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## Nutritional and some elemental composition of shea (*vitellaria paradoxa*) fruit pulp

O. C. Aguzue\*, Akanji F. T., Tafida M. A. and Kamal M. J.

Chemistry Advanced Laboratory, Sheda Science and Technology Complex, Garki, Abuja

### ABSTRACT

The oven dried shea (*vitellaria paradoxa*) fruit pulp were analysed for its nutritional composition and some elemental constituents. The result showed mean value as moisture 4.58%, ash 8.95%, crude fat 1.35%, crude protein 3.5%, crude fibre 9.6% and carbohydrate 72.02%. Results of mineral analysis showed that calcium had the highest concentration of all the elements analysed and were found to be of the order: Ca > Ni > Co > Mg > Pb > Mn > Fe > Cd. These values suggest that the fruit can be used as nutrient supplement and as a source of micro and macro elements to the body.

**Keywords:** *vitellaria paradoxa*, shea fruit pulp, nutritional composition and elemental constituents.

### INTRODUCTION

*Vitellaria paradoxa* formerly known as *butryospermum paradoxum* is a tree indigenous to Africa. It is both a fruit tree and an oilseed crop. The plant is locally abundant in Nigeria in the derived savannah zones [1].

The shea tree produces a fruit whose pulp is sweet and edible when ripe. The nutritious pulp of the fruit is composed of the epicarp and mesocarp. It is widely consumed among the rural dwellers; it is sold in the local market and is also used as feeds to livestock [2]. The fruit ripens at the early part of the rainy season providing farmers a source of food while at the farm, complementing the depletion of food reserve at that critical time [3].

The shea tree is commonly known for its fat called shea butter, this is extracted from the kernels of its nut.

Shea butter oil is still considered second to palm oil as the most important source of cooking fat, particularly by West African rural dwellers [4]. Due to the climatic conditions of the savannah zones; where we have low rainfall and the palm tree hardly thrive, the shea butter oil has found significant use by substituting the palm oil [2].

Among other uses, the butter is also locally used in soap and pomade production [5] and in the treatment of cough and minor bone dislocation [6].

umali et al [4] reported on the elemental analysis and sugar content of the fruit pulp of *vitellaria paradoxa* from six Africa countries (excluding Nigeria). And baiyeri et al [7] reported the analysis carried out on the proximate compositions of the fruit pulp across its major distribution zones in Nigeria.

However, the socio-economical value of the shea butter seems to have overshadowed the usefulness of the fruit pulp which is also very important. Therefore, a more detailed study of the proximate and mineral compositions of the shea fruit pulp was considered necessary to determine its nutritional value and possible industrial or commercial value. The usefulness of the fruit pulp as a source of protein, fats and essential macro minerals necessary for the growth of man and animals is investigated and reported in this study.

## MATERIALS AND METHODS

### Preparation of sample for analysis

Fallen fruits of the shea tree were collected from the reserve garden within Sheda Science and Technology Complex Abuja, between June and July. Fresh whole fruits were depulped and the fruit pulp, comprising the epicarp and mesocarp, were oven-dried at 50°C to a constant weight (for three days). Dry samples were finely milled for laboratory analysis.

### Laboratory analysis

Nutritional compositions of milled samples were determined as described by the Association of Official Analytical Chemists [8] at the Chemistry Advanced Laboratory of Sheda Science and Technology Complex (SHESTCO) Abuja.

The Ash was estimated by incinerating 5 g of moisture free sample in a muffle furnace at 600 °C. Determination of fat was done by extracting 5 g of sample with hexane in a Soxhlet apparatus for 8hr. The micro-Kjedahl method was employed for estimation of crude protein by determining total nitrogen and converting to crude protein by multiplying with 6.25 and carbohydrate was determined by difference. Determinations were done in triplicate and results were expressed as the averages on dry weight basis.

### Elemental analysis

The dried fruit pulp was wet oxidized and the elements were determined by Atomic Absorption Spectrophotometer (Perkin-Elmer model 403, Norwalk Ct, USA). The minerals were reported in mg/100g sample.

**Table 1: Proximate composition of *Vitellaria Paradoxa* fruit pulp**

Components	(% w/w)
Crude Protein	3.50
Crude Fibre	9.60
Crude Fat	1.35
Moisture	4.58
Ash	8.95
Carbohydrate	72.02

*\*mean of triplicate determination.*

**Table 2: Mineral composition of *Vitellaria Paradoxa* fruit pulp**

Elements	Concentration (mg/100g)
Calcium	2.30
Magnesium	0.50
Nickel	0.86
Iron	0.012
Cobalt	0.80
Manganese	0.20
Cadmium	0.043

## RESULTS AND DISCUSSION

The proximate composition is given in table 1. The values obtained showed that the fruit contained high value of carbohydrate 72.02%, the values of protein and crude fat agree with the values (2.6-7.0% and 0.7-1.7%) reported by baiyeri et al[7] while the carbohydrate was high and crude fibre rather low but within range when compared with

other agro forestry specie such as the star apple(*chrysophyllum albidum*) and Africa pear (*Dacryodes edulis*) with values 4% and 17.9% respectively as reported by baiyeri et al[7].

Some of the mineral constituents analysed are reported in table 2. Calcium has the highest content and iron with the lowest value. The result of calcium, manganese and magnesium shows similar values with the one reported by Maranz et al and other mineral varies [9]. The varied levels of these minerals could be as a result of variation in some climatic factors and may also be due to the different rates at which the elements are taken up from the soil by the plants.

### CONCLUSION

Results from the present investigation shows that the fruit is of good nutritional value and a viable source of minerals in the body. It is also expected that the fruit will yield a greater amount of energy considering the relationship between carbohydrate and energy. Its nutritional potential is suggestive of the fact that it helps to alleviate hunger in the rural area during and after (when preserved) it's ripening season.

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