



POTENTIAL PHARMACOLOGICAL ACTIVITIES OF *TALINUM TRIANGULARE* – A REVIEW

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ABSTRACT

As in the development of world the scientific researches and innovations have been the stepping stone. Plants have proved to be very important in medicinal plants research and because of the bioactive compounds present in plants considered to be very useful in drug research and development for the treatment of various diseases. This article reviewed on phytochemicals and various potential activities of water leaf (*Talinum triangulare*). *Talinum triangulare* is an under-utilized, edible plant which is distributed across the world which has various medicinal uses. It survives under varying soil types such as deep fertile soil, shallow rocky soil, salt affected soils etc. *Talinum triangulare* is a herbaceous perennial plant that is native to Mexico, the Caribbean and West Africa. Common names include Ceylon spinach, waterleaf, Sambar cheera or kozhuppan cheera, cariru, Gbure, Surinam purslane, Philippine spinach, Florida spinach, fameflower, Lagos bologi, Sweetheart and Kutu bataw. The beneficial effects of plants are attributed to the presence of secondary metabolites such as polyphenols, tannins, terpenoids, alkaloids, flavonoids, saponins. Shows various potential activities such as Cardio-protective activity, Antidiabetic and hypoglycaemic activity, cerebral function, Antibacterial and antifungal activity, Anthelmintic, Antioxidant activity, gastrointestinal, Pro-vitamins, vitamins and other micronutrients.

KEYWORDS: Bioactive compounds, Plant profile, Pharmacological activities, Synonyms, *Talinum triangulare*.

INTRODUCTION

The utilization of plant based product in food supplements and health industries increased tremendously for the past decades globally. Therapeutic properties of medicinal plants are very useful in the treatment and healing various diseases and the advantaged of these plants is been 100% natural with little or no side effects. Many studies have been done by researchers all over the world to determine the bioactive component in medicinal plant, which could replace artificial products or serve as lead compounds in drug design and synthesis of new and more effective drugs.^[5] Many researchers aimed to identify the possibility of using plants components to solve human health problems. Plants often exhibit a wide range of biological and pharmacological activities, such as anti-inflammatory, anti-fungal and anti- bacterial properties.

Talinum triangulare is a leafy vegetable found in open waste places with rich top soil. It is a member of the family portulacaceae. It occurs in West and Central Africa, in West Africa it occurs alongside a relative, *Talinum portulacifolium* which suggests that this vegetable species is probably of African origin. Waterleaf, as the plant is commonly called, is popular as a pot herb in Nigeria and Cameroon.^[1]



Fig. 1: *Talinum triangulare*.

PLANT PROFILE^[2]

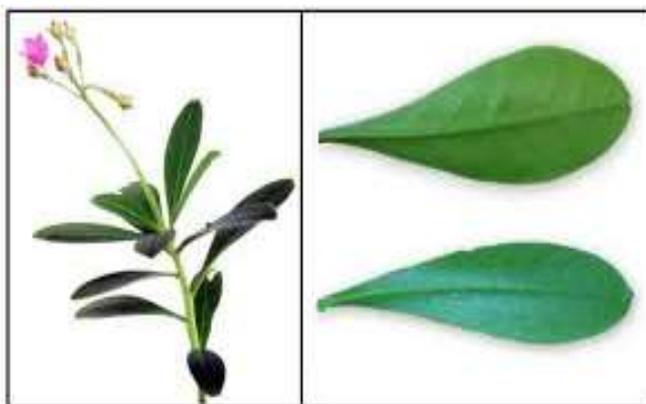
- i) **Botanical name-** *Talinum triangulare*
- ii) **Family-** Portulacaceae
- iii) **Genus –** *Talinum*
- iv) **Species-** *Talinum triangulare* (Jacq.) Wild
- v) **Order-** Caryophyllales
- vi) **Kingdom-** Plantae
- vii) **Division –** Magnoliophyta
- viii) **Class –** Magnoliopsida

Vernacular names

- **English** : Ceylon spinach, Water leaf
- **Malayalam** : Sambar cheera, Kolambi cheera
- **Tamil** : Silon pasalai
- **Kannada** : Nela basale
- **Assamese** : Bilati-paleng
- **Indonesia** : Poslen (West Java), krokot belanda
- **Philippines** : Talilong (Tagalog), galaghati (Subanon), biala (Marinduque).
- **Thailand** : Som-kaoli (Bangkok)
- **French** : Grassé
- **Common name** : Water leaf, Ceylon spinach.^[7]
- **Synonyms** : *Talinum fruticosum*, *Talinum paniculatum*

**Fig. 2: Talinum triangulare.****Botanical description**

Talinum triangulare is an erect perennial herb with swollen roots and obtuse-angular to terete, hairless and succulent stems where it can grow measure about 30-100 cm tall. The branches are with 2 lateral and basal buds. The leaves are arranged spirally to nearly opposite, often crowded at the top of the stem and indistinctly or shortly petioled. The leaf-blades are usually spoon-shaped, with a size of measure about 3-15 cm x 1-6 cm, entire and succulent, obtuse to rounded and occasionally notched at the apex, leaves are simple, lower opposite, upper ones alternate and spirally arranged, linear to oblanceolate-obovate, base articulate to attenuate, margin entire, apex obtuse to acute, succulent or semisucculent, petiole short to sessile, stipules absent.

**Fig.2 Stem and Root of Talinum triangulare.****Fig.3 Leaf of Talinum triangulare.**

The inflorescence is a long peduncled, terminal, corymboid thyrus, with a size of measure about 5-30 cm long, with a 2-5 erect, sharply triangular axes where each with 8-28-flowered. The flowers are bisexual and it is a measure about 0.5-2.5 cm in diameter. The pedicels elongate after anthesis. The 5 pink petals are obovate in shape and up to measuring 10 mm x 4 mm. The stamens are 20-40. Style is 2-3-fid while the ovary is superior. The yellow fruit is capsular, ellipsoid to globular in

shape, with a size of measure 4-7 mm long, 2-3-valved and elastically dehiscent.

The yellow fruit is capsular, ellipsoid to globular in shape, with a size of measure 4-7 mm long, 2-3-valved and elastically dehiscent. The seeds are numerous, compressed spherical-kidney-shaped, with a size of measure about 0.8-1.2 mm long, granulate, smooth and black shining in colour.



Fig. 4 Flower of *Talinum triangulare*.

Talinum triangulare is probably native to tropical America. Its complete native range, however, is difficult to ascertain because it is easily transported and easily naturalises. *Talinum triangulare* has become a weed with pantropical distribution, still extending its range. It was introduced into Java in 1915 from Surinam by the Bogor Botanic Gardens. Elsewhere in Southeast Asia its introduction is also relatively recent.

Origin and distribution

Talinum triangulare is well cultivated in Nigeria and Cameroon, propagated by seed and cuttings. During the rainy season, the vegetable blooms on abandoned farmlands as under growths, and become abundant.

Talinum triangulare was introduced into South India from Sri Lanka and is cultivated in Tamil Nadu as Ceylon Spinach for its edible leaves. The plant is widely grown in most of the humid tropical countries such as West Africa, Asia and South America. *Talinum triangulare* with its slimy texture, is a popular vegetable in many African countries and is popular in Nigeria among some tribes to make indigenous soups such as Gbure, Edikaiko and Afang in Yorubas, Ibibios and Efiks, respectively.^[10]

It is observed from Mexico, Southern United States, tropical Africa, Java, India and Asian countries. It was introduced into Java in 1915 from Surinam by the Bogor Botanic Gardens. Cultivation of this leafy vegetable is also reported from Nigeria, Africa, America and Asia. But in India, cultivation practice for this plant is yet to be standardized.

Chemical composition of *Talinum triangulare*(water leaf)

Talinum triangulare was screened for the presence of bioactive molecules. It had high carotenoids, moderate benzoic acid derivatives, hydroxycinnamates and flavonoids; and low terpenes, alkaloids, phytosterols, alliscins, glycosides, saponins, and lignans contents. Ten known carotenoids (mainly 50.42% carotene and 33.30% lycopene), nine benzoic acid derivatives (mainly 84.63% ferulic acid and 11.92% vanillic acid), and six hydroxycinnamates (55.44% p-coumaric acid and



Fig. 5 Seeds of *Talinum triangulare*.

44.46% caffeic acid) were detected. Also detected were eight lignans (88.02% retusin) and thirty flavonoids (50.35% quercetin and 39.36% kaempferol). The great number of potentially active biomolecules and their multifunctional properties make *Talinum triangulare* a ready source of health-promoting substances.^[3,5]

Nutritional value

Studies showed that *Talinum triangulare* is a rich source of vitamin C, vitamin E, Omega-3 fatty acids, calcium, magnesium, soluble fibres (pectin), potassium, β -carotene, proteins and dietary fibre.^[6,8] Further researches point out that *Talinum triangulare* is also a rich source of crude-protein, crude fibre, vitamins and minerals. These vitamins and minerals contributes to the high antioxidant values of waterleaf.^[9] According to Farombi and Fakoya, antioxidants also help to prevent and minimise the reactive effects of free radicals, including oxidative damage to membranes and increased enzyme inactivation or susceptibility to lipid peroxidation.^[4]

Traditional and medicinal uses

Waterleaf is traditionally harvested and it can be eaten immediately, dried, or kept in a plastic bag in a refrigerator to maintain freshness. It can be prepared in much the same way as spinach, and is popular for soups, stews, stir fries, and pizza, it can also be enjoyed raw. Crude protein content of fresh *Talinum triangulare* leaves and tender stems and found it to be as high as 29.4% and 13.4% respectively.

The presence of flavonoids as reported have shown that the *Talinum triangulare* would be good for the management of cardiovascular diseases and oxidative stress, antitumor properties, used to treat polyuria, internal heat, measles, gastrointestinal disorders, hepatic ailments and cancer.^[11] The dietary fibre present in *Talinum triangulare* could decrease the absorption of cholesterol from the gut and thus functions in the protection against cardiovascular disease, colorectal cancer and obesity and it could also delay the digestion and conversion of starch into simple sugars, an important factor in the management of diabetes mellitus. Helps in skin regeneration, as anti-inflammatory and diuretics.

Talinum triangulare could be important in the medicinal plants' research and because of the phytochemicals that it possess, it could be useful in drug research and development.

The leaves are edible as vegetable, and are used to speed up the elimination of faeces from the body. The root is used for the preparation of rat poison.^[12]

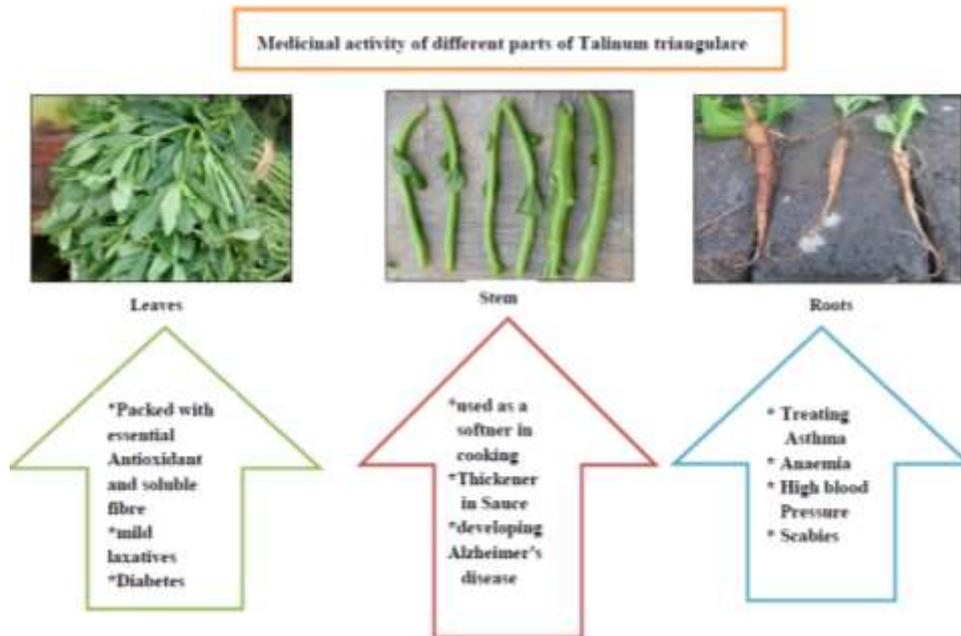


Table No. 1: Pharmacological effect of *Talinum triangulare* (Water leaf).^[4]

Medicinal effects	Function
Antioxidant and Hepatic disease	Suppression of oxidative stress of liver cells. Helps to enhance liver function.
Enhancement of cerebral function	Reduce oxidative stress, enhances cerebral function.
Laxative effect	Antioxidant activity helps to treats mild laxative problem and constipation.
Diabetes	Essential for managing diabetes mellitus, its high dietary content helps to slow down digestion and conversion of starch to simple sugar.
Regulation of cholesterol level	Dietary fibre present in the plant helps to reduce absorption of cholesterol level from the gut, thereby preventing the body from bad cholesterol associated diseases
Cancer prevention, Management of cardiovascular disease	Antioxidant activity makes it important in preventing cancer and tumor growth, Regular consumption helps to reduce risk of contracting stroke
Prevent anaemia and boost blood level, especially for pregnant women	Helps to prevent anaemia and boost blood level by clearing bilirubin from blood, thus helping red blood cells to remain longer and effectively utilized by the body

CONCLUSION

Talinum triangulare has shown to contain high medicinal potentials and also to be ethnobotanically important, notably its leaves. Further scientific research is thus required to ascertain the chemicals responsible for such reports, with more emphasis on the antioxidant activity of the plant. The consumption of *Talinum triangulare* by humans and animals will contribute to the maintenance of their overall health.

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