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M Chitra

Dr. M. S. Swaminathan
Agricultural College and
Research Institute,
Eachankottai, Thanjavur, Tamil
Nadu Agricultural University
(TNAU), Tamil Nadu, India

Kavibharathi M

Dr. M. S. Swaminathan
Agricultural College and
Research Institute,
Eachankottai, Thanjavur, Tamil
Nadu Agricultural University
(TNAU), Tamil Nadu, India

Logeshwari R

Dr. M. S. Swaminathan
Agricultural College and
Research Institute,
Eachankottai, Thanjavur, Tamil
Nadu Agricultural University
(TNAU), Tamil Nadu, India

Loganadhan G

Dr. M. S. Swaminathan
Agricultural College and
Research Institute,
Eachankottai, Thanjavur, Tamil
Nadu Agricultural University
(TNAU), Tamil Nadu, India

Madhan M

Dr. M. S. Swaminathan
Agricultural College and
Research Institute,
Eachankottai, Thanjavur, Tamil
Nadu Agricultural University
(TNAU), Tamil Nadu, India

Mahadurai R

Dr. M. S. Swaminathan
Agricultural College and
Research Institute,
Eachankottai, Thanjavur, Tamil
Nadu Agricultural University
(TNAU), Tamil Nadu, India

Corresponding Author:**Kavibharathi M**

Dr. M. S. Swaminathan
Agricultural College and
Research Institute,
Eachankottai, Thanjavur,
Tamil Nadu Agricultural
University (TNAU), Tamil
Nadu, India

Effect of Turkey berry on Iron deficiency Anemia and its properties and characters

M Chitra, Kavibharathi M, Logeshwari R, Loganadhan G, Madhan M and Mahadurai R

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Abstract

Turkey berry [*Solanum torvum*] is widely considered to have originated in the tropical Americas. It is often seen as a weed in distributed areas. Turkey berry is a nutrient-dense, low calorie and low-fat fruit rich in iron, calcium, fibre and antioxidant compounds. It is widely recognised for promoting cardiovascular health, improving red blood cell production, boosting immunity and managing blood sugar levels. It is known to rich in iron to improving the blood cells and is used in traditional medicine for its antibacterial, anti-viral and anti-inflammatory properties in Ayurvedic medicine. It contains numerous important metabolites such as saponins, steroids and flavonoids, which function as antioxidants, antifungal, antidiabetic, anticancer, antiulcer, antianxiety and immunomodulators. Various notable roles in ethnomedicinal uses and approaches as a traditional medicinal herb. Fruits and leaves are high in alkaloids are used for medicine in addition to culinary purposes. This review seeks to investigate into the nutritional and phytochemical changes of turkey berry.

Keywords: Iron deficiency anemia, Phytochemical Studies, Pharmacological, Nutritional value, Ethnomedicinal value

Introduction

The most common cause of anemia is iron deficiency, which accounts for about 50% cases of anemia especially women. Globally, it is estimated that the major cause of morbidity and mortality in adolescent females is iron deficiency anemia. Anemia negatively affects the cognitive development and academic performance of adolescents. Anemia can also result in pregnancy complications, and poor birth outcomes such as low birth weight, premature birth, and stillbirth. Turkey Berry (*Solanum torvum*) is also known as devil's fig, prickly nightshade, shoo-shoo bush, wild eggplant, and pea eggplant. It is used to yield many health benefits either in fresh or dried form. Due to its rapid spread as a weed in disturbed lands, it is difficult to tell which populations are native and which are introduced. It is believed to be full of iron and a very good anti-inflammatory medicine in Ayurvedic medicine. People are soaked the berries in buttermilk for around a week and dried under the sun for >2 weeks to get completely dried berries. These dried turkey berries are meant to reduce its bitter taste, improving its nutrient content and used in culinary preparations and in homemade remedies. The presence of irons in Turkey berry, which boost the blood levels of individuals and are mostly used for the treatment of anemia, especially among pregnant women. *Solanum torvum* is known to be a rich source of phenolic acids, catechins, anthocyanins, and proanthocyanins.

Medical value

In India, dried leaf powder is used as medicine for diabetic patient and the leaf juice is used to reduce body heat, and unripe fruits are used to strengthen the immunity of the body. In Central America and India, the leaf paste is used to apply on cuts and wounds because its fruit and leaves have anti-microbial activities to control a range of microbial growth. The fruit decoction is used to treat children as a cough medicine, whereas the whole plant is taken to treat sore throat and stomach-ache. It contains several pharmacological active chemicals including the sapogenin steroid, and choriogenin. For inflammatory diseases, leaves can be ideally used as a pain reliever. Different chemical compounds have been isolated from this

plant such as steroids, saponins, alkaloids, and phenols. *Solanum torvum* contains methyl caffeine molecules, which act as an anti-cancer agent to prevent the breast cancer cells. The extracts from turkey berry are very useful in the treatment of colds, hypersensitivity, coughs and other skin diseases.

Chemical content

Turkey berries are mostly fulfilled with water of about 85-90%, making them low in calories but rich in nutrients. Alkaloids, flavonoids, saponins, tannins, and glycosides are all abundant in this plant species. 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%), and tannin (160.30mg/g), flavonoids (104.36mg/g), and phenol as polyphenolic (65.91mg/g) are present. Approximate analysis of turkey berries showed that it contained carbohydrate (7.04%), protein (2.32%), fat (0.28%), crude fibre (3.99%), ash (0.14%), moisture (86.23%), calcium (221.58mg/kg), iron (76.87mg/kg), vitamin C (2.69mg/kg), zinc (21.46mg/kg), manganese (19.47mg/kg), copper (2.65mg/kg), and vitamin A (0.08mg/kg). The fresh berries are dried and made into powder will increase the protein content.

Phytochemical study

The preliminary qualitative phytochemical analysis of *S. torvum* fruits extracts showed in table.1. the presence of majority of the compounds including alkaloids, proteins, tannins, phenolic substance, steroidal glycosides, and flavonoids. The fruits are extracted in acetone, ethanol and petroleum ether, and qualitatively estimated for the presence of lipid, flavonoid, and phenols and minerals such as sodium, potassium, and calcium.

1. Alkaloids, phytosterols, saponins, and tannins were present in the acetone extract of the leaves.
2. Alkaloids, flavonoids, phytosterols, and saponins are identified in the ethanol extract.
3. Petroleum ether has found alkaloids, glycosides, phytosterols, and saponins.

Alkaloids, phytosterols, flavonoids were identified in the above three solvents, while carbohydrate, phenol, and protein were not detected in the above three-tested extracts. The greater the amount of these compounds, the stronger the free radical scavenging activity. The phytoconstituents, including steroidal alkaloids like solasonine and solamargine, flavonoids like rutin, quercetin, and kaempferol, and phenolic compounds like chlorogenic acid are present. These compounds contribute the plant's medicinal properties and significant interest in pharmacological research.

Table 1: Preliminary phytochemical analysis

Chemical test	Ethanol extract	Water extract
Alkaloids	+	+
Proteins	+	+
Tannins	+	+
Phenolic compounds	+	+
Steroidal glycosides	+	+
Flavonoids	+	+

Pharmacological studies

Solanum torvum has a lot of pharmacological activities, including antimicrobial, antioxidant, antidiabetic, antihypertensive, anticancer, anti-osteoporosis, hepatoprotective, cardioprotective, nephroprotective, anti-inflammatory, and anti-ulcerogenic activities. Some of the compounds isolated from the plant, like diosgenin, solamargine, solanine, apigenin, and lupeol, have exhibited cytotoxic activity against cancer cell lines, including liver, lung, breast, and prostate cancers. Different therapeutic properties are spread out across the turkey berry due to its contents of chemical compounds such as steroids, saponins, flavonoids, alkaloids, and various vitamins, which have an action as antioxidants, cardiovascular agents, and immunomodulators. These properties make it a valuable medicinal plant with potential therapeutic applications in various diseases and health conditions. The work studied the erythropoietic, haematonic, and leucocytic activities of some aqueous extracts from its fruits and leaves.

Impact of Turkey Berry on Haemoglobin Level and Cognitive Performance

Cooked fruits of *Solanum torvum* are traditionally used as an adjunct therapy for people with anemia, and the ripened fruits are also used in preparing hemopoietic agents and usually used in soup and stews. Turkey berry

is rich in iron, potassium, calcium, and plant compounds, which can help to improve iron absorption and support haemoglobin production. By addition of Vitamin C like citrus fruits, tomatoes in meal along with turkey berry helps to increase the absorption of iron and at the same time avoid foods which contain calcium, it reduces the efficiency of absorption of iron intake in body. Many pharmacological studies provide empirical evidence supporting its hematopoietic and anti-anemic effects. Turkey berry contributes to its iron status when it is included in the daily meals tend to increase the haemoglobin content of a person and it is not solely to prevent anemia but by increasing the iron content which is responsible for anemia.

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