IJPPR
INTERNATIONAL JOURNAL OF PHARMACY & PHARMACEUTICAL RESEARCH
An official Publication of Human Journals
ISSN 2349-7203
HUMAN

Human Journals
Review Article
October 2020 Vol.:19, Issue:3

A Review on *Scoparia dulcis Linn*

IJPPR
INTERNATIONAL JOURNAL OF PHARMACY & PHARMACEUTICAL RESEARCH
An official Publication of Human Journals
ISSN 2349-7203
HUMAN

Aysha Reem T P*, R V Celestin Baboo, Shijikumar P S, Sirajudheen M K, Sherin A

[1]*Department Of Pharmacognosy, Jamia Salafiya Salafiya Pharmacy College, Malappuram, India-673637*
[2]*Department Of Pharmaceutical Analysis, Jamia Salafiya Salafiya Pharmacy College, Malappuram, India-673637*

[3]*Department Of Pharmaceutics, Jamia Salafiya Pharmacy College, Malappuram, India-673637*
[4]*Department Of Pharmaceutical Chemistry, Jamia Salafiya Pharmacy College, place, India-673637*

Submission: 24 September 2020
Accepted: 30 September 2020
Published: 30 October 2020

Keywords: *Scoparia dulcis*, Scrophulariaceae, anaemia

ABSTRACT

Scoparia dulcis is an annual erect herb distributed throughout tropical and sub-tropical regions of India, America, Brazil. The whole plant is used for ailments like diarrhoea, stomach ache, kidney stone and fever. *Scoparia dulcis* have been paid great attention because they are cheap, have little side effects and according to WHO still about 80% of population rely mainly on plant based drugs. The objective of present investigation is to study the antioxidant power of different extracts of *Scoparia dulcis* belongs to family Scrophulariaceae and have speculated medicinal properties. The antioxidant potent may be attributed to presence of polyphenolic compound. The present review describes morphological, phytochemical and pharmacological aspects of *Scoparia dulcis*. It was concluded that *Scoparia dulcis* therapy may be useful in management of anaemia and possibly other forms.

HUMAN JOURNALS
www.ijppr.humanjournals.com

INTRODUCTION

Scoparia dulcis Linn (Scrophulariaceae) is an important ethnomedicinal plant, commonly known as sweet broom herb, a perennial herb, widely distributed in the tropical and subtropical regions of India, America, Brazil, the West Indies and Myanmar [1,2]. India being a tropical country is endowed with the best natural resources and ancient knowledge for its judicious use. However, in order to make these remedies acceptable for modern medicine, it is necessary to evaluate them scientifically to identify the active ingredients and understand the pharmacological action. Humanity first used materials found in the environment on an empirical basis to cure various diseases. Natural plant and animal products have traditionally provided the pharmaceutical industry with one of its important sources of lead compounds in the search for new drugs and medicines. The search for new pharmacologically active agents from natural resources such as plants, animals and microbes has led to the discovery of many clinically useful drugs.

Description of the plant:

Botanical name: *Scoparia dulcis Linn*. Family: Scrophulariaceae

Common name: Sweet Broom Weed, Sweet Broom Wort Hindi: Mithipatti, Ghodatulsi

Tamil: Sarakkotthini Bengali: Bon-dhonya Malayalam: Kallurukki

Parts used: whole plant, leaves, barks, roots

Botanical Description

Sweet Broom Weed is a branched herb with wiry stems, growing up to 1 m tall. Leaves 3-notely whorled, obovate-oblong to oblanceolate, 1.4 - 3.5 × 0.8 -1.5 cm, tapering to base, subacute at apexes, coarsely crenate-serrate from above base, glabrous on both surfaces. Small white, hairy flowers occur in leaf axils; petioles up to 9 mm long. Pedicels 5-7 mm long, glabrous. Calyx lobes divided to base, oval-oblong, 2.5-3 × l mm, 3- nerved, glabrous within and without, ciliate at margins. The stamens are greenish and the ovary is green. Roots are profusely branched. Flowers small, white, in small 2-4 or 5 flowered inflorescence; corolla white; limb 7-8 mm across; lobes spathulate, 3-3.5 × 2 mm, reflexed with age; seeds minute.[3]

Distribution

Distributed throughout the tropical and sub-tropical region of the world and is found in abundance in South America and the Amazon rain forest and is known as Vassourinha in India.[4]

Therapeutic Uses

Traditionally the fresh or dried plant has been used as a remedy for treating diseases such as; stomach ailments, kidney stones, hypertension, diabetes, inflammation, bronchitis, hemorrhoids, analgesic, antipyretic and urinary disorders. Plant is also used for upper respiratory bacterial and viral infections, to relieve from all types of pain, to tone balance, strengthen heart function, Synonyms are S*coparia grandiflora*, S*coparia ternata*, C*apraria dulcis*, G*ratiola micrantha*. *Scoparia dulcis* L. is traditionally used as a remedy for diabetes mellitus in India and hypertension in Taiwan. It is used to treat illnesses such as fever, diarrhea, ulcer, cancer, sores, rashes, coughs and tuberculosis. Usually, the extract is obtained by maceration in cold water of the whole powdered plant. The fresh or dried plant has been used to treat stomach upset, inflammation, bronchitis, hemorrhoids and hepatitis and as an analgesic and antipyretic. It is considered a panacea for all ills. In Gambia, a lotion prepared from the plant is used to treat fever. An infusion of warm water or a decoction of leaves or whole plant is used medicinally by the indigenous tribes of Nicaragua to treat malaria, gastric disorders, menstrual disorders, insect bites, fevers and heart problems, liver disorders and venereal diseases. It has been used for blood cleansing, childbirth and as a general tonic.

The traditional use of this plant as an aid to abortion or childbirth guarantees that it should not be taken during pregnancy. An extract from S. *dulcis* recently demonstrated hypoglycemic activity, significantly lowering blood sugar in rats. This implies that the plant is probably contraindicated in people suffering from hypoglycemia. However, the herb should not be combined with antidepressants or barbiturates, except under the supervision of a qualified healthcare practitioner, as the herb is associated with sympathomimetic effects (Leslie 2005). The preliminary phytochemical and pharmacognostic fingerprints of this potential medicinal plant grown in Nigeria for the preparation of a monograph and for quality control purposes are reported here for the first time.

Pharmacological Studies

Nephroprotective activity

Scoparia dulcis supplementation during cisplatin therapy reduces the risk of cisplatin-induced nephrotoxicity at a dose dependent curative regime. The prophylactic regime also had significant nephroprotection against cisplatin toxicity. The protective effect of *Scoparia dulcis* in curative and prophylactic treatments. The regimen may be due to the antioxidant property of *Scoparia dulcis.*

The results of this study suggest significant nephroprotection of *Scoparia dulcis* against cisplatin nephrotoxicity. Supplementation of ethanolic extract from *Scoparia dulcis* reduced elevated serum level creatinine, blood urea nitrogen levels and lipid peroxidation levels and improved creatinine clearance.[4,8]

Antimicrobial and antifungal activity

The antimicrobial and antifungal effects of ethanolic extracts of *Scoparia dulcis* and its cream-based formulation have been investigated against different bacteria like *Staphylococcus aureus* and *Escherichia coli* and fungal strains like *Candida albicans* and *Aspergillus niger*. Ethanolic extract and cream based on formulation showed significant antimicrobial activity against gram positive organism and antifungal activity against all organisms compared with their reference drugs (Gentamicin, Clotrimazole). Thus a stable dosage form of the herbal drug. *Scoparia dulcis* can be used against gram-positive and gram-positive, negative bacterial infections and fungi infections.[11,12] The presence of chemical constituents such as flavonoids, alkaloids, tannins, carbohydrates, glycosides can be responsible for antimicrobial activity.[13]

Analgesic, anti-inflammatory and antipyretic activities

The analgesic, anti-inflammatory and antipyretic activities of water and ethanol extracts from *Scoparia dulcis L.* were tested in mice. Results indicate that S.*dulcis* extract is endowed with analgesic effects probably related to the anti-inflammatory plant activity. These effects are mainly related to the presence glutinol and flavonoids, which exert their action in the early phase of the acute inflammatory process through the central and peripheral mechanism. [9,14]

Anti-Diabetic Activity

The antihyperglycemic effects of flavonoids from methanolic extract of aerial parts of *Scoparia dulcis* leaves in normal, streptozotocin-induced diabetic rats. The extract exhibited significant hypoglycemic activity when compared to standard antidiabetic agent Glibenclamide [2]. Hypoglycemia produced by the extract may be due to increased glucose uptake at the tissue level and / or increased pancreatic cell function or due to inhibition of intestinal glucose absorption. The huge phytochemical reservoir, mainly amelin and scopharic acid D *Scoparia dulcis* makes it a successful source of antidiabetic medicines [7]. Anti-hyperlipidemic effect. Administration of S. dulcis plant extract in normal animals resulted in a hypolipidemic effect. The effect was compared with glyburide (600 µg / kg body weight). The results showed that the S. *dulcis* plant extract showed antihyperlipidemic action in experimental diabetic rats, in addition to their antidiabetic effect. Oral administration of an aqueous extract of S. *dulcis* plant (200 mg/kg of body weight) to streptozotocin diabetic rats for 6 weeks a significant reduction in blood glucose, serum and tissue cholesterol, triglycerides, free fatty acids, phospholipids, 3-hydroxy-3-methylglutaryl (HMG)-CoA reductase activity and very low density lipoprotein and low density lipoprotein cholesterol levels. [15]

Sedative and Hypnotic Activity

The sedative and hypnotic activity of the ethanolic extract of all *Scoparia dulcis* plants were investigated using cross-holes, field thiopental-induced headache, bore plate, route rod and thiopental time determination tests in mice at doses of 50, 100 and 200 mg/kg. Diazepam at a dose of 1 mg/kg was used as a reference drug in all experiments. The ethanolic extract of whole plants *Scoparia dulcis* produced a significant dose-dependent inhibition of locomotor activity of mice in both cross-field and open-field tests. In addition, the performance of the rod route and the number of the head plunges into the orifice plate test. In addition, it significantly decreased induction time to sleep and prolonged sleep duration, induced by thiopental sodium. The study suggests that ethanolic.

Scoparia dulcis whole plant extract may possess sedative principles with potent hypnotic properties.

About the Plant:

SYNONYM: *Scoparia grandilfora, Scoparia ternata, Caparia dulcis, Gratiola micrantha*

REGIONAL NAMES: sweet broom (english), tapeicava, tapixaba and vassourinha in portugese, escobillo in spanish, tipycha kuratu in gurani. (23)

Botanical Information:

Rank: Scientific Name and Common Name Kingdom: Plantae – Plants

Subkingdom: Tracheobionta – Vascular plants Superdivision: Spermatophyta – Seed plants Division: Magnoliophyta – Flowering plants Class: Magnoliopsida – Dicotyledons Subclass: Asterid

Sweet broomweed is a perennial herb widely distributed in torroid zone. the original habitat of this plant is tropical America.

Erect annual or perennial herbs. Leaves decussate to whorled, 1-3 x 0.5-1.5 cm, obovate-oblong, base attenuate, margin crenate-serrate, apex acute, penninerved, punctate, chartaceous; petiole to 0.7 cm long. Flowers axillary, solitary or 2; pedicels slender 4-7 mm long. Calyx lobes 2-3 mm, ovate-oblong, ciliate along margin. Corolla white 4-6 mm long, rotate, throat densely hairy, lobes spathulate. Stamens 4, subequal, 3-4 mm long. Ovary globose, 2-celled; ovules many; stigma truncate. Capsules 1-2 mm across, globose. Seeds 4-angled, reticulate.

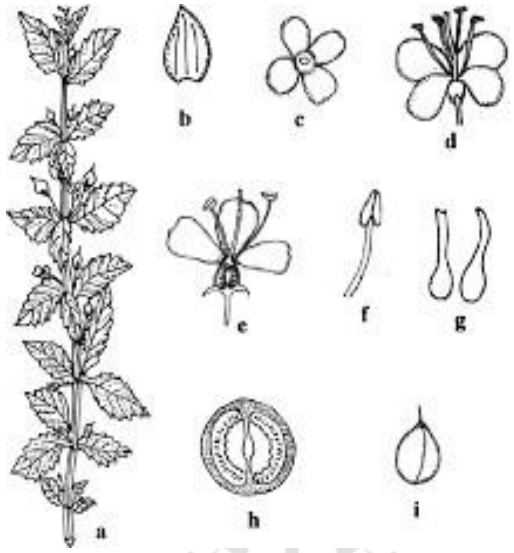
The annual average temperature of Bagerhat district ranges between a minimum of 12.5[degrees]C to a maximum of 33.5[degrees]C. Annual rainfall of Bagerhat, the one plant that was commonly used by Kavirajes of both regions was *Scoparia dulcis* (Family: Scrophulariaceae). It is commonly seen in India, Myanmar, Brazil, West Indies, America, Africa.

1. Morphological Studies

Hermaphrodite flowers, complete, usually axillary, 6-7 mm in diameter, 4 fid, rotate, regulate. Sepals 4-5, gamma lobes, regular, calyx oval, oblong lobes, 2.5-3.0 x 0.8-1.0 mm, 3 nerves, glabrous, ciliated at margin, persistent. Pale yellow to white corolla, corona present, thickly hairy throat tube, lobes 2-4 mm long, obtuse apex, slightly curvilinear, upper lobes

slightly larger than others. Stamens 4, exercised; filament inserted at the top of the corolla tube, glabrous; dorsifixed anthers. Upright style, 2 mm long; truncated stigma for 2 parts, sometimes notched. Flowering time: almost all year.

Scoparia dulcis L.; a. A habit sketch (×1); b. Sepal (×8); c. Petal (×4.5); d. A flower (×5); e. L. S. of flower (×5); f. Stamen (×6.5); g. Carpels (×8); h. T.S. of ovary (×50); i. Fruit (×6).



Leaves

The leaves are opposite or sliced in three. They are simple and sessile. The blade is oblanceolate, 2.5 to 5 cm long and 1.5 cm wide. The base is attenuated by the sharp corner, forming a pseudo-petiole. The top corner is wide. Both sides are smooth and full of shiny green glands. The margin is entire in the lower half of the leaf blade and notched in the upper half.

Inflorescence

The flowers are solitary or in pairs in the leaf armpits.

Flower

They are a bluish color. They are carried by a peduncle of 6 to 8 mm in length. The chalice consists of 5 sepals almost free from the base. They are elliptical, tapering at the top. They are finely hairy. The corolla consists of 4 petals, rarely 5, free almost to the base. They are oval, apiculate at the top. The entire chalice and corolla are 3 to 4 mm long. The four stamens

have anthers of 2 equal cells. The ovary is topped by a threadlike style that does not exceed the corolla.

Fruit

The fruit is a dehiscent, ovoid capsule topped by style. It is 4 mm long and contains numerous seeds. When mature, opens on two valves.

2. Microscopical Studies

Transverse section of leaf:

The leaf shows dorsiventral in nature. It has paracytic stomata on both surfaces and water pores at the apex of most of the marginal teeth. The trichomes are multicellular and glandular stalk. The glandular trichomes are an important feature which are branched and are closely located near the veins. It contains calcium oxalate and collenchymas. Starch grains are also present in the mesodermis. It also shows the presence of tannic acid and phenolic constituents which are stained in dark brown and pink colour. (24)

Transverse section of Stem

It contains the epidermis outer layer with closely arranged cells. These cells are covered with cuticle. It contains more stem unicellular hairs. The hypodermis also consists of more collenchymatous cells with thin walled. Cortex consists thin walled parenchymatous cells. Vascular bundles are arranged inside the ring in a pericycle. Each bundles consist of phloem on the outside and xylem on inside. Pith consists on central region of the stem. Medullary rays are also present between the vascular bundles. (24)

Transverse section of roots

Epiblema is found in the outer layer. Covered by the cuticle. It consists of thin walled rectangular parenchymatous cells. The pith is present at the centre of the Pericycle is arranged within the medullary rays and the medullary rays are radiated from the centre of the root TS to the outer covered epidermis. Vascular bundles and medullary rays are radially arranged. Endodermis is constituted by the inner cortical layers. (24)

1. Chemical Constituents

Scoparia dulcis is a rich source of flavones, terpenes and steroids, phenols, tannins, saponins, amino acids, coumarins and carbohydrates. The main chemicals include scopadulcic acids A and B, scopadiol, scopadulciol, scopadulin, scoparic acids A-C and betulinic acid. Other chemicals include acacetin, amyrin, apigenin, benzoxazin, benzoxazolin, benzoxazolinone, cirsimarin, cirsitakaoside, coixol, coumaric acid, cynaroside, daucosterol, dulcinol, dulcioic acid, gentisic acid, glutinol, hymenoxin, linarin, luteolin, mannitol, scoparinol, scutellarein, scutellarin, sitosterol, stigmasterol, taraxerol, vicenin, and vitexin.

a. Scoparic acid A, diterpene acid, found to be a potent beta-glucuronidase inhibitor.

b. Scoparic acid B, has antitumour activity against human cancer cells.

c. Scopadulcic acid A, compounds with antiviral, antifungal, and antitumor activity. The also shows activity against *Plasmodium falciparum* and is a potential target for antimalarial therapy.

d. Scopadulcic acid B, had been shown to promote antitumor activities and, activity against primary herpes simplex virus, (primary corneal herpes simplex virus infection). The compound has shown to inhibit both the K(+)dependent adenosine triphosphatase (ATPase) activity of a hog gastric proton pump (H+, K(+)-ATPase) with a value of 20-30 microM for IC50 and proton transport into gastric vesicles.

e. Scopadulciol or dulcinol, a tetracyclic diterpenoid, has been reported as an anti-viral agent, inhibitor of Herpes simplex, and an inhibitor of gastric H+, K+-ATPase. Experimental results in cancer gene therapy using the HSV-1 tk gene and ACV/GCV together with SDC was found to be effective in suppressing the growth of cancer cells in animals.

f. Hispidulin, which had been reported to possess bronchodilating and antiasthmatic effect more potent than aminophylline on a molar basis, antimutagenicity, hepatotoxicity antioxidant activity, positive allosteric properties, anticonvulsant activity, and antifungal activity. Hispidulin has also been found to inhibit the aggregation of human platelets by increasing cAMP levels.

g. Scopadiol, potassium adenosine triphosphatase (ATPase) activator.

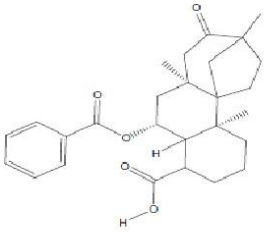
h. Betulinic acid is used for the prevention and treatment of cancer. It has antitumor, antileukemia, antiviral (including HIV) properties, and cytotoxic activity against malignant brain tumor and bone cancer possessed anti-inflammatory activities.

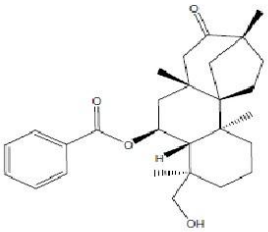
i. Glutinol, the triterpene shows analgesic and anti-inflammatory activity.

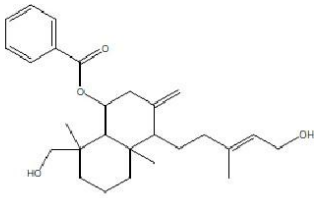
Phytochemistry

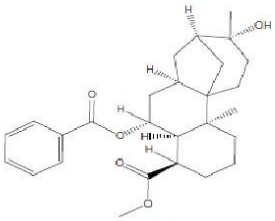
The available literature on S.*dulcis* phytochemical reports reveals that it mainly comprises terpenoids (24 compounds), flavonoids (20 compounds) and steroids (4 compounds) and some diverse compounds (14 compounds) [3,5]. In a previous study, on the antidiabetic effect of *Scoparia dulcis*, a glycoside, fresh plant ameline was obtained and reported that it brought relief for other complications accompanied by diabetes (eg, pyrorrhea, retinopathy, joint pain, susceptibility to cold etc.) within a very short period.

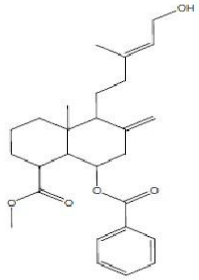
Several different principles include scoparic acid A, scoparic acid B, scopadulcic acid A and B, scopadulciol and scopadulin have been identified and these compounds have been shown to have various biological activities, as an inhibitor against herpes simplex virus replication, H +, K + gastric activator ATPase and antitumor promoting activity etc. Glutinol, an important triterpene obtained from ethanolic extract and flavonoids and scoparinol, a diterpene demonstrated significant analgesic and anti-inflammatory activity in animals. Two ethylene flavonoid glycosides Apigenin7-O-alpha-L-3-Oacetyl-ramopyranosil- (1 -> 6) - beta D glucopyranoside and apigenin 7-O-alpha-L-2, 3-di-O- acetylaminopyranosyl- (1 -> 6) glucopyranoside beta-D, isolated from *Scoparia dulcis*, showed a neuritis growth-mediating growth activity mediated by nerve growth factor in PC12D cells.

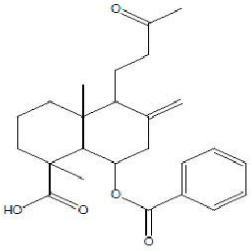

Scopadulcic Acid B

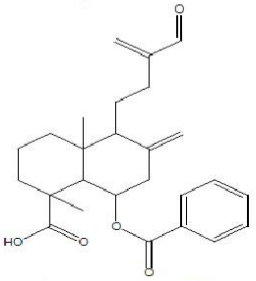

Scopadulciol

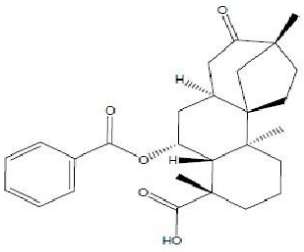

Scopadiol

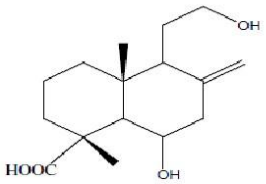

Scopadulin

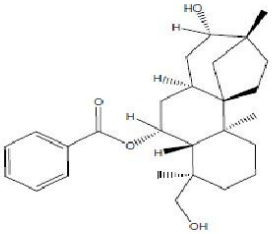

Scoparic Acid A

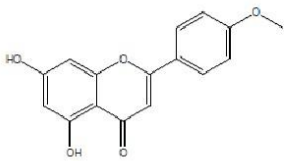

Scoparic Acid B

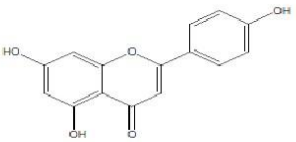

Scoparic Acid C


4-epi-scopadulcic Acid B


scoparic acid D


Dulcidiol


Acacetin


Apigenin

2. Common and Medicinal Uses

Medicinal Uses:

Originally from the American tropics, the broom spread like a weed through the tropics and was widely used as a medicinal herb wherever it goes. It has a wide variety of uses in tropical America, where it is used to treat conditions such as digestive problems, lung complaints, fevers and skin disorders. The plant is seen as an antibiotic, antibiotic, antidote, aphrodisiac, bitter, blood purifier, emetic, febrifugal, hepatic, hypoglycemic and stomach. Roots, leaves and tops are traditionally used in India, Indochina and Southeast Asia as an analgesic, diuretic and antipyretic, to treat gastric disorders such as diarrhea and dysentery, and also for coughs,

bronchitis, hypertension, hemorrhoids and insects. Research has shown that the plant contains several medically active compounds - the aerial parts contain about 4% of a viscous oil which, in addition to fatty acids such as stearic, myristic and linolenic acid, also contains a series of diterpenes. The aerial parts also produce components that contain nitrogen and flavonoids. Scopadulin, a diterpene of the aerial parts, showed mild antiviral activity. The antiviral activity of escopadulciol, a tetracyclic diterpenoid, has been found to inhibit virus replication, as shown by reduced virus production.

Scopadulcic acid B has been shown to have a tumor inhibitory action and has also been shown to inhibit replication of the herpes simplex virus type 1. The fresh stems and leaves contain a compound called ameline, considered by some to be an important therapeutic action in diabetes; however, others doubt it.

Oral administration of ameline relieves the symptoms of glycosuria, reduces hyperglycemia and increases the red blood cell count. It has also been found useful in anemia, albuminuria, ketonuria, retinitis and other complications associated with diabetes mellitus. Unlike insulin, ameline does not cause blood sugar levels to fall below normal, and the reduction in blood and urine sugar occurs gradually. % chlorhexidine gluconate for 6 weeks. There was a slight increase in gingival inflammation in people with gingivitis using the extract, but antiplaque activity was similar to that of 0.02% chlorhexidine.

The whole plant is used to treat a wide range of disorders including diabetes, herpes, cough and cold, fever, nausea, dizziness and antidote for snake bites and cassava poisoning. In low doses, usually in milk, it is used to relieve vomiting in babies, while in larger doses it is used to induce vomiting to cleanse the digestive system. The decoction of the plant is consumed as a treatment for fever and gonorrhea senders and also to induce labor. A cold decoction of the plant is taken as a remedy for gravel and kidney complaints. Fresh or dried plants are used externally to treat a wide range of skin problems, including pimples, impetigo, ulcers, eczema, bruises and contusion. An infusion of the herb is used as a mouthwash for infected gums. The leaves are chewed to treat cough; they taste bitter and then sweet (like licorice). They were previously used to treat diabetes. The leaves are macerated in warm water and drunk abundantly when cooled to treat feverish headaches. (23)

Common Uses:

Agroforestry Uses:

The plant is sometimes used as a sand binder.

Other Uses:

The bushy stems are much used to make temporary brooms for sweeping floors, and there is a belief that they destroy fleas. The fresh or dried plants are said to kill fleas, lice and intestinal worms. (23) Present research justifies the use of the plant in the folklore diabetic treatments. (25)

1. Chemical Study

Phytochemical Screening

Phytochemical analysis intends to serve as a major resource for information on analytical and instrumental methodology in plant science as was reported in "phytochemical analysis" (Houghton et al., 2004). In the present study, a phytochemical screening was carried out to detect the active constituents such as cellulose, starch, fixed oil, alkaloids, flavonoids, tannins, phenols, steroids, terpenoids and quinine. Phytochemical analysis intends to serve as a major resource for information on analytical and instrumental methodology in plant science as was reported in "phytochemical analysis".

Table 1: Organoleptic study of the sample of root and shoot

S.No.	Sample	Colour	Odour	Taste
1.	Root	Yellowish green	Pleasant	Bitter
2.	Shoot	Light green	Pleasant	Bitter

Table 2: Fluorescence analysis of the samples of root and shoot

	Samples	Treatment with chemical reagents	Under ordinary light	Under UV light (254 nm)
1.	Root	Powder with water	Dull white	White
	Shoot		Light green	Light green

3. Physical Study

Determination of Ash values

About 2 g accurately weighed powdered drug from the three samples were incinerated in a silica crucible at a temperature not exceeding 450oC for 4 hours in a muffle furnace until free from carbon. It was then cooled and weighed. The % w/w of ash with reference to the air-dried drug was calculated. The acid insoluble ash, water soluble ash and sulphated ash was done according to the standard procedure (Dr. C. K. Kokate, 1994). Average of the triplicate values were calculated.

Determination of extractive value

Accurately weighed 5 g of air-dried powdered drug was macerated with 100 ml of 90 % alcohol of the specified strength in a closed flask for 24 h, shaken frequently during first 6 h and allowed to stand for 18 h. It was then filtered rapidly, taking precautions against loss of the solvent and 25 ml of the filtrate were evaporated to dryness in a tared flat-bottomed shallow dish and dried at 100oC to constant weight. The % w/w of alcohol soluble extractive value was calculated with reference to the air-dried drug. The same procedure was repeated with different solvents like chloroform, petroleum ether, benzene and water according to the standard procedure (Dr. C. K. Kokate, 4th edition1994).

Determination of total fibre content

About 3 gm of the finely powdered crude drug leaf are weighed and extracted with petroleum ether at room temperature. Then the drug was dried from that 2 gm of drug was taken for the estimation. The drugs were separately boiled with 300 ml of dilute sulphuric acid for 30 minute. Filter the extract material through a muslin cloth and wash with boiling water. Then boil the material with 200 ml dilute sodium hydroxide for 30 minutes. Filter through muslin cloth and wash with boiled water 25 ml of alcohol successively. After washing the residue transfer to silica crucible, which was previously weighed (W1). Dry the residue for 2 to 3 hours for 130degree C and cool the crucible in the desiccators and weigh again (W2). Incinerate the residue for 30 minute at 100oC and cool it to room temperature in a desiccators and weigh again (W3). Then calculated by using the following formula: (W2-W1) - (W3-W1) / weight of sample x 100 (Kanderwal K.R 2005).

Preliminary phytochemical analysis

The extracts prepared with different solvents were taken and standard methods of chemical identification tests (Dr. C. K. Kokate, 1994) were used to detect the nature of phytoconstituents present in them.

Quantitative Estimation Total flavonoid content

The flavonoid content was determined by the use of a slightly modified colorimetric method described previously by (Zhishen et al. 1999). A 0.5 ml aliquot of appropriately (2mg/2ml) diluted sample solution was mixed with 2 ml of distilled water and subsequently with 0.15 ml of 5 % Sodium nitrite solution. After 6 min, 0.15 ml of 10 % Aluminium chloride solution was added and allowed to stand for 6 min, and then 2 ml of 4 % Sodium hydroxide solution was added to the mixture. Immediately, water was added to bring the final volume to 5 ml, and then the mixture was thoroughly mixed and allowed to stand for another 15 min.

CONCLUSION

The present study highlights a clear picture about the "properties of *Scoparia dulcis*". We can conclude that studies with new active principles obtained from the whole plant of *Scoparia dulcis* can results in novel and effective pattern of treatment. Chemical substances derived from this plant have been used to treat human diseases since dawn of medicine. This plant

may provide leads to find therapeutically active useful compounds. Thus, more efforts should be made towards isolation and characterization of the active principles and their structure activity relationship. The combination of traditional and modern knowledge can produce better drugs for the treatment of various ailments with fewer side effects.

REFERENCES

1. Lal B et al. Autecology of *Scoparia dulcis* Linn. Proc. Indian Natn Sci. Acad. 1979; 45 (4):368-374.
2. Mishra M R et al. Antidiabetic and Antioxidant Activity of *Scoparia dulcis* Linn. Indian J Pharm Sci 2013; 75(5):610-614.
3. Mishra M R et al. A Brief Review on Phytoconstituents and Ethnopharmacology of *Scoparia dulcis* Linn. (Scrophulariaceae). IJPM.2011; 3: 422-438.
4. Jose S et al. Effect of the Ethanolic Extract of *Scoparia dulcis* in Cisplatin induced Nephrotoxicity in Wistar rats. IJPER.2015; 49 (4): S68-S74.
5. Jedage H. D. Pharmacognostic, Phytochemical Investigation & Pharmacological Evaluation of *Scoparia dulcis* Linn. Plant Extracts for Nephro-Protective Activity. IJPSR. 2014; 5(8): 3342-46.
6. Freire S M DF et al. Analgesic and anti-inflammatory properties of *Scoparia dulcis* L. Extracts and glutinol in rodents. PTR.1993; 7(6):408-414.
7. Moniruzzaman Md. Et al. Evaluation of Sedative and Hypnotic Activity of Ethanolic Extract of *Scoparia dulcis* Linn. eCAM. 2015; 1-7.
8. Valsalakumari PK et al. Studies on Antimicrobial Activity of *Scoparia dulcis*. WJPPS.2014; 3(10): 600-613.
9. Wankhar W. Phytochemical screening and antimicrobial efficacy of *Scoparia dulcis* Linn (Scrophulariaceae) against clinical isolates. JPP. 2015; 3(6): 17-21.
10. Dr. Pari L et al. Antihyperlipidemic Effect of *Scoparia dulcis* (Sweet Broomweed) in Streptozotocin Diabetic Rats. JM Food. March 2006; 9(1): 102-107.
11. Abere T A et al. Antisickling and toxicological evaluation of the leaves of *Scoparia dulcis* Linn (Scrophulariaceae). BMC Complement Altern Med. 2015; 15: 414
12. Shamina .S, Jishamol. G. Antiurolithiatic Activity of *Scoparia dulcis* in Ethylene Glycol Induced Urolithiasis in Male Albino Wistar Rats. WJPR. 3(2):2698-2708.
13. Jones Ofori-Amoah et al. Assessment of the anti-allergenic effects of *Scoparia dulcis* in asthma management.AJPP.2016; 10(31):638-644.
14. Girish C et al. Antiulcer activity of aqueous extract of leaves of *Scoparia dulcis* (Linn.) in rats. JPR. 2011; 4(8):2526-2528
15. Pratap Kumar Patra, Jitendra Dibeta, - Research Article Antioxidant Study of Different extract of *Scoparia dulcis*
16. Plants for a future - *Scoparia dulcis* Linn
17. Publish plantnet - project Plantaginaceae *Scoparia dulcis* L.
18. tropical.theferns.info *Scoparia dulcis*
19. J.Jeevan Kumar1, T.Joytsna1, Pidipati Vinay Kumar1, Arasan Elayaraja2* and Sheikh Abdul Rahman3 Pharmacognostical study on Whole plant of *Scoparia dulcis* L
20. Rinivas K Reddy, Sanjeeva A Kumar, S Ganapaty - Pharmacological screening of *Scoparia dulcis* roots for hypoglycaemic activity.