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**Research Article**

# ACCESSMENT OF NUTRITIONAL AND PHYTOCHEMICAL QUALITIES OF *Strychnos spinosa* (NUX VOMICA TREE) AS FOOD

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**Abstract**

*Strychnos spinosa* consumed largely by the rural dweller of Nupe people in Niger state of Nigeria were subjected to standard chemical analysis to determine proximate content, mineral composition, and anti-nutritional factors. The results of the proximate analysis showed that the fruit contained 30.0% moisture, 14.9% ash, 6.7% fats, 6.7% crude fiber, 39.6% carbohydrate and 2.13% crude protein. Phytochemical screenings revealed the presence of Alkanoid, Flavoid Glucoside while Steroid and Saponins were absent The mineral analysis shows that calcium has the value 20.3mg/100g, potassium 18.1mg/100g, magnesium 32.0mg/100g, zinc 29.3mg/100g, Iron 41.0mg/100g and manganese 0.4mg/100g. The results of the study indicate that *Strychnos spinosa* can be used for herbal treatment of various diseases and are very nutritious for human consumption.

**Keywords:** *Strychnos Spinosa*, proximate, phytochemical and mineral composition.

## Introduction

*Strychnos spinosa* locally known as yilanchi by Nupe people of Niger State in Nigeria. It is a traditional indigenous plant, it is planted as shade tree, and grown up to 25m height with a denser down. The bark is smooth and grayish with young reddish branches, the leaves are velvety beneath when young (Abdullahi *et al*, 2003). The fruit is short pear shaped and can be eaten raw after it has matured or boiled before eating.

Local indigenous vegetable are found to be good and affordable by low income earners in the society. These plants contain many important compounds and thus serve as important source of minerals, vitamins, proximate and phytochemical compounds. (Sara *et al*, 2008).

Research has shown that some of these local indigenous vegetables are highly nutritional and medicinal (Ndlova *et al*, 2008., Sara *et al* 2008, Penny *et al*, 2002). Studies have revealed that vegetarians are less susceptible to disease healthy and more productive lives with strong immunity (Akindatuns, et al, 2008).

Malnutrition can be tremendously reduced with an increase use of vegetable in the rural environment (Richard *et al*, 2007).

Vegetables have been reported to be inexpensive and very easy to cook, (Devadas and Saroja 1980).

Due to the negligence on these indigenous fruits, this present study therefore aim at assessing the nutritional potential of *Strychnos spinosa* by determining the proximate, phytochemical and mineral compositions.

## Materials and Methods

The fruits of *Strychnos Spinosa* were collected from Bida in Niger state. The fruit were washed with clean water, dry and ground into powder form using electric grinder. The grinded samples were store in a well labeled air – tight container at ambient temperature for further analysis.

**Phytochemcial screening**

Chemical test were carried out on the powdered specimen using standard procedure to identify the constituent as described by Hassan et al 2004 and Trease and Evans (1993). The plant was screened for Tannins, saponins, alkaloid glycoside, steroids and Flavonoid .

**Proximate analysis.**

Proximate screening was carried out on the powdered specimen using standard method described by AOAC 1995. These include crude fibre, crude proteins, Ash, carbohydrate, fat content and moisture content.

**Mineral content**

The mineral contents analyzed were iron (Fe), copper (Cu), Zinc (Zn), Magnesium (Mg) and Calcium (Ca). The same standard methods described by AOAC 1995 were adopted.

## Results and Discussion

The result of phytochemical screening of S*trychnos spinosa* are shown in table I. tannins, Saponins, steroid, alkaloid Flavonoid, and glycoside were the major phytochemical compound identified in the fruit extract. These phytochemical compounds exhibit diverse pharmacological and biochemical actions when ingested by animals (Amadi et al 2006).

**Table1:** Phytochemical Screening of *Strychnos spinosa* sample

| Parameter | Crude extract |
|---|---|
| Taninns | + |
| Saponins | -- |
| Steroid | -- |
| Alkaliod | + |
| Flavonoid | + |
| Glycoside | + |

+ = positive while -- = negative. The results were average of triplet readings.

Saponin reduces the availability of certain nutrients by competing with them and making them indigestible. Alkaloids protect against chronic diseases, saponins protect against hyper cholesterolemia and anti biotic properties.

Steroids show the analgesic properties.Steroids and Saponins were responsible for central nervous system activities. Tannins is used in treating common pathogenic strains (Shelton, 2008).

Glycoside, steroids and tannins can complex with most essential trace metals, therefore making them unavailable for enzymatic activities and other metabolic activities (Maynard 1997).

Proximate composition of *Strychnos spinosa* is presented in Table 2. The ash content of the fruit 14.90% is low compared to 17.3% and 16.30% observe in *crassocephalum* crop idiodes and senecio biafrae (Dairo and Adanlowo, 2007).

**Table 2:** Proximate Composition of *Strychnos spinosa* sample

| Parameter | Concentration (%) |
|---|---|
| Moisture | 30.0 |
| Ash content | 14.90 |
| Fat content | 6.70 |
| Crude fibre | 6.70 |
| Crude protein | 2.13 |
| Carbohydrate | 39.6 |

Ash content reveals the level of mineral nutrients present in plant material. The fat content observed for *Strychnos spinos*a 6.7% is higher than those reported in *Solanum nigrum* 4.80%, commelina nediflora 1.55% and *Boerhavia diffus*a 1.61% (Akubugwo *et al*, 2007).

Fats are essential in diets as they increase the palatability of foods by absorbing and retaining their flavors' (Omotoso, 2006). However *Strychnos spinosa* can serve as a fat supplement in human diet. Though the fibre (6.7%) content of the sample was observed to be a little higher compared to results obtained by (Akubugwo *et al*, 2007)., it is however in agreement with the observations of Asenwa and Ikenebomeh (2008) and ( Herog et al; 1994: (2004) who reported higher values.

Fibre in food materials decrease dry matter digestibility in animals, therefore high crude fibre content shows good nutritive value of a feed material (Husain and Becker 2001).

Carbohydrate content of the fruit is low compared to other fruit consumed in Nigeria such as *Olenum Ingram* 53.51%, *Hibiscus Sabdarifa* (33.00%), *Diospyrous mespillformi*s 77.74% and 54.00% Deneia Ogea ( Herog et al; 1994:Alli, 2009 and Akubugwo et al, 2007) while the value is higher than those of cassava leave 7.6%, *Telfaira accidental*s 15.6% Asenwa and Ikenebomeh (2008). Carbohydrates are important natural sweetness and raw materials for food (Diaro and Adanlawo 2007) However the result shows that the protein content is relatively low but it can contribute to the formation of hormones which control a variety of body function such as repair, growth and maintenance of body protein (Mau et al 1999). The moisture content of the sample was observed to be 30.0% which is within the safe limit storage limit of plant materials (15%) (Diaro and Adanlawo 2007) This value is low compared to 84.70% and 76.86% reported in leaves and seed of *Solanum nigrum* (Akubugbo et al, 2007).However, the value was found to be similar to other fruits vegetables consumed in Nigeria. (Diaro and Adanlawo 2007).

An examination of the data from table 3 shows that *Strychnos spinosa* contains different mineral elements in various proportions. The variation in elemental contribution is mainly attributed to the differences in botanical structure, as well as in the mineral composition of the soil. In which the plant is cultivated. Other factors responsible for a variation in elemental content are preferential absorbability of the plant, use of fertilizers, irrigations water and climatologically conditions (Rejuker and Paradesh 1997).

The calcium value 20.30mg/100g. This is higher than the value reported in seed and leaves of *Solanum nigrum* 17.33mg/100g and 11.82g/100g (Akubugwo *et al,* 2007). Calcium is essential for healthy bones, teeth and blood (Diaro and Adanlawo 2007).The health of the muscles and nerves depends on calcium, it is required for the absorption of dietary vitamin B, for the activation of enzymes such as the pancreatic lipase. It helps to regulate the activity of skeletal muscles. Deficiency of calcium causes rickets and scurry. The recommend daily dietary allowance of Calcium for children is between 500 and 1000mg and 600mg for adults. This high content suggests its possible use to overcome deficiency of Calcium, (Diaro and Adanlawo 2007).

The fruit of *Strychnos spinosa* have fairly adequate concentration of potassium, magnesium and iron in comparison with those reported for *Hybridus, cassava* leaves, (Alli, 2009; Nwaogu et al, 2006). The values obtained for Potassium, magnesium and iron in *Strychnos spinosa* are higher than those reported in *C. crepidiodies,* and *S. biafrae*, (Alozie *et al*, 2009).

Potassium is involved for regulation of Osmotic pressure of the body and helps to maintain acid –base and water balance of the body. Its deficiency causes loss of body weight, nerves, diabetics and poor muscular control resulting in paralysis. Iron and magnesium (Transition elements) are well known for their role in bio-chemical process (Nwaogu et al, 2006)..Iron deficiency causes substantial blood looses.

Deficiency of Zn causes diabetes hyposima, and loss of weight. The availability of Zn (29,0 mg/100 may be beneficial for diabetic patients. Zn is necessary for growth and multiplication of cells and enzymes. Zinc content of *Strychnos spinosa* observed from the result to be 29.0mg/100g is high compared to those of *S. nigrum* 0.07mg/100g, *Telfairo accidenta*ls 17.17mg/100g. (Nwaogu et al, 2006). However, *Strychnos spinos*a contain appreciable amount of zinc which can supplement human diet.

**Table 3:** The Mineral Composition of *Strychnos spinosa* sample

| **Parameters** | **Concentration(mg/100g)** |
|---|---|
| Calcium | 20.30 |
| Potassium | 18.10 |
| Magnesium | 32.00 |
| Zinc | 29.3 |
| Iron | 41.0 |
| Copper | 3.32= |
| Manganese | 0.40 |
| Chromium | 0.40 |

*Strychnos spinosa* included in your diet ensues a good supply of Vitamins A and C that are highly essential for maintaining a good health. *Strychnos spinosa* constituent exhibit alkaline combination which improves all type of digestive and abdominal disorders. It also helps to prevent the oxidation of cholesterol. The fruit of *Strychnos spinos*a is a rich source of dietary fibre (Nwaogu et al, 2006).

## Conclusion

The results of chemical analysis of the crude powder of *Strychnos spinosa* plant showed potential as sources of useful drugs due to phytochemcial compound found in the study and also they can be used to improve the health status of its users as a result of the presence of various compounds that are vital for good health. Anti-microbial and Anti fungal activities should be investigated.

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