2026 Volume: 02 Issue: 03 www.ijrpa.com ISSN 2456-9995 Review Article

International Journal Research Publication Analysis

Page: 01-15

A REVIEW OF MEDICINAL PLANT SOLANUM TORVUM

Jenila S. *[1], Dency Veena J.[2], Dr. Kenneth N.[3], Femi S.[1], Benish M. S., Jaspher Leon C. L.[1] , Shifana M.[1]

[1]B Pharm student, Immanuel Arasar College of Pharmacy, Nattalam, Tamilnadu 629165.

[2]Assistant Professor, Department of Pharmacology, Immanuel Arasar College of Pharmacy, Nattalam,Tamilnadu 629165.

[3]Principal, Department of Pharmaceutics, Immanuel Arasar College of Pharmacy, Nattalam, Tamilnadu 629165.

Article Received: 28 January 2026
Article Revised: 17 February 2026
Published on: 09 March 2026

***Corresponding Author: Jenila S**
B Pharm student, Immanuel Arasar College of Pharmacy, Nattalam, Tamilnadu 629165.

DOI: https://doi-doi.org/101555/ijrpa.7478

ABSTRACT

This work provides a comprehensive overview of the selected plant species covering its introduction, distribution and morphological characteristics. Both macroscopic and microscopic features are described to aid in identification and classification. The extraction methods employed for bioactive compounds are discussed along with the identified major phytochemical constituents. The pharmacological activities of the plant are highlighted supported by relevant studies while its toxicity profile and toxicological classification are outlined to ensure safe usage. Traditional applications in various cultural and medicinal contexts are also presented offering insight into its ethnobotanical relevance.

KEYWORDS: Solanum torvum, tomentose, torvoside, anti-inflammatory, hepatoprotective.

INTRODUCTION

Solanum torvum Swatz is a botanical name referring to a plant species known for its pharmacological benefits. Solanum torvum is a tiny shrub generally known as “turkey burry” that is found across India, Malaysia, China, Philippines and tropical America[1]. Fruits commonly available in the market, are used as a vegetable and one regarded an essential ingredient in their cuisine. Solanum torvum is a bushy and spiny perennial plant used horticulturally as a rootstock for eggplant. This plant is utilized as a herb in various Ayurveda

therapies because of its sedative, diuretic and digestive effects Solanum torvum is used to cure coughs the plant has been used as traditional medical in the community. Solanum torvum helps to reduce the incidence of hypertension, lipid peroxidation, anti-lycation and radical scavenging. Solanum torvum is utilized for eye treatment.

Root and stem have antitumor, anti-inflammatory, antipyretic and antibacterial actions[2]. The main phenolic compounds found in Solanum torvum fruits are phenolic acids, flavonoids, stilbenes, hydrolysable, condensed tannins and lignans which have some beneficial actions like antioxidant, antimicrobial, anti-inflammatory, prebiotic and vasodilation activities. Solanum torvum is known to be a rich source of phenolic acids, catechins, anthocyanins and proanthocyanins.

TABLE 1: Scientific classification.

Rank	**Classification**
Kingdom	Plantae
Phylum	Tracheophyta (Vascular Plants)
Class	Magnoliopsida (Discots)
Order	Solanales
Family	Solanacesae (Nightshade Family)
Genus	Solanaum
Species	Solanum Torvum Sw

Vernacular name

It is also known as turkey berry, prickly nightshade, shoo-shoo bush, wild eggplant, Pea aubergine[3].

Common name

Pea eggplant, Turkey berry, Devil ‘s Fig, Prickly nightshade, Wild eggplant, Turkey Berry.

Botanical name

Solanum torvum**.**

TABLE 2: Regional names of Solanum torvum.

Language/Region	**Vernacular Name**
English	Turkey Berry

Hindi	Bhuringani, Kateli
Tamil	Sundaikai
Telugu	Usthikaya
Malayalam	Chundakka
Kannada	Kacharakayi
Marathi	Dorli, Ghotingani
Bengali	Tibegun
Sinhala(Srilanka)	Thibbatu
Thai	Makhuea Pro

DISTRIBUTION

Turkey berry apparently is native from Florida and southern Alabama through the West Indies and from Mexico through Central America and South America and South America through Brazil. It has been widely introduced and naturalized throughout the tropics and subtropics including Africa, Asia, Australia and The Pacific Islands including, such as Hawaii, Guam and American Samoa. In Asia, it is prevalent in India, Sri Lanka, Malaysia, Thailand and Indonesia. It is also found in parts of the United States particularly in Florida. In West and Central Africa it is locally cultivated as a kitchen garden crop, and it probably occurs in other regions of Africa as well[4].

MORPHOLOGY

Shrub up to 3 m high: terete, tomentose with yellowish-brown (rarely reddish-brown) stipitate-stellate and/or sessile-stellate hairs. Usually armed with few straight or recurved compressed prickles which are usually pubescent basally, up to 7 x 8 mm. Leaves discolourous, solitary or sometimes in pairs, similar in shape but different in size, broadly ovate to oblong, or elliptic, up to 180 x 250 mm; apex acuminate or acute, base mostly unequal, obtuse to subcordate; margins subentire to deeply lobed, with 2-4 pairs of lobes (uncommon in our area). Upper surface scabrid with dispersed stipitate- stellate or sessile-stellate hairs; lower surface densely, softly tomentose with mostly stipitate-stellate hairs; veins rarely armed. Petioles are 10-100 mm long and softly stellate-hairy[5].

Inflorescences lateral and internodal, corymbose cymes, several- to 50-flowered, lateral, distal flowers with short styles, functionally male; inflorescence axes with simple glandular hairs; peduncles 10-30 mm long, usually 1-branched less than 100 mm from base, tomentose, hairs Sessile-stellate and shortly stipitate-stellate; pedicels ±5 mm long, purple, drying dark, hispid-viscid with mostly glandular simple and sessile- stellate hairs;

Elongating up to 22 mm and thickening in fruit, then sometimes recurved. Calyx purplish, 3-6 mm long, hispid-viscid outside with glandular sessile-stellate hairs, glabrous within, 5-lobed; lobes 1.0-2.5 mm long initially, linear or subulate; calyx splitting with age, then lobes 2-5 mm long, lanceolate to ovatelanceolate, apex mucronate, sinuses glabrous. Corolla white, 15-30 mm diameter sessile-stellate pubescent outside, glabrous within, 5-lobed; lobes lanceolate, each with prominent dark lengthwise line inside, 5-12 mm long.

Stamens with filaments 1.0-1.5 mm long, glabrous ; anthers linear-lanceolate, 610 mm long, often oblique at the base, tapering above and dehiscing by minute terminal pores. Ovary globose, with short glandular simple hairs near the apex; style 8-11 mm long, curved, glabrous or sparsely glandular-hairy at the base. Fruit globose. 10-15 mm diam. Glabrous, dull, mucilaginous, produced in clusters of few to 10, yellow-green to dirty brown when ripe, drying black. Seeds flattened-discoid, 1.5-2.5 mm across, buff-coloured, indistinctly reticulate, about 350 per fruit[6].

MACROSCOPICAL CHARACTERISTICS

Habit and size

- A bushy, erect perennial shrub or small tree, typically growing 2- 3 m tall, occasionally reaching up to 5 m.
- It generally features a single stem at ground level, which may branch lower down.

Stems and spines

- Stems are grey – green, with elevated lenticels and nearly smooth bark. The inner bark shows a green layer over ivory-coloured wood.
- Young twigs are densely covered with star-shaped (stellate) hairs and bear short, slightly curved spines (2.5 – 10mm long), which are more abundant on younger growth[7].

Fig 1 Stem of Solanum torvum.

Leaves

- Leaves are arranged alternately or occasionally opposite, with petioles of 1-6 cm long.
- Leaf blades typically 7-23 cm x 5-18 cm, broadly ovate to orbicular, margin entire or shallowly to deeply lobed, with pointy to rounded apices.
- Leaf surfaces are covered in short stellate hairs, giving hairy or fuzzy texture.

Fig 2 Leaves of Solanum torvum.

Inflorescence and flowers

- Flowers are arranged in corymbiform cymes (clustered panicles) in the leaf axils; each cluster may contain many small flowers.
- Individual flowers are 5 – lobed, white corollas (around 8 – 10 mm lobes) tubular- wheel shaped with yellow stamens and superior ovary; the anthers often sit above the stigma.
- Flowers typically fall soon after opening (short anthesis)[8].

Fig 3 Flower of Solanum torvum.

Fruit(berries)

- Fruit are small, globose berries 1 – 1.5 cm in diameter, borne in clusters resembling of green peas when unripe, turning yellow upon maturity.
- The berries are thin-fleshed with numerous flat, round, brown seeds inside[9].

Fig 4 Fruits of Solanum torvum.

MICROSCOPICAL CHARACTERISTICS

Leaf

The blade is surface view is amphistomatic having both anisocytic and anomocytic stomata. The epidermal cells have sinuous anticlinal walls on the adaxial surface and waved on abaxial surface. In cross section the epidermis is 1- layered with round cells and stomata are located on the same level. Porrect stellate trichomes occur on both surfaces. Are they sessile with a reduced midpoint or stalked. The mesophyll is dorsiventral with palisade parenchyma occupying about 60% of the mesophyll.

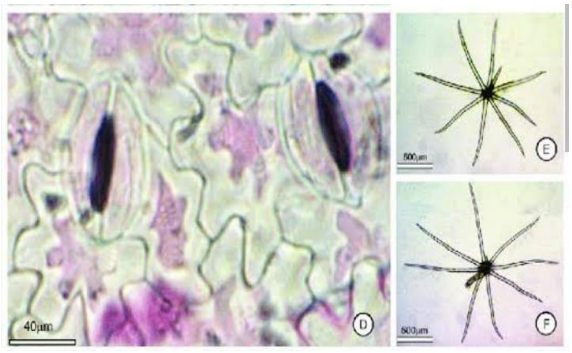

Fig 5 Microscopy of Solanum torvum leaves.

The midrib in cross section show colour biconvex at the apical portion and strongly biconvex at median and basal portions. The epidermis is single-layered and followed by angular collenchyma by 4-7 layers of angular collenchyma. The vascular system is bicollateral. Idioblasts of sand crystals were observed in external phloem. The petiole is circular is cross section at the median and apical portions[10].

Stem

In cross-section, the stem with secondary growth shows a nearly circular contour and single-layered epidermis. The collenchyma is angular forming a continuous cylinder 5-8 layered followed by a reduced cortical parenchyma 4-5 layers thick. The vascularization consists of external phloem. The xylem is lignified and arranged as a massive and continuous cylinder. The medullary parenchyma is composed of thin – walled, rounded cells[11].

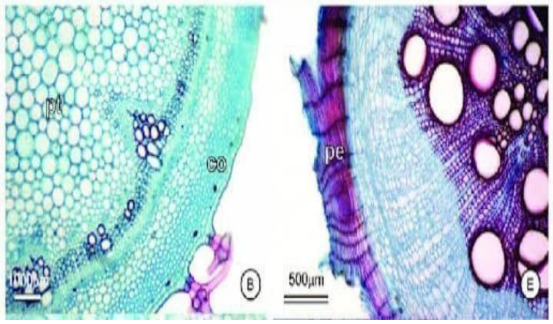

Fig 6 Microscopy of Solanum torvum stem.

Root

The root, in initial secondary growth has an underdeveloped periderm. The 5-6 layers of parenchyma, located between the periderm and phloem, occupy about 40% of diameter. In the central cylinder, a pericycle and 4-5 layers of cambial zone are observed. The secondary phloem and xylem form a massive cylinder, although a tetrarch structure can be verified. In terminal secondary growth the root shows a well - developed periderm, 12-18 layers. Idioblasts bearing druses of calcium oxalate occur in the parenchyma, below the periderm. Strach grains also present in parenchyma and vascular region[12].

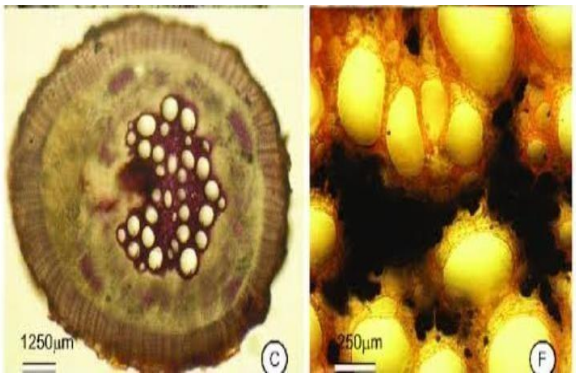

Fig 7 Microscopy of Solanum torvum root.

Fruit

It is a thin fleshed structure containing numerous flat, brown seeds. When mature, the fruit, when mature is topically typically yellowish-green in colour. The fruit is borne in cluster and is described a round in shape.

Pericarp

Epicarp:

It features radically elongated cells with a thin cuticle and appears dark brown, with a striated cuticle in fragments.

Mesocarp:

Divided into outer and inner zones. The outer zone contains mesocarp composed parenchymatous cells, sometimes with sclerenchymatous cells in the outer layers. These cells may contain calcium oxalate crystals. The inner zone consists of larger, thin-walled parenchymatous cells with dense contents, likely starch grains.

Endocarp:

Endocarp merges into pithy pulp where the seeds are located, within the endodermis[13].

Seeds

Tesla:

Composed of groups of thin-wallet, elongated, and collapsed cells.

Endosperm:

Made upof thinwalled parenchymatous cells containing aleurone grains and fat globules. It is significantly thickened and contains globoids.

Embryo:

The cotyledons show thin-walled, radically elongated cells surrounding a broad area of round to polyhedral parenchymatous cells[14].

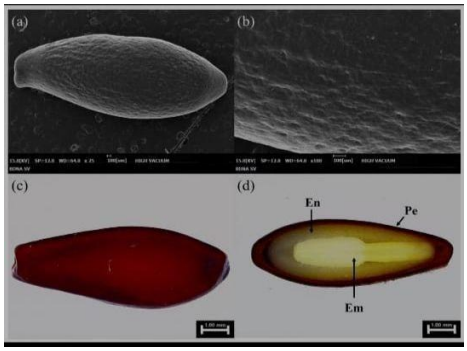

Fig 8 Microscopy of Solanum torvum seed.

TOXICOLOGICAL CLASSIFICATION

Acute toxicity (Human cases)

Consumption of immature fruits or exposure to environmental stress factors has led to severe gastrointestinal and neurological symptoms, including vomiting, dizziness, slurred speech, cranial nerve defects, ataxia, and even respiratory failure requiring ventilation.These effects are attributed to the high concentration of steroidal glycoalkaloids, such as solasonine and solamargine, which inhibit acetylcholinesterase.

Animal toxicity

Aqueous extracts have a lethal effect in mice, causing a decrease in the counts of erythrocytes, leukocytes, and platelets. In rats, the ethanolic fruit extract showed an LD_{50} of 1600 mg/kg (OECD-style acute toxicity assessment). No major toxicity issues were observed at lower doses; instead, beneficial effects, such as hypoglycemic and hepatoprotective actions, were noted[15].

Additional effects

Some extracts demonstrate immunostimulant and erytropoietic properties in rats increasing white and red blood cells counts and haemoglobin. Researches highlights a possible cascinogenic risk in mice fried dried fruit administered to niece induced hepatic tumors in 30% of cases.

PHYTOCHEMICAL ANALYSIS

Extraction:

Mature and healthy plants were collected and washed thoroughly. Fruit part of the plant was cut into pieces and was shade dried at room temperature, for about two weeks. The dried plant was ground to fine powder. About 30gm of plant powder was extracted by using cold

extract method with petroleum ether, distilled water and methanol. The aqueous extract was prepared directly by boiling the powder with distilled water. These extracts were concentrated and kept in brown bottles were used for the preliminary phytochemical screening[16].

Phytochemical screening:

The plant extracts were tested for the presence of bioactive compounds such as terpenoids, alkaloids, glycosides, steroids, phenols, tannins, flavonoids and saponins by standard method. Sun dried S. torvum fruit extracts in methanol show the presence of iron salts, vitamin E (tocopherol), B and C vitamins, oils, glycosides, saponins, tannins, flavonoids and alkaloids. Reports revels that chloroform, petroleum ether and methanol extracts of the fruits, leaves and roots of S. torvum were devoid of anthraquinones, cyanides and, surprisingly, glycosides and flavonoids. In methanolic extracts of S.torvum fruits, two novel steroidal glycosides-torvoside H and torvanol A were discovered in addition to the already known glycoside torvoside. Torvanol A was extracted from the leaves. Extensive research has been carried out on the chemical constituents of S. torvum. Fruit, leaves and roots are among the parts used to isolate a variety of compounds. This plant species is an excellent source of glycosides, tannins, saponins, flavonoids, and alkaloids[17].

Compounds isolated from fruit.

Antiviral isoflavonoid sulphate and steroidal glycosides were also isolated from the fruits of S. torvum. In a study of methanol extracts of fruit, a novel isoflavonoid sulphate, as well as torvoside H, a novel steroidal glycoside and torvoside, a previously known glycoside and x-tocopherol were isolated[18].

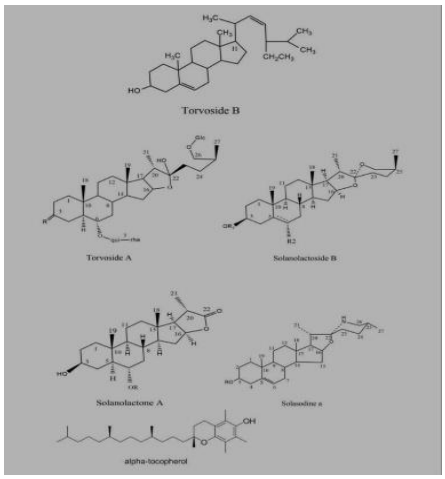

Fig 9 Phytochemistry of Solanum torvum fruit.

PHARMACOLOGICAL ACTIVITIES OF SOLANUM TORVUM

Antimicrobial activity:

Solanum torvum fruit extracts in methanol have demonstrated antibacterial effectiveness against a range of clinical isolates from both humans and animals[19].

Anti-inflammatory and analgesic activity:

Solanum torvum aqueous extract has strong anti-inflammatory and analgesic effects. Aqueous extracts containing tannins and phenols possess anti -inflammatory and analgesic properties, which are associated with several mechanisms, including the inhibition of the production of inflammatory mediators such as prostaglandins and cyclooxygenase as well as the suppression of prostaglandin E2 (PGE2) production through the arachidonic acid cascade, a key inflammatory pathway. Solanum torvum aqueous extract has strong anti- inflammatory and analgesic effects[20].

Antibacterial and antifungal activity:

The phytochemicals behind the strong antibacterial and antifungal activity of the extracts include flavonoids and polyphenolic tannins. Compared to the results shown in the leaves, stems and inflorescence extracts, methanolic extracts of the roots of Solanum torvum showed promising antibacterial and antifungal actions on all species examined[21].

Antihypertensive activity:

Methanolic extract of Solanum torvum has been shown to lower blood pressure, modify vascular responsiveness to catecholamine's, and reverse metabolic abnormalities caused by fructose. Intravenous injection of aqueous and methanol extracts of ripe Solanum torvum fruits lowered blood pressure.

Anti-viral activity:

On human and animal clinical isolates of Herpes Simplex Virus, methanolic extracts of sun-dried fruit of Solanum torvum including alkaloids, flavonoids, saponins, tannins, and glycosides were shown to have anti-viral effects.

Antidiabetic activity:

Solanum torvum has been shown to significantly reduce blood glucose levels. The presence of phytoconstituents comparable to alkaloids and flavonoids in the extract may contribute for this anti-diabetic activity. In traditional medicine, the fruits of Solanum torvum are frequently

used to manage diabetes mellitus. It has been reported that experimental rats were given oral doses of methyl caffeate (10, 20, and 40 mg/kg) derived from Solanum torvum plants for 28 days. As a result, Solanum torvum demonstrated antidiabetic activity[22].

Anti-ulcer activity:

The anti-ulcer efficacy of Solanum torvum leaves against ethanol, indomethacin, pylorus ligation, and cold-restraint stress-induced stomach ulcer in rats was examined. The ethanolic extract of Solanum torvum inhibits the development of Ehrlich's Ascites Carcinoma (EAC) cells significantly. The anticancer potential of the ethanolic extract of Solanum torvum fruit was demonstrated by in vitro cytotoxicity data. Tests for cytotoxicity using extract concentrations between 50 g/ml and 1000 g/ml produced results ranging from 7.09% to 85.79%, respectively [23].

Anticancer activity:

Anticancer phenolic chemicals have also been identified from the Solanum torvum plant leaves and seeds. Solanum torvum was discovered to be particularly efficient in inhibiting cell growth in mammary gland breast cancer cell lines. Solanum torvum contains methyl caffeine molecules, which act as an anti-cancer agent[24].

TABLE 6: Traditional uses of Solanum torvum.

Traditional uses	Method of utilization	Part used
Relief from colds and Coughs.	Powder mixed with hot water or cow milk and administrated orally	Leaves (after drying in shade)
To cure cracked foot	Externally applied on cracks. Powdered	Root (Extraction)
Curing coughs	Fried fruit is taken for cough	Fruit (after frying)
To reduce body heat	Leaf juice take orally	Leaf (extractions)
Lethal to mice	Aqueous extract of berry	Fruit
Edible fruit	Cooked fruit as an important ingredient of soups and sauces	Fruit
To control bacterial and fungal diseases of S. melongena.	Intercropping cultivation	Whole plant
Asthma, diabetes,	Combination of root and leaf	Root and leaves

hypertension	juice	
Vermifuge.	Cooked fruit	Fruit
To treat liver diseases, tuberculosis, and as anti-anemic.	Root Juice	Roots

CONCLUSION:

Solanum torvum, the medicinal plant belonging to the family Solanaceae, is a small thorny shrub bearing clusters of round green berries with broad hairy leaves. Toxicologically, Solanum torvum shows mild acute toxicity and animal toxicity when consumed in excessive amounts. Phytochemical analysis involves extraction of the fruits, preliminary phytochemical screening, and isolation of bioactive compounds such as alkaloids, flavonoids, and saponins. The pharmacological activities of Solanum torvum include anti-inflammatory, analgesic, antibacterial, antifungal, antiviral, antihypertensive, antidiabetic, anti-ulcer and anticancer activities. It is used in the treatment of diabetes, hypertension, infection, ulcers, inflammation, pain, anemia, digestive disorders and also helps in boosting immunity and improving overall health.

REFERENCES:

1. Ranjitha, M. and Jagannath, S. (2022). Comparative phytochemical analysis of leaf, stem and callus extracts of Solanum diphyllum L., Ann. Phytomed., 11(2):765-770.
2. Sivapriya, M., & Leela, S. (2007). Isolation and purification of a novel antioxidant protein from the water extract of Sundakai (Solanum torvum) seeds. Food Chemistry, 104(2), 510-517.
3. Akinmoladun, F. O., Akinrinlola, B. L., & Farombi, E. O. (2020). Pharmacological and phytochemical properties of Solanum torvum: A review. Journal of Medicinal Plants Research, 14(6),280-288.
4. Anbu, J., Jayachitra, A., & Lakshmi, S. D. (2009).Phytochemical and antibacterial studies on Solanum torvum Swartz. African Journal of Biotechnology, 8(20), 5522-5525.
5. Koffi, N., Errahmani, M. B., Dossahoua, T. M., & Dosso, M. (2011). In vitro antimicrobial activity of Solanum torvum fruit extract against clinical isolates of Helicobacter pylori. African Health Sciences, 11(3), 516-520.
6. Myster R W, Walker L R, 1997. Plant successional pathways on Puerto Rican landslides. Journal of Tropical Ecology. 13 (2), 165-173.

7. Narikawa T, Sakata Y, Komochi S, Melor R, Heng C K, Jumali S, 1988. Collection of solanaceous plants in Malaysia and screening for disease resistance. JARQ, Japan Agricultural Research Quarterly. 22 (2), 101-106.
8. Narikawa T, Sakata Y, Komochi S, Rejab M, Kok H C, Suratman J, 1988a. Collection of Solanaceous Plants in Malaysia and Screening for disease resistance. Japan Agricultural Research Quarterly. 22 (2), 101-106.
9. Nayak S K, Satapathy K B, 2015. Diversity, uses and origin of invasive alien plants in Dhenkanal district of Odisha, India. International Research Journal of Biological Sciences. 4 (2), 21-27.
10. Abbas I, Nakamura K, Hasym A, 1985. Survivorship and Fertility Schedules of a Sumatran Epilachnine "Species" Feeding on Solanum torvum under Laboratory Conditions (Coleoptera: Coccinellidae). Applied Entomology and Zoology. 20 (1), 50-55.
11. Poonguzhali, S., Karthikeyan, B., & Kumuthakalavalli, R. (2017). Pharmacognostic and phytochemical studies on Solanum torvum Sw. Journal of Pharmacognosy and Phytochemistry, 6(3), 01-06.
12. Chah KF, Muko KN, Oboegbulem SI 2000. Antimicrobial activity of methanolic extract of Solanum torvum fruit. Fitoterapia 71: 187-189.
13. Kanta, C. & Sharma, I. P. (2020). Floral polymorphism and scanning electron microscopy determination in relation to climatic influence on Solanum nigrum L. Notulae Scientia Biologicae , 12(2): 289-300.
14. Ayyanar, M. and Ignacimuthu, S. (2005). Medicinal plants used by the tribals of Tirunelveli hills, Tamil Nadu to treat poisonous bites and skin diseases. I.J.Trad. Knowl, 4(3); 229-236.
15. Fagbohun, ED. Lawal, OU. Ore Me, (2012). The proximate, mineral and phytochemical analysis of the leaves of Ocimum gratissimum L., Melanthera scandens A. And Leea guineensis L. And their medicinal value. Inter.J.of App. Biol. Pharma. Technol.201;3:15-22.
16. Krishnaiah, D. Sarbatly, R. Bono, A. (2007). Phytochemical antioxidants for health and medicine: A move towards nature. Biotechnol Mol Biol Rev. 1: 97104.
17. NSI, EW. and Dyegh, AH. (2004). Preliminary phytochemical screening and antimicrobial activity of terminalia aricennoides. Intern.J.Sci. Technol.; 42-44.
18. Parmar, N. and Rawat, M. (2012). Medicinal plants used as antimicrobial agents: a review. Inter. Res. J. of Pharm.; 3(1):31-40.

19. Shihabudeen, MH. Priscilla, DH. Tirumurugan, K. (2010). Antimicrobial activity and phytochemical analysis of selected Indian folk medicinal plants. Int J Pharma Sci. 1: 430434.
20. Steenhuysen, J. (2007). "Mother Nature Still A Rich Source of New Drugs." Reuters Limited. Wang, J. (2006). "Platensimycin is a selective Fab inhibitor with potent antibiotic properties. "Nature, 441; 358-361.
21. Jaiswal, B.S. and Mohan, M. (2012). Effect of Solanum torvum on the contractile response of isolated tissues preparation in fructose fed rats. Int. J. Pharm. Biol. Sci., 3(3):161-169.
22. Kamble, S.; Mohan, M. and K asture, S. (2009). Protective effect of Solanum torvum on Doxorubicin induced cardiac toxicity in rats. Pharmacol. Online, 2:1192-1204.
23. Koomson. D.A.; Kwakye, B.D.; Darkwah, W.K.; Odum, B.; Asamoah, K.A and Aidoo, G. (2018). Phytochemical constituents, total saponins, alkaloids, flavonoids and vitamin C contents of ethanol extracts of five Solanum torvum fruits. Pharmacog. J., 10(5):946-50.
24. Siemonsma, J.; Piluek, K. and Kala, C.P. (2005). Ethnomedicinal botany of the Apatani in the Eastern Himalayan region of India, J. Ethno. and Ethnomed. Plant Res. South-East Asia (PROSEA) Bogor, Indonesia, 1(18):412-419.