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Formulation, Standardization and Evaluation of a Herbal Hemostatic Spray Based on Durva (Cynodon dactylon) Extract

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ABSTRACT

Herbal medicines have gained significant importance due to their safety, effectiveness and minimal side effects. Cynodon dactylon (Durva grass) is a medicinal plant widely used in traditional medicine for its hemostatic, anti-inflammatory and wound healing properties. The present study aims to formulate, standardize and evaluate a herbal hemostatic spray using Durva extract. The plant material was collected, dried and subjected to hydro-alcoholic extraction to obtain the active constituents. The extract was incorporated into a spray formulation using suitable excipients such as ethanol, glycerin and distilled water. The prepared formulation was standardized using physicochemical parameters such as pH, viscosity, spray pattern and phytochemical screening. The formulation was also evaluated for stability, antimicrobial activity and hemostatic potential. The results indicated that the herbal spray showed satisfactory physicochemical characteristics and promising hemostatic activity. Thus, the developed herbal hemostatic spray based on Durva extract may serve as a safe and effective natural alternative for the management of minor bleeding and wounds.

Keywords: Herbal formulation, Hemostatic spray, Durva, Cynodon dactylon, Wound healing, Herbal medicine.

INTRODUCTION

Since ancient times, a variety of illnesses have been treated with herbal remedies.Natural plant-based formulations are gaining increasing attention because they are safer and produce fewer side effects compared to synthetic drugs[1]. One of the commonly used medicinal plants in traditional medicine is Cynodon dactylon, commonly known as Durva or Bermuda grass[2]. Durva belongs to the family Poaceae and is widely distributed in tropical and subtropical regions[3]. It has been used in traditional systems of medicine such as Ayurveda for treating wounds, cuts, bleeding disorders, skin diseases and inflammation[4].The plant contains several bioactive constituents such as flavonoids, alkaloids, glycosides, tannins and phenolic compounds that contribute to its medicinal properties[5].Among its pharmacological activities, the hemostatic effect of Durva is particularly significant[6]. Hemostasis refers to the process of stopping bleeding from damaged blood vessels[7]. Herbal hemostatic formulations are useful in controlling minor bleeding, promoting clot formation and accelerating wound healing[8].In recent years, topical spray formulations have become popular because they provide easy application, uniform distribution and better patient compliance[9]. Therefore, the present study focuses on the formulation, standardization and evaluation of a herbal hemostatic spray prepared from Durva extract[10-12].

Relevant conflicts of interest/financial disclosures: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

• **Common name of Cynodon dactylon:-**

Table l - Common name of Cynodon dactylon

Language	Common name
English	Bermuda grass, Couch grass, Devils grass
Hindi	Doob ghaas, Durva
Tamil	Arugampul
Sanskrit	Durva, Swarna Durva
Kannada	Garike hullu
Marathi	Haritali
Gujarati	Dharo
Bengali	Dubla ghaas

MATERIALS AND METHODS-

1. Collection of Plant Material-

Fresh whole plant of Cynodon dactylon was collected from a local area. The plant material was washed with distilled water to remove dust and impurities and dried under shade. The dried plant material was then powdered using a grinder and stored in an airtight container for further use[13].



Figure l - Fresh plant of Durva (Cynodon dactylon) and Grinded powder

2. Preparation of Extract-

The dried powdered plant material of Cynodon dactylon was subjected to hydro-alcoholic extraction using ethanol and distilled water by using a Soxhlet apparatus[14].



Figure ll - Preparation of extract by using Soxhlet apparatus

Approximately 50 g of the powdered plant material was placed in a thimble and loaded into the Soxhlet extractor. A mixture of ethanol and distilled water (hydro-alcoholic solvent) was used as the extraction solvent and placed in a round bottom flask attached to the Soxhlet apparatus.

3. Formulation of Herbal Hemostatic Spray-

•Formulation Composition (100 mL):-

Table ll :- Formulation Table

Ingredient	Quantity	Function
Durva hydroalcoholic extract	5 ml	Active hemostatic agent

Ethanol (30%)	30 ml	Solvent and antimicrobial support
Glycerin	5 ml	Humectant and skin moisturizer
Propylene glycol	5 ml	Co-solvent and penetration enhancer
Sodium benzoate	0.1 g	Preservative
Distilled water	q.s. to 100 ml	Vehicle

4. Apparatus Required-

The following laboratory apparatus were used for the formulation process[15]:-

• Beaker (100 mL or 250 mL)

• Magnetic stirrer

• Measuring cylinder

• Glass rod

• Digital weighing balance

• Whatman filter paper

• Funnel

• Sterile spray bottle container

• Soxhlet apparatus

• Heating mental

5. Formulation Procedure-

Step 1:- Preparation of Extract Solution:-

- Initially, 5 ml of hydroalcoholic extract of Cynodon dactylon was accurately weighed using a digital weighing balance and transferred into a clean and dry beaker.

- After that, 30 mL of 30% ethanol was added slowly into the beaker containing the extract. The mixture was placed on a magnetic stirrer and stirred continuously for 10–15 minutes until the extract completely dissolved in the solvent and a uniform solution was obtained.

Step 2:- Addition of Co-solvents:-

- After obtaining a uniform extract solution, 5 mL glycerin and 5 mL propylene glycol were added to the mixture.

- The solution was again stirred using a magnetic stirrer for 5–10 minutes to ensure proper mixing and homogeneity of the formulation.

Step 3:- Preparation of Preservative Solution:-

- In a separate beaker, 0.1 g sodium benzoate was accurately weighed.

- Then 5–10 mL distilled water was added and the mixture was stirred until the preservative completely dissolved, forming a clear solution.

Step 4:- Addition of Preservative:-

- The prepared sodium benzoate solution was then slowly added to the main formulation mixture.

- The entire mixture was stirred continuously for approximately 5 minutes using a magnetic stirrer to ensure uniform distribution of the preservative throughout the formulation.

Step 5:- Make-up of Final Volume:-

- Distilled water was gradually added to the formulation while stirring continuously.

- The total volume of the formulation was adjusted to 100 mL. Continuous stirring ensured the formation of a homogeneous solution.

Step 6:- Filtration:-

- The prepared formulation was filtered using Whatman filter paper and funnel to remove any undissolved particles or impurities.

Step 7:- Filling and Packaging:-

- The filtered formulation was carefully transferred into a sterile spray bottle container using a funnel.

- The bottle was tightly closed to prevent contamination.

Proper labeling was done, including:-

•Name of formulation

•Batch number

•Date of preparation

Step 8:- Storage Conditions:-

- The prepared herbal hemostatic spray was stored at room temperature (approximately 25°C) in a dry place.

- The container was kept away from direct sunlight to maintain the stability and effectiveness of the formulation.

6. Standardization of the Formulation-

6.1 Organoleptic Evaluation-

- The formulation was evaluated for color, odor, appearance and clarity[16].

6.2 pH Determination-

- The pH of the formulation was determined using a calibrated digital pH meter[17].

6.3 Viscosity Measurement-

-A Brookfield viscometer was used to measure the formulation's viscosity[18].

6.4 Phytochemical Screening-

- Preliminary phytochemical tests were carried out to detect the presence of flavonoids, alkaloids, tannins, saponins and phenolic compounds[19].

6.5 Microbial Limit Test-

- The formulation was tested for microbial contamination to ensure safety and stability.

7. Evaluation of Herbal Spray-

7.1 Physical Evaluation-

The spray was evaluated for:-

•Color

•Odor

•Clarity

•Homogeneity[20]

7.2 Spray Pattern Test-

- The spray was tested to evaluate the pattern and uniform distribution of the spray on a surface[21].

7.3 Stability Studies-

- The formulation was stored under different temperature conditions and evaluated periodically for changes in pH, color, clarity and precipitation[22,23].

7.4 Hemostatic Activity-

- The ability of the formulation to stop bleeding was evaluated using suitable experimental models[24,25].

8. Characteristics of the Final Product-

Table lll - Parameters and Results

Parameter	**Result**
Appearance	Clear yellowish-brown liquid
Odour	Mild herbal odour
pH	5.5 – 6.5
Spray pattern	Fine mist
Stability	No precipitation or phase separation

RESULT AND DISCUSSION-

The formulated herbal hemostatic spray showed acceptable physicochemical characteristics including appropriate pH, clarity and stability. Phytochemical screening confirmed the presence of flavonoids, tannins and phenolic compounds responsible for hemostatic and wound healing activity.



Figure lll - Final Spray Image

The spray demonstrated good spray pattern and stability without precipitation or phase separation during the study period. The formulation exhibited promising hemostatic and antimicrobial activity, indicating its potential use as a natural topical agent for controlling minor bleeding and wounds.

CONCLUSION-

The present study successfully formulated and evaluated a herbal hemostatic spray based on the extract of Cynodon dactylon. The formulation showed satisfactory physicochemical properties, stability and potential hemostatic activity. Therefore, this herbal spray may be considered as a safe, effective and convenient natural alternative for the management of minor bleeding and wound care.

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REFERENCES

1. C. K. Kokate et al. Pharmacognosy. Pune: Nirali Prakashan; 2016.
2. K. R. Khandelwal et al. Practical Pharmacognosy Techniques and Experiments. Pune: Nirali Prakashan; 2015.
3. S. S. Agrawal et al. Herbal Drug Technology. Hyderabad: Universities Press; 2007.
4. V. D. Rangari et al. Pharmacognosy and Phytochemistry. Nashik: Career Publications; 2002.
5. W. C. Evans et al. Trease and Evans Pharmacognosy. London: Saunders Elsevier; 2009.
6. Harborne J. B. et al. Phytochemical Methods. London: Chapman and Hall; 1998.
7. P. K. Mukherjee et al. Quality Control of Herbal Drugs. New Delhi: Business Horizons; 2019.
8. Remington J. P. et al. Remington: The Science and Practice of Pharmacy. Philadelphia: Lippincott Williams & Wilkins; 2005.
9. Leon Lachman et al. The Theory and Practice of Industrial Pharmacy. Mumbai: Varghese Publishing House; 1991.
10. World Health Organization et al. Quality Control Methods for Herbal Materials. Geneva: WHO Press; 2011.
11. World Health Organization et al. Guidelines on Good Agricultural and Collection Practices for Medicinal Plants. Geneva; 2003.
12. Indian Pharmacopoeia et al. Ghaziabad: Indian Pharmacopoeia Commission; 2018.
13. The Ayurvedic Pharmacopoeia of India et al. New Delhi: Government of India; 2008.
14. K. M. Nadkarni et al. Indian Materia Medica. Mumbai: Popular Prakashan; 2007.
15. R. N. Chopra et al. Glossary of Indian Medicinal Plants. New Delhi: CSIR; 1996.
16. H. Wagner et al. Plant Drug Analysis: A Thin Layer Chromatography Atlas. Berlin: Springer; 2009.
17. S. H. Ansari et al. Essentials of Pharmacognosy. New Delhi: Birla Publications; 2006.
18. Tyler V. E. et al. Pharmacognosy. Philadelphia: Lea and Febiger; 1998.
19. Cynodon dactylon pharmacological studies et al. Journal of Ethnopharmacology.

20. Hemostatic activity studies of Cynodon dactylon et al. International Journal of Pharmaceutical Sciences.
21. Evaluation of wound healing properties of Cynodon dactylon et al. Asian Journal of Pharmaceutical Research.
22. Phytochemical screening of Cynodon dactylon et al. Journal of Herbal Medicine.
23. Extraction and phytochemical analysis of Cynodon dactylon et al. International Journal of Pharmacognosy.
24. Herbal spray formulation studies et al. International Journal of Pharmaceutical Research.
25. Evaluation of topical herbal formulations et al. Journal of Pharmaceutical Technology.
26. Stability studies of herbal formulations et al. International Journal of Pharmacy and Pharmaceutical Sciences.
27. Spray dosage form evaluation et al. Journal of Pharmaceutical Sciences.
28. Quality control parameters of herbal medicines et al. Journal of Herbal Drug Research.
29. Hemostatic herbal preparations et al. Journal of Ethnopharmacology.
30. Phytochemical and pharmacological studies of Cynodon dactylon et al. International Journal of Herbal Medicine.

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