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Research Article

Muyalcheviyan/Shashasruthi

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Phytochemical Investigation and Traditional Usage of Muyalcheviyan/Shashasruthi (Emelia sonchifolia Linn.)

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Introduction: Muyalcheviyan, a lesser-known but highly revered plant in Ayurveda, has garnered attention for its medicinal properties and therapeutic potential. Despite its limited mention in mainstream herbal literature, its efficacy in traditional Ayurvedic treatments underscores the need for comprehensive research and documentation.

Materials and Methods: This article aims to provide an overview of its Physicochemical and Phytochemical analysis, pharmacological properties, microbial limit test and its relevance in contemporary and traditional herbal medicine. All the specified analysis were done according to Ayurvedic Pharmacopoeia of India standards.

Results: Phytochemical analysis showed the presence of tannins, alkaloids, flavonoids, proteins etc. The physicochemical analysis revealed all the parameters under the mentioned range.

Discussion: Phytochemical, physicochemical, traditional uses and microbial limit test were discussed in the article.

Keywords: Physicochemical and Phytochemical analysis, Traditional uses, Microbial Limit Test

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Introduction

Ayurveda, the ancient Indian system of medicine, relies heavily on plant-based remedies to promote health and treat diseases. Scientific evidence indicates that a minimum of 80% of individuals worldwide rely on medicinal herbs and their bioactive compounds for essential healthcare needs. Phytochemicals are the compounds that are made by plants.

The primary and secondary metabolisms of the plant produce these. For the plants to flourish or to fend against other plants, animals, insects, microbial pests, and diseases, these phytochemicals are essential. These phytochemicals have extraordinary properties like antibacterial, antifungal, anti-cancerous, antioxidant, anti-inflammatory, anti-diabetic activities etc. The identification of this compound relies on the tools of phytochemical analysis and hence the knowledge about these techniques is important.**[1]**

Phytochemical analysis is a quickly developing and relatively new chemical discipline that investigates the structure, biosynthesis, metabolism, and biological function of organic compounds in plants. **[2]**

This article delves into the origins, traditional applications, and emerging pharmacological insights into the Shashasruthi plant, offering a holistic perspective on its role in Ayurveda.

Materials and Methods

Raw Drug Collection: The raw drug Muyalcheviyan was collected from natural habitat, Shahapur Belagavi Karnataka.

Common names

English	Lilac Tassel flower
Malayalam	Muyalcheviyan
Tamil	Muyalciruthalai
Telugu	Manchala
Hindi	Hirankhuri
Sanskrit	Shashasruthi
Kannada	Muyalugoravi

Preparation of *Swarasa*: *Swarasa* of Muyalcheviyan was prepared according to classical SOP at RSBK Lab, KLE SHRI BMK Ayurveda Mahavidyalaya, Belagavi.

Figure 1: Muyalcheviyan at natural habitat

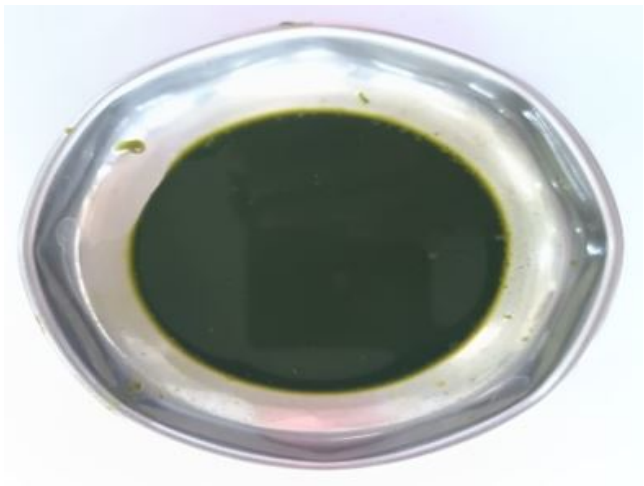

Figure 2: *Swarasa* of Muyalcheviyan

Preparation of Extract: Extract was prepared using 100ml distilled water and 5ml *Swarasa*. Kept in the orbital shaker for 6 hours and kept standing for 18 hours at Central Research Facility, KLE SHRI BMK Ayurved Mahavidyalaya, Belagavi.

Phytochemical Analysis:[3]

(A) Test for Alkaloids:

Dragendoff's test: 2ml of sample was taken and, to this 2-3 drops of Dragendoff's reagent were added and the appearance of orange brown precipitate and indicates the presence of alkaloids.

(B) Test for Carbohydrates:

Molisch's test:2ml of sample was mixed with few drops of Molisch's reagent (α-naphthol dissolved in alcohol) shake and add concentrated sulphuric acid along the sides of the test tube and observed for the appearance of a violet ring at the junction of two liquids for positive test.

(C) Test for Reducing Sugar:

Benedict's Test:3ml of sample was mixed with equal quantity of Benedict's reagent, heat in water bath for 5 minutes. Appearance of green, yellow or red colour depending on the amount of reducing sugar gives positive test.

(D) Test for Monosaccharides:

Barfoed's test: 2ml of sample was mixed with 2ml of Barfoed's reagent, heat for 1-2 minutes and cool. Appearance of red precipitate gives positive result.

(E) Test for Pentose Sugars:

Bial's Orcinol test: Few drops of sample were mixed with 3ml of Bial's reagent, boil the reagent and add few drops of the sample. Green or purple colour gives positive results.

(F) Test for Hexose Sugar:

Selwinoff's test: 1ml of sample were mixed with 3ml of Selwinoff's reagent, heat for 1-2 minutes. Red precipitate gives positive results.

(G) Test for Non-reducing Polysaccharides:

Iodine Test:3ml of the sample was mixed with few drops of dilute iodine solution. Appearance of blue colour and its disappearance on heating and reappearance on cooling indicates positive results. Liebermann's Reaction:3ml of sample was mixed with 3ml acetic anhydride, heat and cool, add concentrated sulphuric acid. Blue precipitate gives positive results.

(H) Test for Proteins:

Million's test: 3ml of sample was mixed with 5ml of Million's reagent. White -warm precipitate turns to Brick red or the precipitate dissolves giving red coloured solution gives positive results.

(I) Test for Amino Acids:

Ninhydrin test:3ml of the sample was mixed with 5% Ninhydrin solution, heated in boiling water bath for 10 minutes. Purple or Bluish colour indicates positive results.

(J) Test for Steroids:

Salkowski reaction:2ml sample was mixed with 2ml Chloroform and 2ml concentrated Sulphuric Acid and shaked well. Chloroform layer showing red colour and Acid layer showing Greenish Yellow Fluorescence gives positive results.

(K) Test for Cardiac Glycosides:

Keller-Killani test:2ml of the sample was mixed with Glacial acetic acid,1drop of 5% Ferric Chloride and Conc. sulphuric acid. Reddish brown colour at the junction of two liquids with upper bluish green layer gives positive results.

(L) Test for Anthraquinone glycosides:

Born Trager's test: 3ml of sample is mixed with Dilute sulphuric acid. Boil and filter the mixture. To cold filtrate add equal volume of chloroform of benzene, shake well, separate the organic solvent and add ammonia. Pinkish red colour gives positive results.

(M) Test for Saponins:

Foam Test:3ml of sample is mixed with equal amount of distilled water and shake well. Persistent foam indicates positive results.

(N) Test for Tannins:

2-3 ml of sample is mixed with 2-3ml of Ferric Chloride solution. Deep blue -black colour indicates positive results.

(O) Test for Flavonoids:

Small quantity of drug or extract is mixed with lead acetate solution. Yellow coloured precipitate indicates positive results.

Microbial Limit Test: Conducted as per the Ayurvedic Pharmacopoeia of India

Physicochemical Analysis

(A) Specific Gravity: Fill the pycnometer with distilled water at a specified temperature (usually 20°C or 25°C). Weigh the filled pycnometer using the balance and record the weight. This gives the weight of the pycnometer with water. Empty, dry, and weigh the empty pycnometer. Fill the pycnometer with the test liquid at the same temperature. Weigh the filled pycnometer and record the weight. Weight of Liquid/Weight of water gives the specific gravity.

(B) pH: Rinse pH electrode with distilled water. Immerse electrode in standard buffer solution (e.g., pH 7). Adjust meter to display correct value for buffer. Repeat calibration with other buffer solutions if necessary. Rinse electrode with distilled water. Immerse electrode in the sample solution. Wait for reading to stabilize and record pH value.

(C) Total Solids: This involves measuring combined amount of dissolved & suspended solids in liquid sample. Filter sample through pre-weighed filter. Measure residue on filter (Suspended Solids). Evaporated filtrate residue (Dissolved Solids). Total Solids = Suspended Solids + Dissolved Solids.

Traditional Usages

Shashasruthi has been traditionally used in various Ayurvedic formulations for its diverse medicinal benefits. It is often associated with the following therapeutic applications: **Wound Healing:** Paste made from its leaves is applied to cuts and abrasions to accelerate healing. **Digestive Disorders:** Decoctions of the plant are used to alleviate symptoms of indigestion and flatulence. **Respiratory Ailments:** Known for its expectorant properties, *Shashasruthi* is used in treating conditions like asthma and bronchitis. **Skin Disorders:** Its anti-inflammatory and antimicrobial properties make it effective in treating eczema and other skin conditions. **Stress and Anxiety:** Ayurvedic practitioners utilize it in formulations aimed at reducing stress and improving mental clarity.

Pharmacological Properties:

Modern studies have begun to validate the traditional claims of Shashasruthi's therapeutic properties. Some of its notable pharmacological attributes include: **Anti-inflammatory activity[4]** Hussain *et al.* have described in detail about the anti-inflammatory activity of Emelia sonchifolia. **Antimicrobial activity:[5-11]** Researchers elaborately mentioned about antimicrobial activity in their publication. **Antioxidant activity:[12-17]** Scholars in their publication have mentions *Shashasruthi's* Antioxidant activities.

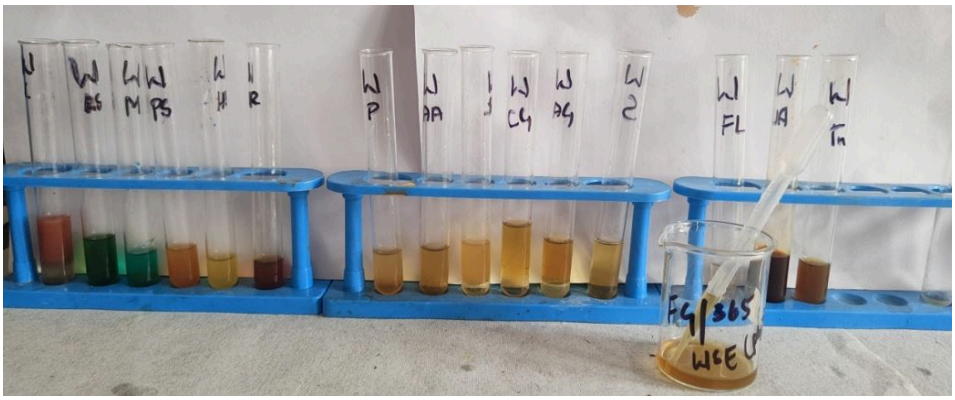

Figure 3: Phytochemical Analysis of *Swarasa*

Observations and Results

Table 1: Phytochemical Analysis

SN	Tests	Results
1.	Test for Carbohydrates	Positive
2.	Test for Reducing Sugar	Positive
3.	Test for Monosaccharides	Positive
4.	Test for Pentose Sugar	Negative
5.	Test for Non-Reducing Sugar	Positive
6.	Test for Hexose Sugar	Negative
7.	Test for Proteins	Positive
8.	Test for Amino Acids	Positive
9.	Test for Steroids	Negative
10.	Test for Flavonoids	Positive
11.	Test for Alkaloids	Positive
12.	Test for Tannins	Positive
13.	Test for Glycosides	
	A. Cardiac Glycosides	Negative
	B. Anthraquinone Glycosides	Negative
	C. Saponin Glycosides	Positive

Microbial Limit Test

Table 2: Test for specific micro-organisms (Qualitative)

Micro-organism	Limits (As per IP)	Results
E-Coli	Absent/100mL	Absent
S aureus	Absent/100mL	Absent
P aeruginosa	Absent/100mL	Absent
S abony	Absent/100mL	Absent

*IP-Indian Pharmacopoeia

Table 3: Microbial Limit Test (Quantitative)

Micro-organism	LIMITS (As per IP)	RESULTS
Total Bacterial Count	30-300cfu/mL	10cfu/mL
Total Fungal Count	10-100cfu/mL	5cfu/mL

Table 4: Physicochemical Standards

SN	Tests	Results
1.	Specific Gravity	1.007
2.	pH	4.68
3.	Total Solids	2.279%

Discussion

The exploration of *Shashasruthi* (*Emilia sonchifolia*) reveals its profound significance in both traditional Ayurvedic medicine and modern pharmacological research. This herb, celebrated for its wide-ranging therapeutic applications, bridges ancient practices and contemporary science. The discussion highlights its traditional uses, phytochemical properties, pharmacological activities, and relevance to integrative medicine.

Traditional Relevance in *Ayurveda*: In *Ayurvedic* texts, *Shashasruthi* is categorized as versatile medicinal herb, offering therapeutic benefits for conditions ranging from fever & respiratory disorders to skin diseases & eye ailments. Its cooling (*Sheeta Virya*) & light (*Laghu*) properties are particularly emphasized in managing inflammatory & febrile conditions. Herb is often used in decoctions, pastes, or powders, aligning with holistic approaches to disease management in *Ayurveda*. This demonstrates herb's adaptability to various formulations & health concerns, which is central to its traditional significance.

Phytochemical basis: The identification of flavonoids, phenolics, alkaloids, and terpenoids in *Emilia sonchifolia* underscores its pharmacological potential.

Flavonoids: They are hydroxylated phenolic substances and are known to be synthesized by plants in response to microbial infection.**[18]** Functional hydroxyl groups in flavonoids mediate their antioxidant effects by scavenging free radicals and/or by chelating metal ions.**[19]**

Alkaloids: Alkaloids, found in many plants, can contribute to wound healing bypromoting collagen and fibroblast production, accelerating wound contraction, and reducing inflammation.They also play a role in tissue granulation, protein synthesis, neo-vascularization, and epithelization.Specific alkaloids, like taspine, have been shown to stimulate fibroblast chemotaxis, further aiding in the early stages of wound healing.

Tannins: It is believed that tannins can promote wound healing through several mechanisms: 1) scavenging of free radicals and reactive oxygen species (ROS), 2) promoting wound contraction, and 3) increasing formation of capillary vessels and proliferation of fibroblasts.

Amino acids: Collagen is a structural protein in the human body and is the primary component of the connective tissue that rebuilds the wound. Collagen comprises of approximately 90% nonessential amino acids. During wound healing process, the body needs an increased supply of these amino acids for faster collagen formation. The body also needs essential amino acids to decrease the number of inflammatory cells during wound healing process and to help in faster formation of collagen fibers.

Test for micro-organisms: Microbial and fungal contamination not only affects the chemical composition but also decreases the therapeutic potency of herbal drugs. Microbial contamination of herbal drugs is a major impediment that prevents India from becoming an herbal giant. Therefore, fungal contamination of drugs, especially raw materials, should be prevented during the manufacture of thesepreparations. Above microbial count satisfies the microbiological quality of given samples and defined the least probability of contamination during processing.

Physicochemical basis:

Specific gravity helps verify that the extract concentration is within acceptable limits. Abnormal specific gravity values can indicate contamination, dilution, or substitution with other materials. Specific gravity of 1.007 suggests a substance that is very close in density to water, with minor contributions from solutes, impurities, or other factors.

Ph of 4.68 suggests the presence of natural organic acids. Acidity at this level can help inhibit the growth of certain harmful microorganisms, improving the stability and shelf life of the Swarasa. This pH is typical for herbal juices rich in secondary metabolites like tannins, flavonoids, and phenolic compounds. A pH of 4.68 is generally well-tolerated by the human body, as it is close to the pH of some bodily fluids and natural acidic foods.

Total solids typically refer to the concentration of dissolved and suspended particles, including organic compounds like water-soluble nutrients, minerals, and active plant metabolites that contribute to the therapeutic properties of the preparation. The TS content in swarasa generally falls within a range of **2–10%.** Here with 2.279% suggests that it is freshly prepared without significant evaporation or concentration.

Contemporary Relevance: The integration of *Shashasruthi* into modern medicine is a growing trend, with its inclusion in formulations like ointments for wounds, creams for haemorrhoids, and decoctions for respiratory ailments. The herb's antioxidant, anti-inflammatory, and antimicrobial properties make it a strong candidate for integrative healthcare approaches. However, challenges such as standardization of bioactive compounds, sustainable cultivation, and clinical validation must be addressed to maximize its therapeutic potential.

Conclusion

The review underscores Shashasruthi's therapeutic potential as a versatile medicinal plant in Ayurveda and its growing relevance in contemporary medicine. Bridging traditional knowledge with scientific validation can unlock its full potential, fostering its application in various healthcare domains. On the whole the samples are having microbial count under the limits and are microbiological quality assured. The microbial limit confirmatory test for pathogens confirmed the absence of any of the pathogens in thetestsamples. Future research should focus on exploring its molecular mechanisms, conducting clinical studies, and developing standardized formulations for wider use.

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