcohol, polysorbate 60 and white petrolatum in oil phase vessel and allow to heat it up to 60 °C to 70 °C to form a clear oil phase
4.In manufacturing vessel Emulsification step In main Manufacturing vessel take a purified water and heat it upto 65 °C to 70 °C then add oil phase from step no 3.1 into manufacturing vessel under stirring and homogenization for 20-30 min by maintaining the temp up to 65 °C to 70 °C and allow to cool upto 55°C - 60 °C
5.Addition of extract phase Add drug phase from step 2.1 into the main manufacturing vessel at 55°C - 60°C and homogenized the bulk for 10 min to form uniform emulsification
6.pH Adjustment Stage Adjust the pH of the bulk formulation of step 5.1 to pH 6.2 (± 0.5) using a Triethanolamine solution at a temperature of 50°C ($\pm 5^\circ\text{C}$).
7.Cooling under stirring Cool the bulk from step no 6.1 upto 25°C to 30°C under stirring by circulating cool water
8.Filling and packaging Filling of bulk in aluminum tube.

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Formulation Table:

SR.NO.	INGREDIENTS	QUANTITY	CATEGORY
1.	Achyranthes aspera extract	5.0 gm	drug
2.	White petrolatum	2.30	Occlusive agent
3.	Stearyl alcohol	1.70	moisturizer
4.	Propylene glycol	60	Humactant
5.	Polysorbate 60	1.50	Emulsifier
6.	Methyl paraben	2	Preservative
7.	Propyl paraben	3	Preservative
8.	Triethanolamine	Q.S.	Emulsifier
9.	Purified water	Q.S	Solvent

Wound Healing Activity

S. Edwin et al. (2008) investigated the ethanolic and aqueous extracts of leaves of *Achyranthes aspera* for wound healing activity. The wound healing activity was studied using two wound models, excision wound model and incision wound model (9).

Evaluation parameters:

1. Visual Assessment of Appearance:

The sample solutions were examined in a transparent test tube with a diameter of 15-25 mm against a white background to evaluate color and a blank background to assess clarity under diffused daylight. The observations were recorded accordingly (10).

2.Colour and Clarity Test using Light Transmittance:

In this test, a gel sample is assessed for color by passing light through it. The percentage of light transmission is compared to predetermined rates set for different grades. It is important to ensure that the gel test cuvette is free from fingerprints and that the sample is devoid of bubbles or cloudiness. Any of these conditions may reduce the amount of light transmitted through the sample, thus affecting its grade (10).

3.Ph: The measurement and maintenance of pH play a crucial role in quality control testing. Cream formulation was evaluated for its pH with pH paper was found to be in range of 5.8 to 6.5.

4.Specific Gravity (g/cm³):

Specific gravity is a measurement of the density of a substance relative to that of water. For solids and semi- solids, specific gravity is typically determined in relation to water at its densest state (11).

5.Viscosity Measurement:

Viscosity assessment is conducted to monitor any changes that may occur during the aging process . Viscosity and consistency play a significant role in the stability of solutions. An increase in viscosity may indicate a higher likelihood of instability (10).

6.Homogeneity:

All the prepared herbal cream was tested for homogeneity by visual inspection and was evaluated for presence of any aggregates present in the formulation.

7.Spreadability

The spreadability was determined for all the prepared herbal cream. Spreadability was determined by the apparatus which consists of a wooden block, which was provided by a pulley at one end.

Spreadability was calculated using the following formula:

$$S = M \times L / T$$

S = Spreadability,

M= Weight in the pan (tied to the upper slide)

L = Length moved by the glass slide

T = Time (in sec.) taken to separate the slide completely each other.FTIR of *Achyranthes aspera* Extract (10).

Results:

Authentication of Plant Material Macroscopic Characteristics

The detail macroscopic characters of fresh plant of *Achyranthes aspera* was noted including special features such as color, size and shape etc as shown in Fig. 8.1. The branches are thick, fleshy, succulent, widely spaced and green. Odour is aromatic pungent and taste is bitter.

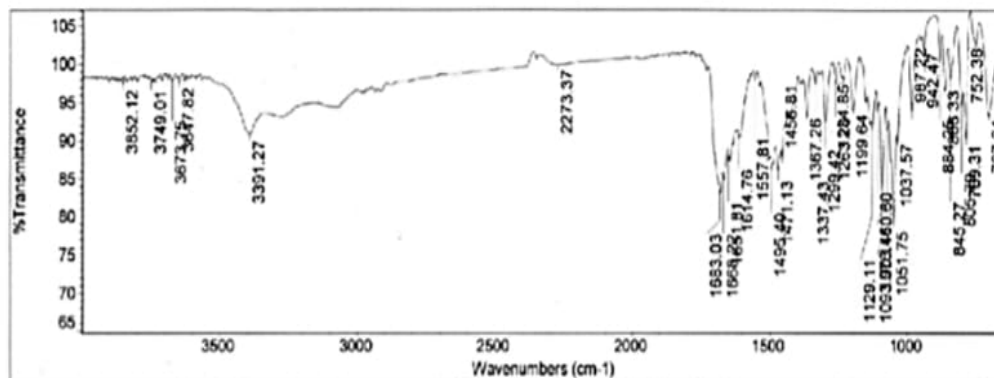
Phytochemical Investigation:

Sr. No.	Test	Stem Extract observation
1	Tests for alkaloids	++
2	Tests for glycosides	++
3	Tests for Proteins	++
4	Test for flavonoids	++
5	Test for fats and oils	-
6	Test for carbohydrate	++
7	Tests for tannins (phenolic compounds)	-
8	Test for saponin	-
9	Test for Steroid	-

Note: "+"- Presence of Phyto constituents; "-"- Absence of Phyto constituents

Result of Preformulation studies:

1. FTIR of *Achyranthes aspera* Extract

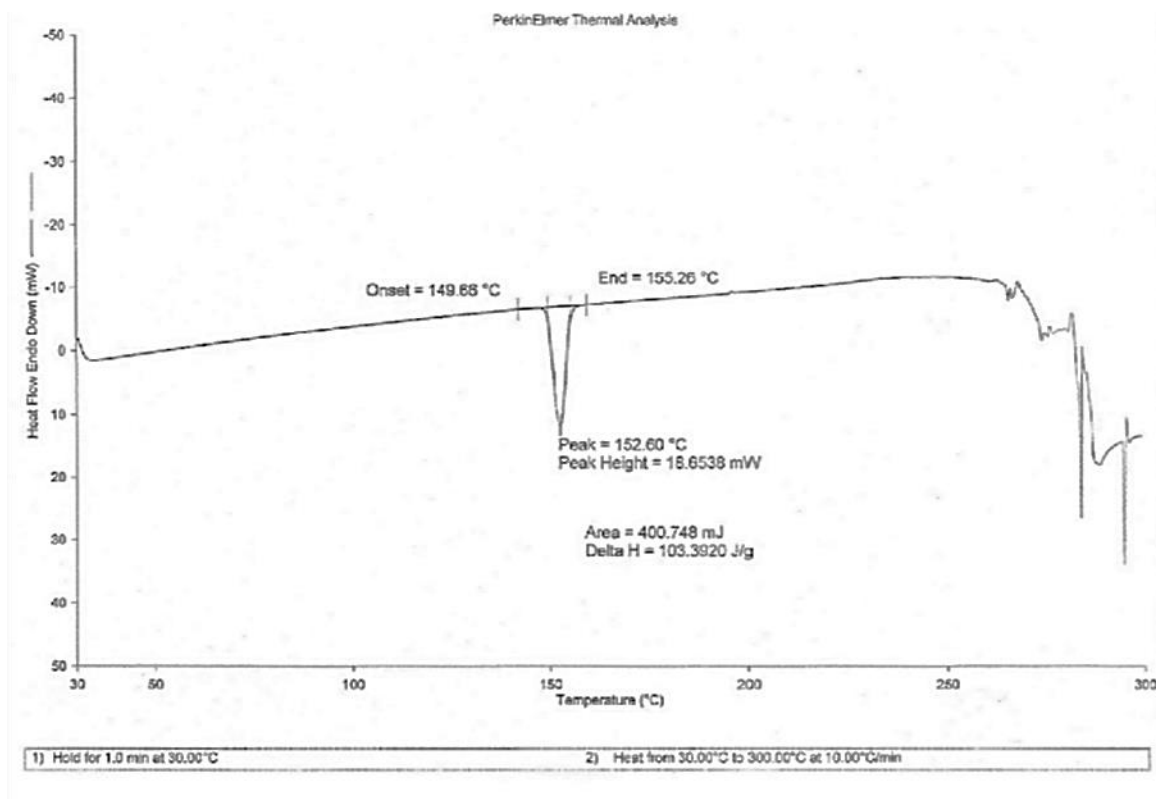


Standard IR Ranges (cm ⁻¹)	IR Ranges (cm ⁻¹)	Functional Group
3700-3584	3673.75	O-H Stretching
3400-3300	3391.27	N-H Stretching
2275-2250	2273.37	N=C=O Stretching
1685-1666	1683.03	C=O Stretching
1370-1365	1367.26	C-H Bending
1205-1124	1199.64	C-O Stretching
995-985	987.22	C=C bending

Interpretation of IR Spectra

2. DSC

Differential Scanning Calorimetry was performed using nitrogen as reference. Differential Scanning Calorimetry scan were recorded at the heating rate 10 °C/min in the temperature range 50 – 300 °C.



Results of Herbal Cream of Achyranthes Aspera Finished Product

Results of experimental trials were compared with the results of herbal cream of Achyranthes aspera Extract. So cream product was evaluated for invitro parameters like Description, pH, specific gravity and viscosity.

Characteristics tests of herbal cream products:

Sr. No.	Physical Tests	Results
1.	Description	Pale green colour, viscous cream
2.	Homogenecity	Homogenous
3.	Colour and Clarity	95-105%
4.	Specific gravity(gm/cm ³)	1.070-2.000
5.	Viscosity(MPa.S)	4000-5000
6	PH	5.8-6.8
7.	Water content	4.8-6.0%
8.	Spredability(gm.cm/sec)	9.8

Conclusion:

The invitro study of formulated herbal study conclude that, effective spread ability and viscosity gives good results in wound healing cream. All invitro evaluation of cream has prove that all characteristics has a effective cream formulation. This can be used a treatment for wound healing.

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