



## A Review of Chemical Constituents and Traditional Uses of *Solanum Torvum* Plant

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### ABSTRACT

One prevalent plant in traditional medicine is *Solanum torvum*. This review supports all updated information on its chemical constituents and traditional uses. Numerous human illnesses have been treated with plant extracts on a massive scale. The chemical entities of this plant has been used as anti-hypertensive, anti-oxidant, cardiovascular, anti-platelet aggregation activities, anti-microbial activity, sedative, digestive, hemostatics and diuretic activities etc.

Key words: *Solanum torvum*, chemical constituents, traditional uses.

### INTRODUCTION

*Solanum torvum* Swartz of the family Solanaceae have been extensively used for both food and pharmaceutical purposes and also known as pendejera, turkey berry, devil's fig, pea eggplant, platebrush or susumber, is a bushy, erect and spiny [perennial plant](#) used horticulturally as a [rootstock](#) for [eggplant](#). Because grafted plants are so resilient to diseases that attack the root system, the crop may be grown for a second year.<sup>[1]</sup>



The plant is usually 2 or 3 m in height and 2 cm in basal diameter, but may reach 5m in height and 8 cm in basal diameter. At ground level, the shrub typically has a single stem, however it occasionally branches on the lower stem. Grey and almost smooth, the stem bark has elevated lenticels. A green layer covers an ivory coloured inner bark. The plants examined by the author, growing on firm soil, had weak taproots and well-developed laterals. The roots are white. Foliage is confined to the growing twigs.

The gray-green twigs have hairs shaped like stars all over them. The spines are short and slightly curved and vary from thick throughout the plant, including the leaf midrib, to entirely absent. The widely oval leaves are opposite or one per node, and their borders are either completely lobed or strongly lobed. The petioles are 1 to 6 cm long and the blades are 7 to 23 by 5 to 18 cm and covered with short hairs. The white flowers are clustered in corymbiform cymes and are tubular in shape with five pointed lobes. They are shed soon after opening.

The fruits are berries that resemble green peas and grow in clusters of small green spheres, each measuring about one centimetre in diameter. They become yellow when fully ripe. Many flat, spherical, brown seeds are contained in their thinly skinned body, Little and others 1974) [2].

### CHEMICAL CONSTITUENTS.

Many studies have been conducted to determine the chemical composition of *Solanum torvum*. Fruit, leaves, and roots are among the sections that are used to isolate a variety of chemicals. Alkaloids, flavonoids, saponins, tannins, and glycosides are all abundant in this plant species (Chah et al., 2000).

According to Pérez-Amador et al. (Perez-Amador et al., 2007), the percentage composition of various compounds within this species is total alkaloid content (0.12%) total glycoalkaloids (0.038%), and glycosylated compounds derived from solasodine, namely solasonine (0.0043%) and solamargine (0.0028%). Kusirisin et al (2009) identified tannin, flavonoids, and phenol as polyphenolic substances. These chemicals' respective concentrations were measured and found to be 160.30, 104.36, and 65.91 mg/g<sup>[3]</sup>.

**Compounds isolated from aerial parts:** Aerial parts of *S. torvum* are rich sources of steroid and saponins. Lu et al., 1983 isolated four steroidal compounds solanolide 6-O- [α-L-rhamnopyranosyl- (1→3) - O-β-D-quinovopyranoside], solanolide 6-O- [β-D-xylopyranosyl-(1 → 3)-O-β-D-quinovopyranoside], yamogenin 3-O- [β-D-glucopyranosyl- (1 → 6)-O-β-D-glucopyranoside] and solanolide 6-O- [α-L-rhamnopyranosyl-(1 → 3)-O-β-D-quinovopyranoside]. Yuan-Yuan et al. (2011) described the discovery of two new spirostanol glycosides, torvosides M and N, and two novel C-22 steroidal lactone saponins, solanolactosides A, B (1, 2). Their structures were characterized as solanolide6-O- [α-L-rhamnopyranosyl-(1 → 3)-O-β-D-quinovopyranoside], solanolide 6-O- [β-D-xylopyranosyl-(1 → 3)-O-β-D-quinovopyranoside], yamogenin 3-O- [β-D-glucopyranosyl-(1 → 6)-O-β-D-glucopyranoside] and neochlorogenin 3-O- [β-D-glucopyranosyl-(1 → 6)-O-β-D-glucopyranoside] on the basis of spectroscopic analyses<sup>[4]</sup>.

**substances that are separated from leaves** in 1983, Mahmood et al. extracted torvanol A from the foliage. Yuan-Yuan et al., 2011 were able to isolate nine new compounds namely neochlorogenin 6-O-β-D-quinovopyranoside, neochlorogenin 6-O-β-D- xylopyranosyl- (1→3) -β-D-quinovopyranoside, neochlorogenin 6-O-α-L-rhamnopyranosyl- (1→3)-β-D- quinovopyranoside, solagenin 6-O-β-D-quinovopyranoside, solagenin 6-O-α-L-rhamnopyranosyl- (1→3) -β-D-quinovopyranoside, isoquercetin, rutin, kaempferol and quercetin. Furostanol glycoside 26-O-beta-glucosidase plays a significant role in the leaves' methanolic extracts. Mahmood et al., 1983 isolated some non-alkaloidal compounds namely, 3, 4-trimethyl triacontane, octacosanyltriacontanoate and 5-hexatriacontanone by spectral data and chemical studies. Triacontanol, 3- triacontanone, tetraacontanoic acid, sitosterol, stigmasterol and campesterol have also been isolated and identified<sup>[5]</sup>.

**substances that are separated from fruit** The fruits of *S. torvum* were also used to extract steroidal glycosides and antiviral isoflavonoid sulphate. MeOH fruit extracts were studied by Arthan et al. in 2002, and they discovered torvanol A, a novel isoflavonoid sulphate, and torvoside H, a new steroidal glycoside. the already-known glycoside, torvoside A<sup>[6]</sup>.

**Compounds isolated from roots** The root of *Solanum torvum* is source of steroidal glycosides such as torvosides A-G. They were structurally characterized as (25S)-26-O-fl-~glucopyranosyl)-5c~-furostan-3fl, 6a, 22sc, 26-tetraol 6-O-[α-L-rhamnopyranosyl-(1 ---> 3)-fl-D-quinovopyranoside], (25S)-26-O-(fl-D-glucopyranosyl)-22c-methoxy-Sa-furostan-3fl,6c,26-triol 6- O- [fl-D-xylopyranosyl- (1---> 3) -/3- D-quinovopyranoside], neosolaspigenin 6-O- [α-L-rhamnopyranosyl- (1-> 3)-fl-D- quinovopyranoside], neosolaspigenin 6-O-[fl-D-xylopyranosyl-(1->3)-/3-D-quinovopyranoside], (25S)-26- O-(fl-D-glucopyranosyl)-6a,26-dihydroxy-22a-methoxy-Sa-furostan-3-one 6-O-(fl-D-quinovopyranoside), (25S)- 26-O-(fl-D-glucopyranosyl)-6a,26-dihydroxy-22a-methoxy- Sceurostan-3-one 6-O-[/3-D-xylopyranosyl-(1->3)-/3-D-quinovopyranoside], and (25S)-26-hydroxy-22a-methoxy-5a-furostan-3- one 26-O-(fl-D-glucopyranoside) <sup>[7]</sup>.

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## TRADITIONAL USES.

*Solanum torvum* Sw. [Solanaceae] is a tiny shrub that grows abundantly throughout Thailand and is often called "Turkey berry." Turkey berry' is an erect spiny shrub of about 4m tall evergreen and widely branched. It is native and cultivated in Africa and West Indies <sup>[8]</sup>. Its edible fruits, commonly available in the market are used as a vegetable and are regarded as an essential ingredient in Thai cuisine. Its fruit and leaves, which are rich in alkaloids can however, be used for Medicinal or ritual purposes. The plant is cultivated in the tropics for its sharp tasting immature fruits. The fruits of *Solanum torvum* are used commonly in traditional medicine as antihypertensive <sup>[9]</sup>. It has antioxidant <sup>[10]</sup>, Cardiovascular, anti-platelet aggregation activities <sup>[11]</sup> antimicrobial activity against human and clinical isolates <sup>[12,13]</sup> and sedative, digestive, hemostatics and diuretic activities <sup>[14]</sup>.

Aqueous extracts of turkey berry are lethal to mice by depressing the number of erythrocytes, leukocytes and platelets in their blood (Tapia and others 1996).

Plant extracts have been reported to help cure leprosy, acne, colds and coughs, hyperactivity, and skin conditions. <sup>[15]</sup>

[Methyl caffeate](#), extracted from the fruit of *S. torvum*, shows an [antidiabetic](#) effect in [streptozotocin](#)-induced diabetic rats. <sup>[16]</sup>

Cholinergic poisoning has been reported as a result of the consumption of *Solanum torvum* berries prepared in Jamaican dishes. <sup>[17][18]</sup>

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## CONCLUSION

*Solanum torvum* is a significant source of several pharmacologically and medicinally significant compounds, including steroidal glycosides, sitosterol, stigmasterol, and campesterol, according to a thorough review of the literature. The plant has also been widely studied for their various pharmacological activities like antihypertensive, antioxidant, cardiovascular, antiplatelet aggregation activity, antimicrobial and antiviral activity etc. More clinical trials should be conducted to support its therapeutic use of *Solanum torvum*. It's also critical to understand that extracts from *Solanum torvum* may be useful when used in conjunction with other herbs or medications, maybe even having a moderating impact when taken alone. In order to concentrate future research on *Solanum torvum*, this review seeks to emphasise its primary therapeutic qualities.

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