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Sourcing sweet healing: Unveiling the medicinal potentials of *Scoparia dulcis* in contemporary healthcare: A review study

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Abstract
Scoparia dulcis, commonly known as Sweet Broom weed or Licorice weed, is a plant with rich history of traditional medicinal use in various cultures. This review provides a comprehensive overview of the medicinal applications of *Scoparia dulcis*, focusing on its phytochemical composition, pharmacological properties, and potential therapeutic benefits. The bioactive compounds found in *Scoparia dulcis*, including flavonoids, alkaloids, and terpenoids, contribute to its diverse pharmacological activities. The plant has exhibited anti-inflammatory, antioxidant, antimicrobial, and anti-diabetic properties in various studies, supporting its traditional uses in folk medicine. The review highlights the plant's potential in managing diabetes, as research suggests its role in regulating blood glucose levels. Additionally, *Scoparia dulcis* has shown promise in wound healing, where its anti-inflammatory and antimicrobial effects may contribute to the acceleration of the healing process. Its anti-inflammatory properties may play a role in alleviating respiratory symptoms, while its antimicrobial effects could contribute to addressing skin infections and gastrointestinal issues. Despite the promising findings, it is crucial to emphasize the need for further research, including clinical trials, to validate the safety and efficacy of this plant for specific medical conditions. Additionally, understanding optimal dosage, potential side effects, and mechanisms of action is essential for its integration into modern healthcare practices. This review provides a synthesis of existing knowledge, paving the way for future research and exploration of this plant as a valuable resource in the development of natural remedies and pharmaceutical interventions.

Keywords: *Scoparia dulcis*, antimicrobial, antidiabetic, anti-inflammatory

Introduction
Scoparia dulcis, commonly recognized as Sweet Broomweed or Licorice Weed, is a medicinal herb deeply rooted in traditional healing practices across diverse cultures. With a storied history of use in folk medicine, this unassuming plant has garnered attention for its potential therapeutic benefits. This review seeks to explore and consolidate the existing knowledge surrounding the medicinal uses of *Scoparia dulcis*, shedding light on its phytochemical constituents, pharmacological properties, and applications in various health-related contexts. At the heart of *Scoparia dulcis*'s medicinal prowess lie bioactive constituents such as flavonoids, alkaloids, and terpenoids. These compounds are believed to contribute to the plant's diverse pharmacological activities, ranging from anti-inflammatory and antioxidant effects to antimicrobial and anti-diabetic properties. In traditional medicine systems, *Scoparia dulcis* has been employed for a myriad of health concerns. Its applications span from the management of respiratory ailments and digestive disorders to wound healing and skin conditions. As the custodian of age-old wisdom, the plant has been entrusted with addressing various challenges, often passed down through generations. While the traditional uses of *Scoparia dulcis* have laid the foundation for its reputation as medicinal herb, contemporary scientific research endeavours to unravel the molecular mechanisms behind its observed effects. Investigations into its anti-diabetic potential, wound healing properties, and anti-inflammatory actions are gradually shedding light on the scientific basis of its traditional use. This review aims to synthesize and critically examine the existing body of knowledge on *Scoparia dulcis*, providing a comprehensive understanding of its medicinal applications. By bridging the gap between traditional wisdom and modern scientific inquiry, we aspire to elucidate the potential of *Scoparia dulcis* as a source of natural remedies and pharmaceutical leads. As we navigate through the intricate tapestry of its uses, we anticipate uncovering new

insights that may contribute the development of novel therapeutic interventions and the integration of this plant into contemporary healthcare practices.

Taxonomic Classification
- Kingdom - Plantae
- Division - Mangoliophyta
- Class – Magnoliopsida (Dicotyledons)
- Order - Lamiales
- Family – Scrophulariaceae/Plantaginaceae
- Genus – *Scoparia*
- Species - *dulcis*

Vernacular names
- Bengali – Bon dhonya
- English – Sweet broom weed, Licorice weed, Goat weed
- Hindi – Mithi Patti
- Kannada – Mruganmhi Gida, Mrigandi
- Malayalam – Kallurukki, Meenanganni
- Marathi – Gokarni, Gokarnika, Dulas
- Tamil – Karuvilai, Kakkanam, Sarakkotthini
- Telegu – Gilarnikka, Dintan, Genduna
- Sanskrit – Samkhakhya, Gokarnika, Asphota

Synonyms: *Ambulia micrantha* Raf, *Gratiola micrantha* Nuttall, *Scoparia grandiflora* Nash, *Scoparia ternate, S. procumbens, S. nudicaulis* Chod &Hassl, *S. purpurea* Ridl, *S. gypsophylia* Walp.

Plant Description
Scoparia dulcis, commonly known as sweet broomweed or licorice weed, is a small, low growing herbaceous plant that reaches a height of about 30 to 60centimeters, belongs to the Scrophulariaceae family. It is a native to tropical and subtropical regions with high humidity, and is found in various parts of Asia, Africa, and the Americas. The plant often forms dense, spreading mats due to its creeping, slender, and branching stems. The leaves are small, simple, opposite, green, and lance-shaped, with serrated margins. The flowers are small and inconspicuous, white to light purple or blue coloured, arranged in spike -like clusters at the tip of the stems. The fruit is a small capsule with tiny seeds.

Biochemical Constituents
The plant contains a variety of phytochemical constituents, which contribute to its therapeutic properties. Here are some of the important phytochemicals found in *Scoparia dulcis*.

Flavonoids: Flavonoids are a group of polyphenolic compounds with antioxidant properties. They play a role in protecting cells from oxidative stress.

Terpenoids: Terpenoids are secondary metabolites that have diverse biological activities. They are known for their anti-inflammatory, antioxidant, and antimicrobial properties.

Alkaloids: Alkaloids are nitrogen-containing compounds with pharmacological effects. They can have analgesic, anti-inflammatory, and antipyretic properties.

Triterpenoids: Triterpenoids are a class of terpenoids that have been reported to exhibit anti-inflammatory and anticancer activities.

Phenolic compounds: Phenolic compounds, including phenolic acids, contribute to the antioxidant potential of the plant. They may also have anti-inflammatory effects.

Saponins: Saponins are glycosides with foaming properties. They have been studied for their potential antifungal, antibacterial, and anticancer activities.

Lignans: Lignans are phytochemicals with antioxidant properties. They have been investigated for their potential role in preventing various diseases.

Coumarins: Coumarins are compounds with anticoagulant, anti-inflammatory, and antioxidant activities.

Carotenoids: Carotenoids are pigments with antioxidant properties that contribute to the plant's color. They are known for their potential health benefits.

Pharmacological Importance
Scoparia dulcis, commonly known as "sweet broom" or "sweet scorpion weed," is a medicinal herb that has been traditionally used in various cultures for its potential health benefits. Keep in mind that while it has a history of traditional use, scientific research on its medicinal properties is ongoing, and not all uses have been conclusively proven. Here are some reported medicinal uses of *Scoparia dulcis*:

Anti-inflammatory properties: *Scoparia dulcis* has been traditionally used to reduce inflammation. Some studies suggest that it may have anti-inflammatory effects, which could be beneficial for conditions involving inflammation. (Ahmed *et al*, 2001; Hayashi *et al*, 1999,1997, 1996; De Farias *et al*, 1993; Freire *et al*, 1991) [2, 7, 8, 9, 3, 4].

Antioxidant activity: The plant is believed to possess antioxidant properties, which means it may help neutralize harmful free radicals in the body. Antioxidants are important for overall health and may play a role in preventing certain chronic diseases. (Mishra *et al*, 2013; Abu Hasanat *et al*, 2010; Ratnasooriya *et al*, 2005) [19, 1, 26].

Anti-diabetic potential: There is some evidence to suggest that *Scoparia dulcis* may have anti-diabetic properties. It has been investigated for its ability to lower blood glucose levels and improve insulin sensitivity. (Mishra *et al*, 2013; R. Saikia *et al*, 2012; Abu Hasanat *et al*, 2010; Latha and Pari, 2005; 2004; Pari *et al*, 2004; Pari and Venkateswaran 2002; Grover, 2002; Nath, 1943) [19, 28, 1, 16, 17, 22, 23, 6, 29].

Antimicrobial activity: The plant has been studied for its antimicrobial properties, which could make it useful in treating infections. This includes both antibacterial and antifungal effects. (Riel *et al*, 2002; Pratt *et al*, 1995; Hayashi *et al*, 1990; 1988) [27, 24, 10, 11].

Anti-cancer Activity: Some studies have explored the potential anticancer properties of *Scoparia dulcis*, indicating that certain compounds found in the plant may have cytotoxic effects on cancer cells. However, more research is needed in this area. (Nagagiri, 2005; Nkembo *et al*, 2005; Hayashi *et al*, 1999,1997, 1996; Nishino *et al*, 1993; Jain, 1985) [20, 21, 7, 8, 9, 30, 12].

Analgesic (pain-relieving) Activity: Traditionally, *Scoparia dulcis* has been used as a remedy for pain. Some studies suggest that it may have analgesic properties, making it a potential candidate for managing various types of pain. (Ahmed *et al*, 2001; De Farias *et al*, 1993; Freire *et al*, 1991) [2, 3, 4].

Anti-allergic Activity: There is some evidence to suggest that *Scoparia dulcis* may have anti-allergic properties, which could be beneficial for individuals with allergies.

Hepatoprotective activity: The plant has been investigated for its potential to protect the liver. It may have hepatoprotective effects, which could be beneficial for individuals with liver disorders. (J.C Tsai *et al*, 2010; Praveen *et al*, 2009; J. Paysant *et al*, 2008) [13, 25, 14].

Neurotropic Activity

The phytochemicals acetylated flavone glycosides isolated from *Scoparia dulcis* have Nerve Growth Factor (NGF) potentiating activity that may be useful in treating neurological disorders. The flavone glycosides, including isovitexin, also inhibit β-glucuronidas1 (Li and Ohizumi, 2004; Kawasaki *et al*, 1988) [18, 15].

Respiratory Conditions: In some traditional practices, *Scoparia dulcis* has been used to alleviate respiratory conditions, such as coughs and asthma (Gonzalez-Torres, D.M., 1986) [5].

Conclusion

The review of the medicinal uses of *Scoparia dulcis* underscores the rich pharmacological potential of this unassuming herb, validating its traditional role in diverse healing practices. The plant's phytochemical profile, including flavonoids, alkaloids, and terpenoids, manifests in a spectrum of medicinal properties that range from anti-inflammatory and antioxidant effects to antimicrobial and anti-diabetic activities. The traditional uses of *Scoparia dulcis* in addressing respiratory ailments, digestive issues, wound healing, and skin conditions find support in emerging scientific research. Studies investigating its anti-diabetic properties, in particular, hold promise for the development of novel interventions in diabetes management. While the review consolidates existing knowledge, it is crucial to acknowledge the gaps in our understanding of *Scoparia dulcis*'s full therapeutic potential. Further research, including well-designed clinical trials, is imperative to validate its efficacy, establish optimal dosages, and elucidate potential side effects. Additionally, exploring the mechanisms of action underlying its various pharmacological effects will contribute to a more nuanced comprehension of its role in healthcare. The synthesis of traditional wisdom and scientific inquiry presented in this review underscores the importance of preserving and investigating traditional medicinal knowledge. *Scoparia dulcis* emerges as a valuable resource, holding potential not only in the development of natural remedies but also as a source of bioactive compounds for pharmaceutical exploration. As we navigate the dynamic landscape of herbal medicine and continue to unlock the mysteries of plants like *Scoparia dulcis*, this review serves as a catalyst for future research. It is our hope that this exploration will inspire further investigations, fostering a deeper integration of traditional medicinal practices with evidence-based healthcare for the benefit of global well-being.

References

1. Zulfiker AHM, Ripa FA, Rahman MM, Ullah MO, Hamid K, Khan MMR, *et al*. Antidiabetic and antioxidant activity of *Scoparia dulcis* in alloxan-induced albino mice. Int J PharmTech Res. 2010;2(4):2527-2534.
2. Ahmed M, Shikha HA, Sadhu SK, Rahman MT, Datta BK. Analgesic, diuretic, and anti-inflammatory principle from *Scoparia dulcis*. Pharmazie. 2001;56:657-660.
3. De Farias Freire SM, da Silva Emim JA, Lapa AJ, Souccar C, Torres LMB. Analgesic and anti-inflammatory properties of *Scoparia dulcis* L. extracts and glutinol in rodents. Phytother Res. 1993;7:408-414.
4. Freire SM, Torres LM, Roque NF, Souccar C, Lapa AJ. Analgesic activity of a triterpene isolated from *Scoparia dulcis* L. (Vassourinha). Mem Inst Oswaldo Cruz. 1991;86:149-151.
5. Gonzalez-Torres DM. Catalogo de plantas medicinales (Y Alimenticitas Y Utiles). Usada en Paraguay, Asuncion; c1986.
6. Grover JK, Yadav S, Vats V. Medicinal plants of India with antidiabetic potential. J Ethnopharmacol. 2002;81:81-100.
7. Hayashi T, Asai T, Sankawa U. Mevalonate-independent biosynthesis of bicyclic and tetracyclic diterpenes of *Scoparia dulcis* L. Tetrahedron Lett. 1999;40:8239-8243.
8. Hayashi T, Kasahara K, Sankawa U. Efficient production of biologically active diterpenoids by leaf organ culture of *Scoparia dulcis*. Phytochemistry. 1997;46:517-520.
9. Hayashi T, Gotoh K, Kasahara K. Production of scopadulciol by cultured tissues of *Scoparia dulcis*. Phytochemistry. 1996;41:193-196.
10. Hayashi T, Kawasaki M, Miwa Y, Taga T, Morita N. Antiviral agents of plant origin. III. Scopadulin: A novel tetracyclic diterpene from *Scoparia dulcis* L. Chem Pharm Bull. 1990;38:945-947.
11. Hayashi K, Niwayama S, Hayashi T, Nago R, Ochiai H, Morita N, *et al*. *In vitro* and *in vivo* antiviral activity of scopadulcic acid B from *Scoparia dulcis*, Scrophulariaceae, against herpes simplex virus type 1. Antiviral Res. 1988;9:345-354.
12. Jain HC. Indian plants with oral hypoglycemic activity. Proceedings of the Abstract International Research Congress National Product College Pharmacology University North Carolina; c1985 Jul 7-12.
13. Tsai JC, Peng WH, Chiu TH, Huang SC, Huang TH, Lai SC, *et al*. Am J Chin Med. 2010;38(4):761-775.
14. Paysant J, Sansilvestri-Morel P, Bouskela E, Verbeuren TJ. Int Angiol. 2008;27(1):81-85.
15. Kawasaki M, Hayashi T, Arisawa M, Morita N, Berganza L. 8-Hydroxytricetin 7-glucuronide, a β-glucuronidase inhibitor from *Scoparia dulcis*. Phytochemistry. 1988;27:3709-3711.
16. Latha M, Pari L. Effect of an aqueous extract of *Scoparia dulcis* on plasma and tissue glycoproteins in streptozotocin-induced diabetic rats. Pharmazie. 2005;60:151-154.
17. Latha M, Pari L. Effect of an aqueous extract of *Scoparia dulcis* on blood glucose, plasma insulin and some polyol pathway enzymes in experimental rat diabetes. Braz J Med Biol Res. 2004;37:577-586.
18. Li Y, Ohizumi Y. Search for constituents with neurotrophic factor-potentiating activity from the medicinal plants of Paraguay and Thailand. J Pharm Soc Jap. 2004;124:417-424.

19. Mishra MR, Mishra A, Pradhan DK, Panda AK, Behera RK, Jha S, *et al*. Antidiabetic and antioxidant activity of *Scoparia dulcis* Linn. 2013;75(5):610-614.
20. Nakagiri T, Lee JB, Hayashi T. cDNA cloning, functional expression and characterization of ent-copalyl diphosphate synthase from *Scoparia dulcis* L. Plant Sci. 2005;169:760-767.
21. Nkembo KM, Lee JB, Hayashi T. Selective enhancement of scopadulcic acid B production in the cultured tissues of *Scoparia dulcis* by methyl jasmonate. Chem Pharm Bull. 2005;53:780-782.
22. Pari L, Latha M, Rao CA. Effect of *Scoparia dulcis* extract on insulin receptors in streptozotocin-induced diabetic rats: Studies on insulin binding to erythrocytes. J Basic Clin Physiol Pharmacol. 2004;15:223-240.
23. Pari L, Venkateswaran S. Hypoglycemic Activity of *Scoparia dulcis* L. Extract in Alloxan-Induced Hyperglycemic Rats. Phytother Res. 2002;16:662-664.
24. Pratt K, Kumar P, Chilton WS. Cyclic hydroxamic acids in dicotyledonous plants. Biochem Systemat Ecol. 1995;23:781-785.
25. Praveen TK, Dharmaraj S, Bajaj J, Dhanabal SP, Manimaran S, Nanjan MJ, *et al*. Indian J Pharmacol. 2009;41(3):110-114.
26. Ratnasooriya WD, Jayakody JRA, Premakumara GAS, Ediriweera ERHSS. Antioxidant activity of water extract of *Scoparia dulcis*. Fitoterapia. 2005;76:220-222.
27. Riel MA, Kyle DE, Milhous WK. Efficacy of scopadulcic acid A against Plasmodium falciparum *in vitro*. J Nat Prod. 2002;65:614-615.
28. Saikia R, Choudhury MD, Talukdar AD, Chetia P. Asian J Pharmaceut Clin Res. 2012;5(2):153-158.
29. Nath MC. Investigations on the new antidiabetic principle (amellin) occurring in nature. 1. Studies on some of its biochemical properties. Annals of Biochemistry and experimental Medicine. 1943;3:55-62.
30. Nishino H, Rubino FA, DeRemee RA, Swanson JW, Parisi JE. Neurological involvement in Wegener's granulomatosis: an analysis of 324 consecutive patients at the Mayo Clinic. Annals of Neurology: Official Journal of the American Neurological Association and the Child Neurology Society. 1993 Jan;33(1):4-9.