

Phytochemical And Ethnobotanical Evaluation Of The Leaves Of *Talinum triangulare* (Jacq) Wild.

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Abstract

Phytochemical analysis and ethnobotanical survey of the leaves of *Talinum triangulare* (Jacq) Wild were investigated. Qualitative phytochemical screening revealed the presence of alkaloids, tannins, phenols, flavonoids and saponins while the leaf extract was devoid of glycosides, steroids and carbohydrates. Quantitative estimation of each phytochemical present showed that the leaf extract contained 0.04% alkaloids, 12.5% tannins, 2.12% phenols, 26% flavonoids and 0.19% saponins. Ethnobotanical survey showed that *Talinum triangulare* has a number of nutritional and therapeutic uses in the different localities in South Eastern Nigeria.

Key words: Phytochemical, Ethnobotany and *Talinum triangulare*.

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Introduction

Talinum triangulare (Jacq) Wild commonly called waterleaf is a vegetable and belongs to the family *Portulacaceae*. It is an erect succulent herb which can be found as a natural weed and sometimes cultivated as a short-lived perennial herb. The mature plant measures between 30 cm and 60 cm in height. Vegetables are plants eaten as supporting food or main dishes and may be aromatic, bitter or tasteless (Edema, 1987).

The plant is found in West Africa, West Indies, South America (Adams, 1972) and in warmer parts of the world (Mabberly, 1980). In Nigeria, its wide acceptance across various ethnic groups has earned it several local names such as "ngbolodi" (Igbo), "mmon-mmong ikong" (Efik/Ibibio) and as "egure" (Yoruba) among others. The plant is cultivated during rainy season usually in a variety of habitats including road sides, open fields and abandoned agricultural lands (Edet and Sunday, 2007).

Vegetables vary considerably in their nutrient composition. Their carbohydrate content is low when compared with the starchy foods which form the bulk of the food eaten by man. They contain vitamins, essential amino acids, minerals and

antioxidants (Fasuyi, 2006). According to Okafor (1983), vegetables are the cheapest and most available source of proteins, vitamins, minerals and essential amino acids. Some of the important vegetables grown in Nigeria include *Amaranthus cruentus* L., *Telfaria occidentalis* Hook. F., *Gongronema latifolium* Benth, *Celosia argentea* L., *Vernonia amygdalina* Del., and *Talinum triangulare* (Jacq) Wild.

Nutritionally, both the leaves and tender stems of *T. triangulare* are consumed as part of dietary supplement in starchy foods, sauces, condiments, spices and flavourings in human diet. They are also used as supplementary feeds to livestock such as rabbits, poultry, swine and cattle (Alector and Adeogun, 1995). The nutrient contents of the leaves of *T. triangulare* as reported by Mensah *et al* (2008) include carbohydrate, protein, ash, lipids, amino acids, moisture, crude fiber, ascorbic acid, pectin, potassium, calcium, magnesium, iron, sodium, beta-carotene and vitamins. Mensah *et al.* (2008) showed that the leaves or roots of *T. triangulare* are either employed singly or in combination with other medicinal herbs as diuretics in gastrointestinal disorder. The leaves are also used in the treatment of ailments such

as oedema, dropsy, swellings and scabies. The use of the roots in preparing rat poison has been reported by Aiyeloja and Bello (2005).

Following the nutritional and medicinal importance of this plant, there is the need to evaluate the phytoconstituents and ethnobotany of *T. triangulare*. This paper therefore examines the phytochemical and ethnobotanical properties of the leaves of *T. triangulare*.

Materials and Methods

Collection and identification of plant materials. The leaves of *Talinum triangulare* (Jacq) Wild. were collected from a village compound in Igbo-Eze South Local Government Area of Enugu State and authenticated by Prof. J.C. Okafor, a taxonomist, of Fame Agricultural Center, Enugu and used for this study.

Preparation of sample: The leaves of *T. triangulare* were sun dried and milled into a uniform powder using an electric milling machine. The milled sample was stored in a plastic container till required for analysis.

Extraction procedure: Ten grammes (10 g) of the powdered leaf sample was placed in a beaker containing 50ml of ethanol. The extract was obtained from the mixture by agitating the mixture on a rotary shaker for 45 minutes. The extract was then stored in a closed container for phytochemical analysis.

Phytochemical analysis: The phytochemical screening of the leaf extract of *T. triangulare* was carried out using the procedures and methods described by Harbone (1994) to test for the presence and amount of some bioactive compounds like alkaloids, tannins, saponins, phenols, glycosides, flavonoids, steroids and carbohydrates in the leaf extract.

Ethnobotanical survey: The survey on the ethnobotany of *T. triangulare* was carried out in South Eastern Nigeria where the plant is very popular. The localities visited include Nsukka (Enugu State), Awka (Anambra State), Umuahia (Abia State), Abakaliki (Ebonyi State) and Orlu (Imo State).

Information was obtained on the plant through personal contacts (interviews)

and the use of questionnaire. Data was elicited from 200 respondents per locality. Questionnaire was administered to literate respondents while non literate ones were interviewed. The services of three trained research assistants were employed to help elicit data in some of the localities under survey.

Results

The phytochemical screening of the leaf extract of *T. triangulare* (Jacq) Wild revealed the presence of alkaloids, flavonoids, tannins, phenols and saponins (Table 1). The leaf extract was however devoid of glycosides, steroids and carbohydrates. Quantitative estimation of the percentage of each of the phytochemical identified showed that the leaf extract contained 0.04% alkaloids, 26% flavonoids, 12.5% tannins, 2.12% phenols and 0.19% saponins (Table 2).

Table 1: Qualitative phytochemical screening of the leaf extract of *T. triangulare* (Jacq) Wild.

Constituents	Results
Alkaloids	+
Flavonoids	+
Tannins	+
Phenols	+
Saponins	+
Glycosides	–
Steroids	–
Carbohydrates	–

+ = present, – = absent

Table 2: Quantitative phytochemical screening of the leaf extract of *T. triangulare* (Jacq) Wild.

Constituents	Percentage
Alkaloids	0.04
Tannins	12.5
Phenols	2.12
Flavonoids	26.0
Saponins	0.19

The survey on the ethnobotany of *T. triangulare* revealed the nutritional and medicinal uses of the plant in the various

localities surveyed (Table 3). All the respondents agreed that the leaves of *T. triangulare* are edible in the various localities. They confirmed the use of the

leaves in feeding livestock, treatment of various ailments and the use of the roots in preparing rat poison.

Table 3: Ethnobotany of *T. triangulare* (Jacq) Wild in South Eastern Nigeria.

Locality	Local Name	Number of respondent	Percentage of respondent	Plant part used	Traditional Useage
Nsukka	Ngborodi	190	22.1	Leaf/Root	<ol style="list-style-type: none"> 1. Leaves are edible. 2. Leaves are eaten to speed up the elimination of faeces during indigestion. 3. Roots are used to prepare rat poison.
Awka	Mgbolodi	185	21.5	Leaf/Root	<ol style="list-style-type: none"> 1. Leaves are edible and used to feed livestock. 2. Leaves and roots are used to treat schistosomiasis, scabies and fresh cuts. 3. Roots are used to prepare rat poison.
Abakaliki	Mgborodi	130	15.1	Leaf	<ol style="list-style-type: none"> 1. Leaves are edible. 2. Leaves are used to feed livestock and treat gastrointestinal disorder. 3. Leaves are taken to reduce cardiovascular diseases.
Umuahia	Mgbolodi	165	19.2	Leaf	<ol style="list-style-type: none"> 1. Leaves are edible. 2. Leaves are used to feed livestock. 3. Leaves are used to treat dropsy, swellings and oedema.
Orlu	Mgbolodi	190	22.1	Leaf	<ol style="list-style-type: none"> 1. Leaves are edible. 2. Leaves are used to treat dropsy, swellings, oedema and cardiovascular diseases. 3. Leaves are used to feed livestock.
Total		860	100%		

Discussion

The phytochemical screening and quantitative estimation of the percentage yield of phytoconstituents of the leaf extract of *Talinum triangulare* revealed the presence of alkaloids, tannins, phenols, saponins and flavonoids. Similar bioactive constituents have been reported on leaf extract of *Ocimum gratissimum* (Mbata and Saika, 2008) and *Ageratum conizoides* (Sazada *et al.*, 2009). Doherty *et al.* (2010) showed that alkaloids and their synthetic derivatives are used as basic medicinal agents for their analgesic, antispasmodic and antimicrobial effects. They are physiologically active when administered to animals. Tannins hasten the healing of wounds and inflamed mucous membrane (Okwu and Okwu, 2004). The presence of tannins in the leaf extract of *T. triangulare* supports its use in treating wounds, varicose ulcers and burns in herbal medicine. The occurrence of phenols in the leaf extract is an indication that the plant might be an antimicrobial agent. According to Okwu (2004), phenols have been extensively used in disinfection. The leaf extract of *T. triangulare* therefore possess potent antiseptic or antibactericidal properties. Furthermore, the presence of phenols suggest that the leaf extract of *T. triangulare* could act as anti inflammatory, anti clotting, antioxidant, immune enhancers and hormone modulators (Doherty *et al.*, 2010).

Flavonoids are known for their antioxidant properties. They protect the body against allergies, viruses and tumors (Okwu, 2004). This could be the reason why the leaf extract of *T. triangulare* is used in treating intestinal troubles in herbal medicine. The presence of saponins were also detected in the leaf extract. Saponins have the characteristics of formation of foams in aqueous solutions, hemolytic activity, cholesterol binding properties and bitterness (Sodipo and Akiniyi, 2000). These qualities make saponins a good material for manufacturing of drugs.

The use of the leaves of *T. triangulare* for both nutritional and therapeutic purposes has been revealed in this study. Mensah *et al.* (2008) reported the use of

leaves or roots of *T. triangulare* in treating ailments such as gastrointestinal disorder and oedema. The use of the leaves of *T. triangulare* as part of the dietary supplement in starchy food, sauces, condiments, spices and flavouring in human diets, and as supplementary feeds to livestock such as rabbit, poultry, swine and cattle has been reported by Alector and Adeogun (1995). These reports confirm their uses in the various localities surveyed. Ezekwe *et al.* (1997) showed that *T. triangulare* helps to reduce the risk of cardiovascular diseases. The use of the plant root in preparing rat poison was reported by Aiyelaja and Bello (2005). These findings equally agree with the results obtained in this study.

The present study has examined the phytoconstituents and ethnobotany of the leaves of *T. triangulare*. The results obtained in this study explains why the plant material is used in herbal medicine. The leaves of *T. triangulare* can be seen as a potential source of food and drug. The use of this plant for the treatment of diseases as claimed by traditional healers should be investigated.

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