

## Review on the Medicinal Potentials of Waterleaf (*Talinum triangulare*)

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### ABSTRACT

Scientific researches and innovations have been the stepping stone for development of the world. It is then very important to engage in research today, especially for developing countries. Plants have been instrumental in the hands of scientific researchers today and used to improve the health systems of the world. Thus, the purpose of this review is to explore the medicinal potentials of the commonly known Waterleaf (*Talinum triangulare*), which has been extensively used in local communities in Nigeria and beyond, to treat/manage various human ailments which include regulation of blood sugar level, dropsy, oedema and body weight management, as well as for food and feed. This research will help to promote the utilization and cultivation of Waterleaf by the public, and as well serve as a vital tool on which further researches can be based upon and used to explore the different parts of the plant.

**Keywords:** Biological, Ethnobotanical, Medicinal, Potential, *Talinum triangulare*.

### Introduction

Utilization of plant-based products in food supplements and health industries keeps increasing globally over the past decades, this is believed to be due to carcinogenic related problems associated with the usage of artificial or chemical products. Therapeutic properties of medicinal plants are very useful in the treatment of various diseases and the advantage of these plants is 100% natural with little or no side effects [1]. Many researchers aim to identify the possibility of using plant components to solve human health related problems [2], since it has been well known that plants show biological and pharmacological activities [3].

*Talinum* comprises of about 40 species, with most of them found in Mexico and Southern United States, while a few (about seven species) in tropical Africa [4]. *Talinum triangulare* is sometimes confused with *Talinum portulacifolium*, but the latter specie differs by its paniculate inflorescence which has terete axis, with sepals not prominently veined and smooth seeds [5].

### Botany and Classification

Kingdom: Plantae

Subkingdom: Tracheobionta – Vascular plants

Super division: Spermatophyta – Seed plants

Division: Magnoliophyta – Flowering plants

Class: Magnoliopsida – Dicotyledons

Subclass: Caryophyllidae

Order: Caryophyllales

Family: Portulacaceae – Purslane family

Genus: *Talinum* – fame flower

Species: *Talinum triangulare* (Jacq.) Willd. – Ceylon spinach [6]

Common names: Waterleaf, talinum, Ceylon spinach, Philippine spinach.

Synonym: *Talinum fruticosum* (L.) Juss. [7]



**Fig.1.** *Talinum triangulare* (leaves)

*Talinum triangulare* (Water leaf) is an edible leafy vegetable that belongs to the family Portulacaceae. It is a herbaceous perennial plant that normally has its stem evident above ground. The genus *Talinum* generally are self-pollinated, but there is the tendency for the population to be heterogeneous due to their floral propensity for insect pollinations [8]. *Talinum triangulare* is an erect, glabrous perennial herb with stem and leaves succulent but roots swollen and fleshy, has purple flowers.

It is eaten as a vegetable throughout the tropical regions, including many West and Central African countries. It 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. This abundance affects its market price, making it drop to a level where it is almost worthless to collect for sale.

However, during the dry season water leaf is harvested from the wild when other more popular leafy vegetables are scarce, and thus very expensive. The vegetable becomes a common place ingredient at backyard gardens where it is often treated as an unwanted plant. A lot of water is released when the vegetable is cooked leaving very limited dry matter to be consumed.

The slimy vegetable leaves are therefore often sun dried before cooking in order to retain appreciable dry matter as vegetable soup [9].

**Table 1.** Biological Uses and the Function of *Talinum triangulare*

| <b>Treatment/ Medicinal Effect</b>                                   | <b>Function</b>   | <b>Source</b> |
|--|---|---------------|
| Antioxidant and Hepatic disease                                      | Suppression of oxidative damage of liver cells  | [10]          |
| Liver Disease  | Helps to enhance liver function   | [11]          |
| Enhancement of cerebral function                                     | Reduce oxidative stress, supports neurons of cerebrum and enhances cerebral function.   | [12]          |
| Laxative effect  | Antioxidant activity helps to treats mild laxative problem and constipation.  | [13]          |
| Diabetes   | Essential for managing diabetes mellitus, its high dietary content helps to slow down digestion and conversion of starch to simple sugar.                             | [13]          |
| 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 | [13]          |
| 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                         | [14]          |
| Body weight management   | The high dietary fibre prevents obesity and excess body weight.   | [15]          |
| 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   | [11]          |

### Proximate Compositions and Mineral Content

Proximate compositions of *Talinum triangulare*; protein (28.82-32.22%), crude fibre (8.50-9.30%), ash (2.46-3.26%), nitrogen-free extractives (1.38-2.18%), Dry matter (19.55-23.15%) and carbohydrate (55.34-56.54%). Mineral composition in mg/100g; P (196.50), Ca (74.60), Mg (70.40), K (156.60), Na (80.60), Zn (10.50), Fe (0.65), Cu (0.12) [9].

## Ethnobotanical Importance

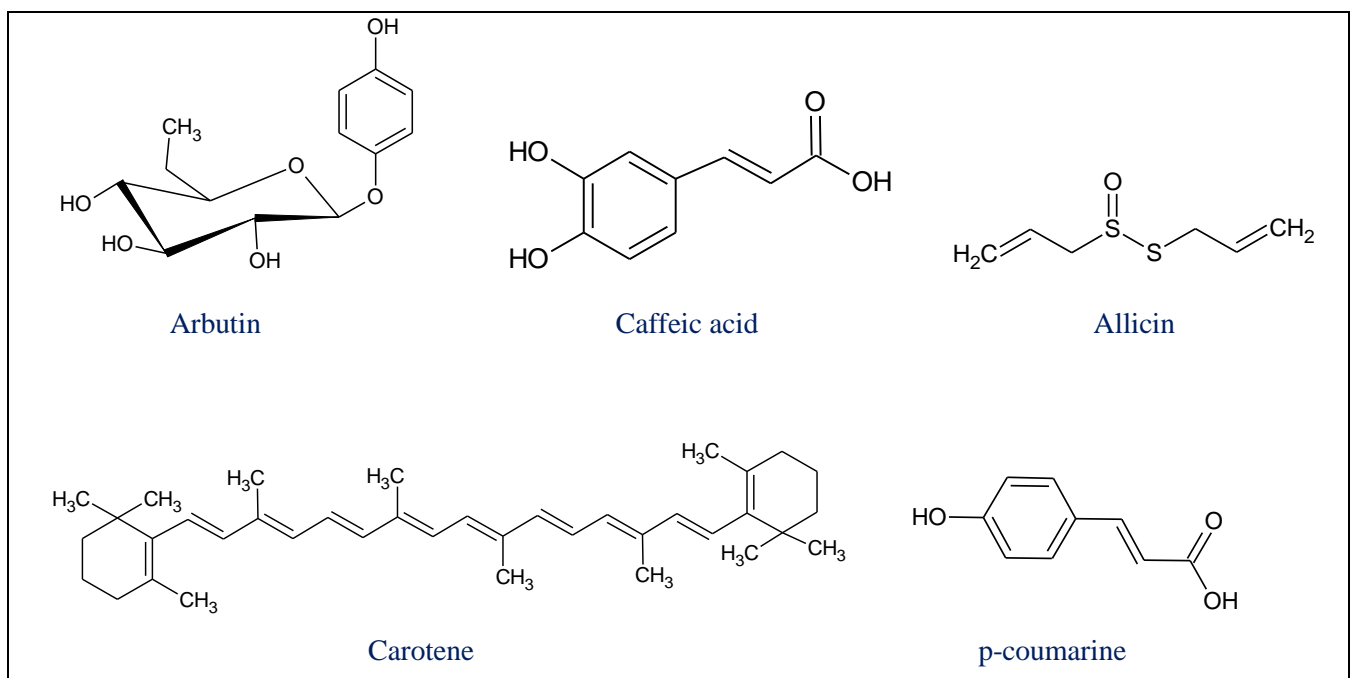
The mineral content makes it effective as supplement for soybean meal and groundnut cake in formulating broiler feed, as a cheap yet effective alternative for poultry feed [16]. The leaves are edible as vegetable, and are used to speed up the elimination of faeces from the body; also used to feed livestock; treat gastrointestinal disorder, dropsy, swelling, oedema and to reduce cardiovascular diseases. The root is used for the preparation of rat poison [17].

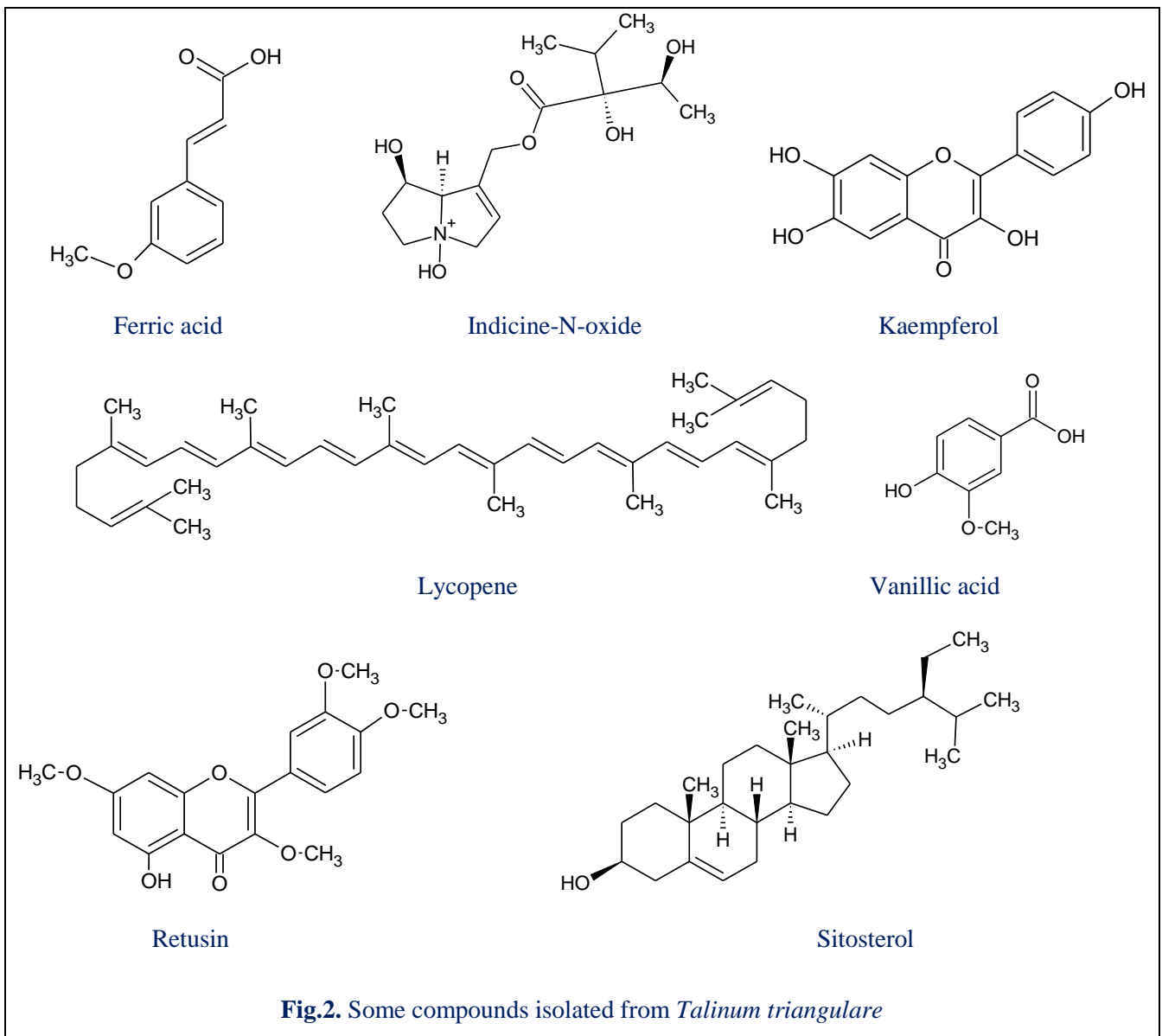
*Talinum triangulare* has among other plants been enlisted in an inventory of medicinal plants in a homestead garden, where a traditional medical practitioner harnesses its parts for herbal preparations [18]

## Chemical Composition

Phytochemical analysis revealed that *Talinum triangulare* is an excellent source of tannins, alkaloids, saponins, phenol and flavonoids, which suggests its potential medicinal and dietary benefits. Alkaloids and phenols were especially found to be in high amounts in *Talinum triangulare*, which justifies its high use as an antioxidant. Studies showed that the leaves contain a reasonable proportion of bioactive compounds that are essential for preventing and treating various ailments [17, 19-20]. Antioxidant properties of *Talinum triangulare* was ascertained by Liang and others supporting that it contains high antioxidant properties [10].

Ikechukwu and others ascertained the presence of bioactive compounds using gas chromatography coupled with pulse and flame ionization detector. This shows that *Talinum triangulare* has high carotenoids; moderate benzoic acid derivatives, hydroxycinnamates and flavonoids; low terpenoids, alkaloids, phytosterols, alliscins, glycosides, saponins and lignans contents. Compounds detected in high contents include; Carotenoids (carotene and lycopene), benzoic acid derivatives (ferulic acid and vanillic acid), hydroxycinnamates (p-coumaric acid and caffeic acid), lignans (retusin), flavonoids (quercetin and kaempferol), Phytosterol (Sitosterol), Glycosides (Arbutin) Saponins (Avenacin-B1), alliscins (Diallyl thiosulphinate), alkaloid (Indicine-N-oxide) [21].





### Nutritional and Health benefits

Studies showed that *Talinum triangulare* is a rich source of vitamin C, vitamin E, Omega-3 fatty acids, calcium, magnesium, soluble fibres (pectin), potassium,  $\beta$ -carotene, proteins and dietary fibre [22]. Further researches points out that *Talinum triangulare* is also a rich source of crude-protein, crude fibre, vitamins and minerals [23]. These vitamins and minerals contributes to the high antioxidant values of waterleaf. 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 [24].

### Conclusion

*Talinum triangulare* has shown to contain high medicinal potentials, interestingly 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.

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