

Azanza garckeana (Goron Tula) as an Edible Indigenous Fruit in North Eastern Part of Nigeria

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Abstract

Azanza garckeana known as “Goron Tula” (Tula Kola nut) in Gombe State and Morojwa in Botswana is a valuable edible indigenous fruit widely distributed in Tula, Kaltungo Local Government Area of Gombe State and in Michika in Adamawa State. It is an indigenous fruit tree species that is semi-domesticated by the people of Tula. It is an important indigenous source of food in Tula, which is believed to increase the fertility of the people. Besides the fruit, the tree provides fodder for their animals, timber for firewood, shade; soil conservation and the bark and root are utilized for health purpose. The pulp and seed is an important source of phytochemical and mineral components such as ascorbic acid, Magnesium, Calcium, Sodium, Iron, Potassium, Phosphorus, crude fiber, Carotenoids, Tannins, Saponins, Alkaloids, Flavonoids, Phenols, C. glucosides and Xanthone. The potentials of *Azanza garckeana* cannot be over emphasized. It has a high socially and economic value in Northern part of Nigeria.

Keywords: *Azanza garckeana*, edible fruit tree, Phytochemical, North Eastern Nigeria

1. Introduction

Nigeria is located at the West Africa, it have boundary with Benin in the West, Chad and Cameroun in the East and Niger in the North. Nigeria is blessed with indigenous fruit trees such as bread fruit, cashew and pears including Avocado pear, mangoes and Tula kola nut (*A. garckeana*). Some are undomesticated but plays an important role among the people living in the rural areas of Nigeria (Ochokwu *et al.*, 2014). Indigenous fruit trees are good sources of fruits, nuts, spices, vegetables, beverages and edible oil (Mojeremane and Tshwenyane (2004)). Indigenous fruits provide minerals, vitamins and ant nutritional factors essential for maintenance of human health (Saka *et al.*, 1994 and Ochokwu *et al.*, 2014). According to Mojeremane and Tshwenyane (2004) and Ochokwu *et al.* (2014) the nutritional value of indigenous fruit bearing tree species shows that many are rich in phytochemical, which include glucosides, essential vitamins and minerals while some are high in fat, protein and crude fiber. Other benefits of indigenous fruit trees include fodder, medicinal, firewood, timber, shade and cosmetics. This are mostly utilized during the period of seasonal food shortages. In Nigeria, indigenous fruit trees are available during the dry season and are utilized because of inadequate agricultural produce hence improving food security among the households. The growing of trees means less dependence on arable agriculture, help decrease environmental degradation and prevent desertification. *A. garckeana* is one of the indigenous fruit tree species found in Nigeria (Ochokwu *et al.*, 2014). It is semi domesticated in Kaltungo and michika local government area of Gombe and Adamawa state in Nigeria and recently was located at Jimeta Yola.

2. Local Names and Distribution:

Azanza garckeana in English is known as tree hibiscus, azanza, snot apple, in Nigeria goron tula, Bostwana morojwa South Africa *Thespesia garckeana* (Orwa *et al.* 2009; Mojeremane and tshwenyane, 2004; and Ochokwu *et al.*, 2014). It is also found in Sudan, kenya, Malawi, Mozambique, Namibia, Tanzania, Zimbabwe, and Zambia. *A. garckeana* is widely distributed in the east, west and southern Africa. It generally grows naturally in all types of woodlands from sea level to about 1700m above sea level (Mbuya *et al.*, 1994). It also grows in semi arid areas, receiving lowest annual rain fall of 250mm and highest rain fall of 1270mm (Orwa *et al.*, 2009). *A. garckeana* grows in a variety of soils and is found near termite mounds and deserted areas while in Nigeria it grows in open woodland in the north eastern part of the country.

2.1 Description of *A. garckeana*:

A. garckeana is a deciduous shrub; the tree can grow to a height of 3-15m high depending on the climate condition, the stem diameter at breast height of up to 25cm (Orwa *et al.*, 2009). The tree is multi-stemmed with straight or crooked stem, which is sometimes forking from the base.

The bark is rough and grayish-black to brown, fibrous with longitudinal fissures. The twigs are hairy when young but become smooth with age and branches have wooly hairs. The leaves are distinctively rounded, 8 by 12 cm on long stalks as shown in Figure i. They are always simple, alternate and roundish. The leaves have 3 to 5 lobes, which are covered in brown star-shaped hairs, and have longitudinal fissures in the midrib. The tip of the leaf is usually bluntly pointed or rounded. The base of the leaf is heart-shaped and is 5 to 7 nerved. The young leaves are bronze in colour and velvety Mojeremane and Tshwenyane (2004). The flowers are large up to 6cm

long, solitary on long pedicels in the axils of uppermost leaves, yellow with a purple-brown centre; the petals are obovoid or globose and capsules are up to 4cm long, the thickness is 3cm. the fruit is globose and have woody capsules of up to 3 to 4cm in diameter, it is divided into 5 segments with each segment containing a seed, the remains of the calyx and epicalyx at the base; the seeds are hemispherical, up to 10 mm long, 7 mm thick, with brownish and woolly floss (Orwa *et al.*, 2009).

FAO (1983) reported that *A. garckeana* grows naturally in semi arid areas receiving annual rain fall that range from 250mm to 1270mm. Flowering takes place during the raining season, while fruit ripening occurs during the dry season, hence it takes about six month from flower fertilization to ripening of the fruit (Orwa *et al.*, 2009), while In Southern Africa, flowering occurs from December to May and fruiting from February to September while in North Eastern Nigeria flowering occurs from May to October and fruiting/ ripening from November to April (Ochokwu *et al.*, 2014).



Fig 1 *Azanza garckeana* tree with fruit and leaves (Mojeremane and Tshwenyane (2004))

3. Importance of *Azanza garckeana*

3.1 The fruits and leaves

The fruits are the most useful part of *Azanza garckeana*. The fruits are eaten while slightly green or when ripe Figure ii. They are persistent, therefore are picked on repining. Some people dry them and reconstitute them later Figure iii (Mojeremene and Tshwenyane (2004)). The fruits can be soaked in a small amount of water to make jelly; they can also be boiled and used as relish or made into porridge Mojeremene and Tshwenyane (2004). Leaves are used for making relish and can be burned to produce salt. The fruits of *A. garckeana* have been reported in a number of states in northern Nigeria. This is an indication that the species is not a simple and occasionally exploited tree of the wild vegetation but has a role in economic systems of farmers.



Fig 2: *Azanza garckeana* fruit
Ochokwu *et al.*, (2015)



Fig 3: *Azanza garckeana* pulp after seed removal

3.2. Timber

The wood of *Azanza garckeana* has many uses, which are, appreciated by people living in rural area of Tula. The wood is a source of fuel wood in areas where there is shortage of firewood and is fully utilized by rural people, and it can also be converted into charcoal (Orwa *et al.*, 2009). The wood is used for construction materials, poles, fencing posts, farm implements, tool handles, domestic utensils and knife sheaths (Orwa *et al.* 2009, Mojeremene and Tshwenyane 2004 and Ochokwu *et al.* 2014)

3.3. Fodder

Leaves are eaten by game and livestock and are a source of fodder during the dry season, The leaves also provide bees with forage (ICRAF, 1992).

3.4. Miscellaneous uses

The long shoots are traditionally used as whips (Palmer and Pitman, 1972) and the inner bark and pulp is a source of fibre (Mateke, 1998). *Azanza garckeana* is commonly used for ornamental purposes. The roots are medicinal and are taken orally for painful menstruation and to treat coughs and chest pains. An infusion made from the roots and leaves is dropped into the ear to treat earache or taken orally as an antiemetic Orwa *et al.* (2009). The trees provide shade to people during the cropping season. *Azanza garckeana* has been used in soil conservation projects; it is also used for mulching and as green manure (ICRAF, 1992).

3.5. Husbandry and management

Within its geographical range the *Azanza garckeana* occurs naturally as a component of open vegetation and pure stands are not common. Conventional plantations are not common but management and planting of few or single trees interspersed with land devoted to other uses takes place. Organized planting of *Azanza garckeana* has not occurred, however the species regenerates naturally from seed, coppice and suckers (FAO, 1983). The seeds germinate readily when conditions are favorable. The seeds can achieve acceptable germination percentages without any pre-treatment. Coppice shoots are produced after the tree has felled.

3.6. Agro-forestry potential

Azanza garckeana is an incidental component of many farming systems. Traditionally many crops (maize, millet sorghum etc.) are grown under the canopy of *Azanza garckeana*. The advantages of intercropping these crops with *Azanza garckeana* have not been scientifically studied. However, casual observations indicate that crops grow better under the canopy and the leaves decay and serves as source of manure to the crop. There is no information available on the species contribution to crop production although the leaves are a source of manure and can improve soil fertility. Most recently it has been planted intentionally as an agro-forestry tree in trials in Botswana and other countries but conclusive results of the trials are not yet available Mojeremene and Tshwenyane (2004).

4. Conclusion and recommendation

Azanza garckeana is an important multipurpose edible indigenous fruit tree in Nigeria. The species has great potential to be used an agro-forestry species, considering the presence of ant-nutritional factors and minerals compositions in *A. garckeana*, it can be used as a fertility enhancer and therefore should be encouraged as it will minimize the dependence on synthetic drugs as fertility enhancing agents

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Fig 4: *Azanza garckeana* Particle Size Reductions (Ochokwu *et al.*, 2015)



Fig 5: *Azanza garckeana* Pounded into fine particles

Table 1: Nutrient Composition and % Dry Matter Basis of *Azanza garckeana* Pulp Meal

Nutrient and Mineral Compositions	Values
Moisture Content	14.5%
Crude Protein	10.9%
Fat	7.0%
Crude Fiber	41.3%
Ash	11.2%
Nitrogen Free Extract	15.1%
Sodium	180.30 mg/l
Calcium	17.82 mg/l
Iron	13.89 mg/l
Magnesium	3.59 mg/l
Potassium	1810.0 mg/l
Phosphorus	59.50 mg/l
Energy Value	2.20 kcal/g
p ^H	5.09
Ascorbic Acid	20.5mg/100g

Ochokwu *et al.*, (2015)

Table 2: Phytochemical Composition of *Azanza garckeana* Pulp

Phytochemical	Composition%
Carotenoids	3.90
Tannins	0.18
Saponins	1.20
Alkaloids	2.80
Flavonoids	0.75
Phenols	1.90
Cyanogenic glucosides (ug/g)	0.21
Xanthone	0.68

Ochokwu *et al.*, (2015)

Table 3: Phytochemical Composition of *Azanza garckeana* Seed

Samples	Composition
Tannin	0.22 %
Saponin	1.72%
Alkaloids	3.7%
Flavonoids	1.0%
Phenols	2.60%
Cyanogenic lucosides	0.33ug/g
Carotenoids	3.40%

Michael *et al* (2015)

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