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**PROXIMATE, PHYTOCHEMICAL AND MINERAL COMPOSITIONS OF *VIGNA ACCONITIFOLIC* COAT, WHOLE GRAINS AND FRUITS (WHITE PARTS)**

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**ABSTRACT**

*Proximate, phytochemicals and mineral analysis of Vigna acconitifolic was analysed using standard procedures. The proximate (%) analysis indicates ash, moisture, crude fat, crude fibre, protein content and carbohydrate content. There is significant difference in the values obtained for the three samples analyzed for the mineral elements. These include calcium, magnesium, zinc, copper, nickel, manganese, iron, phosphorus. Also, important phytochemicals are also present in the sample such as tannins, phenols, flavonoids and saponins. The samples are subjected to statistical analysis of SPSS 23. The result of this study had shown that Vigna acconitifolic coat contained high nourishment in the sample analysed.*

**Keywords:** *Vigna acconitifolic, SPSS 23, proximate, phytochemical and mineral analysis*

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**INTRODUCTION**

*Vigna acconitifolic* seeds is one of the many genera of the flowering plant family of fabaceae which serve as nourishment for animals and mankind. This group of crops known as legumes (Shurtleff *et al.*, 2013). *Vigna acconitifolic* commonly called cowpea or beans are summer crops that require mild temperature to grow. *Vigna acconitifolic* contain moderate

number of nutrients and it takes about 50-60 days to grow from planting to harvest time. Some uncooked varieties of *Vigna acconitifolic* seem to be injurious to health, with tasteless toxin and lectin which can be eliminated by proper cooking. Not minding the side effects, it is still a significant source of protein for ages even till today. The best method of removing this toxicity is to cook the *Vigna acconitifolic* for minimum of 20 minutes though, may take more than that before it can be suitable for eating (Vicky, 2008). *Vigna acconitifolic* is very rich in protein, fiber, according to (Harrison *et al.*, 2009). The eatable *Vigna acconitifolic* have oligosaccharides such as raffinose and stachyose, which is a type of sugar molecule found in plant cabbage ( Peter, 2001). Consumption of *Vigna acconitifolic* contributes to the important fibre and soluble fibre in a diet. Blood cholesterols can also be reduced by soluble fibre (Ramiel, 2010). The objective of this research work is to evaluate the nutritional, nutraceutical and mineral potential of *Vigna acconitifolic* coat, whole grains and the white part of the grains.

## MATERIALS AND METHODS

### SAMPLE COLLECTION AND PREPARATION

The sample for the analysis was obtained from a local market in Iree town, Boripe Local Government Area of Osun State. The sample of *Vigna acconitifolic* species, locally called "Ewa Oloyin" grade 1, were cleaned to remove any impurities and foreign materials by hand picking. The *Vigna acconitifolic* was soaked with distilled water for 5 minutes, squeezed to remove the coats. The coats and the white part was air dried for a week. The coats, the white part and a whole grain of the *Vigna acconitifolic* which is not soaked in distilled water was grounded separately into powdery form and it was kept in a cover tight container. The samples for the analysis were labelled to be;

Sample A: *Vigna acconitifolic* coats

Sample B: *Vigna acconitifolic* whole grains

Sample C: *Vigna acconitifolic* fruits (white parts)

## METHOD

### The phytochemicals analysis.

Phytochemical parameters were carried out to determine some secondary metabolites such as phenols, alkaloids, flavonoids, terpenoids and saponins in *Vigna acconitifolic* samples by applying the methods used by (Harborne, 1973 and Sofowora, 1993).

### Mineral determinations

The method of (AOAC, 2000) was used to determine some micro and macro elemental constituents of the *Vigna acconitifolic* sample analyzed.

### Proximate analysis.

The recommended method of the Association of Official Analytical Chemist (AOAC,2000) were employed in the determination of moisture, ash, crude protein, crude fibre and crude fat contents while carbohydrate was determined by difference (FAO,1998)

### Statistical analysis.

All analysis was carried out in triplicates and subjected to statistical tool (SPSS 23)

## RESULTS AND DISCUSSIONS

Table 1: Proximate analysis of *Vigna acconitifolic* (%)

PARAMETERS	SAMPLE A	SAMPLE B	SAMPLE C
Ash content	4.263	3.643	3.704
Moisture content	12.917	10.901	10.574
Crude fat content	7.778	11.194	10.697
Crude fibre content	40.854	4.333	1.274
Protein content	27.400	20.206	18.795
Carbohydrate content	6.790	49.725	54.957

Table 2: Mineral analysis of *Vigna acconitifolic* (ppm)

PARAMETERS	SAMPLE A	SAMPLE B	SAMPLE C
Calcium	130.000	46.000	40.000
Magnesium	60.000	37.200	36.000

Zinc	1.630	1.008	0.975
Copper	0.150	0.992	0.960
Nickel	0.145	0.089	0.087
Manganese	0.100	0.062	0.060
Iron	1.375	0.853	0.825
Phosphorus	20.800	43.200	32.800

**Table 3: Qualitative phytochemical analysis**

PARAMETERS	SAMPLE A	SAMPLE B	SAMPLE C
Tannins	+ve	+ve	+ve
Phenols	+ve	+ve	+ve
Alkaloids	-ve	-ve	-ve
Flavonoids	+ve	+ve	+ve
Terpenoids	-ve	-ve	-ve
Saponins	+ve	+ve	+ve

Key:

+ve = Presence of constituents

-ve = Absence of constituents

**Table 4: Quantitative phytochemical analysis**

PARAMETERS	SAMPLE A	SAMPLE B	SAMPLE C
Tannins (mg/g)	1.959	1.329	0.627
Phenols (%)	48.975	33.225	15.675
Alkaloid (%)	0.000	0.000	0.000
Flavonoids (%)	5.336	17.322	15.736
Saponins (%)	4.586	11.163	11.941

Sample A: *Vigna acconitifolic* coats

Sample B: *Vigna acconitifolic* whole grains

Sample C: *Vigna acconitifolic* fruits (white parts)

## DISCUSSION

The proximate composition of the sample (%) is shown in table 1. The ash, moisture, crude fat, crude fibre, protein and carbohydrate content ranged

from (3.704-4.263), (10.574-12.917), (7.778-10.697), (1.274-40.854), (18.795-27.400) and (6.790-54.957) respectively.

In this study, a relatively high fibre value was recorded for *Vigna acconitifolic* coats (40.854) compared to (4.333) for *Vigna acconitifolic* whole grains and (1.274) *Vigna acconitifolic* fruits. According to (Chaney, 2006), he explains crude fibre as a rapid means of stool remover from the gastrointestinal tract which aids to guide the digestive tract problem such as constipation and diverticulosis. Other health importance of crude fibre in food is to reduce sugar uptake, reducing the cholesterol in the blood and also the binding of carcinogens.

The ash content of any sample is an indication of the mineral elements embedded in the samples analyzed (Bradbury and Holloway, 1988). This indicates (4.263) for *Vigna acconitifolic* coats, (3.643) for *Vigna acconitifolic* whole grains and (3.704) for *Vigna acconitifolic* fruits.

Among the analyzed samples, *Vigna acconitifolic* coats had the highest protein content of (27.400) compared to (20.206), (18.795) for *Vigna acconitifolic* whole grains and *acconitifolic* fruits respectively. It implies that *Vigna acconitifolic* coats is rich in protein. Nevertheless, the body requires proteinous food for tissue building (Genton *et al.*, 2010). *Vigna acconitifolic* coats had the lowest carbohydrate content of (6.790) compared with the two other samples analyzed, i.e *Vigna acconitifolic* fruits (54.957) and *Vigna acconitifolic* whole grains (49.725). This shows that *Vigna acconitifolic* fruits contains more carbohydrate than the coats. This shows that *Vigna acconitifolic* fruits is a good source of energy ( Oko and Ugwu, 2011).

Mineral composition (ppm) of the sample is shown in table 2. The mineral elements analyzed were calcium, magnesium, zinc, copper, nickel, manganese, iron and phosphorus. The level of calcium in the *Vigna acconitifolic* coats (130.000) was the highest among the three samples analyzed. Calcium helps in the formation of bones and also makes the bones to be strong. It contributes in enzyme activation, blood clotting, muscle contraction and cellular processes (Gropper, 2005). This shows that calcium is richly embedded in the *Vigna acconitifolic* coats. Next in concentration was magnesium (60.00) in the *Vigna acconitifolic* coats

while the concentration of zinc, copper, nickel, manganese and iron were quite low. However, the value for phosphorus in the *Vigna acconitifolic* whole grains seems to be highest (43.200) amongst the *Vigna acconitifolic* fruits (32.800). According to (Gropper *et al.*, 2005), phosphorus is actively involved in several biological important compounds which involves roles of acid-base balance, cell membrane structure, nucleic acid formation, energy transfer and storage bone mineralization.

The result of the phytochemical analysis of *Vigna acconitifolic* is shown in table 3. Alkaloids and terpenoids were absent while tannins, phenols, flavonoids and saponins were present. The indication of saponins in the sample have adjuvants and pharmacological activities (Gemedé and Ratta, 2004). Phenol is said to have antioxidant effects. Its mechanisms also involves free radicals scavenging and metal chelating activities (Wang *et al.*, 2014). In case of flavonoid, which possesses beneficial characteristics such as anticancer, antiviral and anti-inflammatory activities that reduces capillary fragility and restrict human platelet aggregation (Peace and Happiness, 2018).

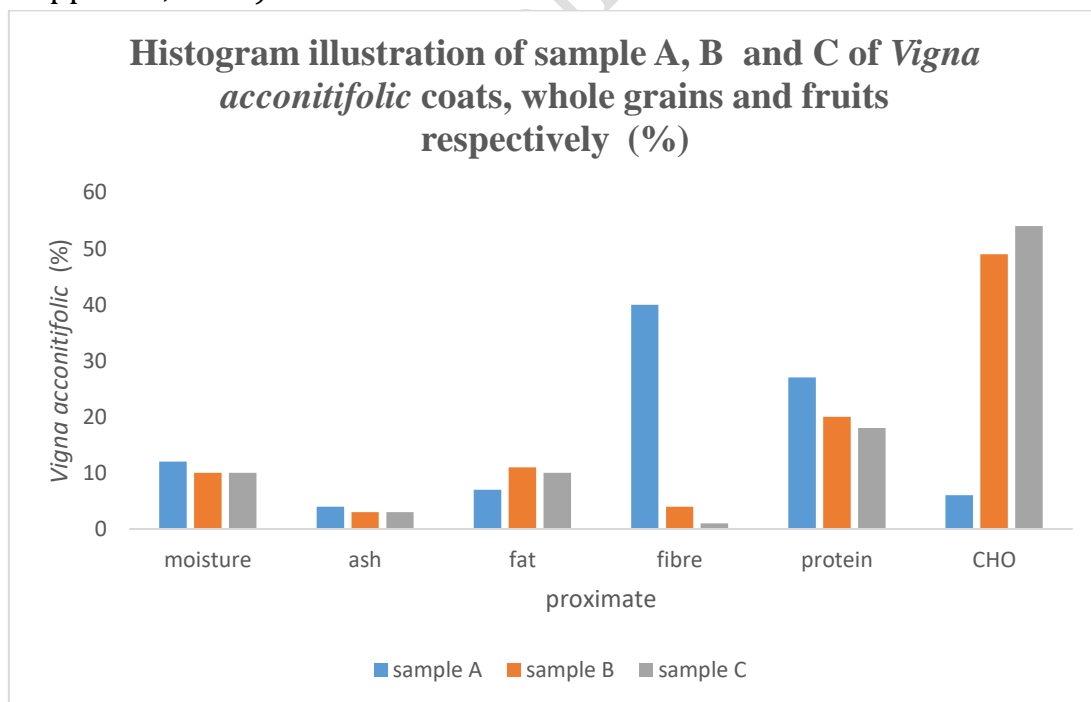


Fig1: Shows the proximate compositions of the analyzed *Vigna acconitifolic* samples

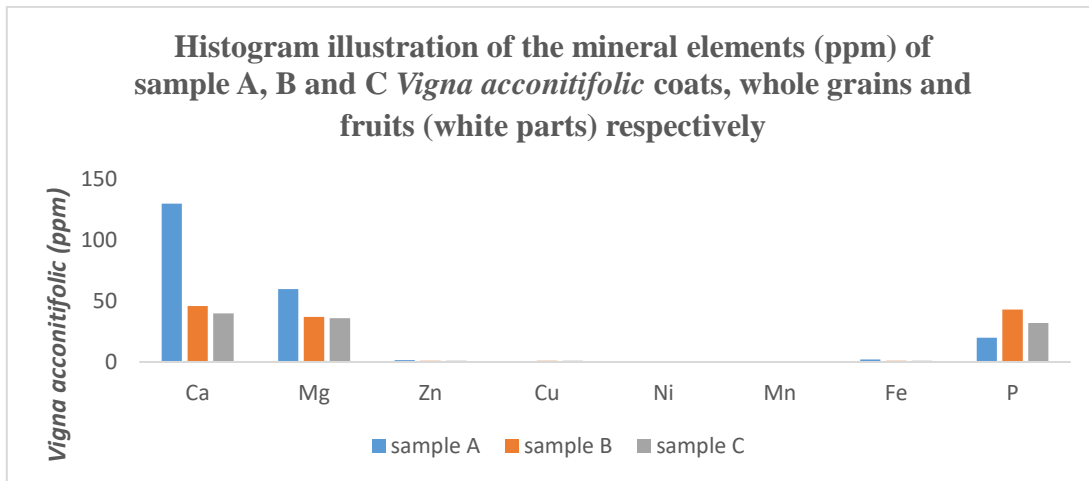


Fig 2: Shows the mineral elements of the analyzed *Vigna acconitifolic* samples

From the fig 1 above, it can be deduced that the moisture content of sample A (10%) is a bit higher than sample B and C which are 9% respectively. Also the percentage ash content for the three samples is low. The percentage fat content is a bit higher in sample B than A and C. As *Vigna acconitifolic* is a proteinous crops, it has high percentage value in sample A than the two other samples analyzed. Likewise, a very high percentage fibre content in sample A was observed when compared with the percentage of the other two samples. It is also notable that samples B and C are high in carbohydrate. From fig 2 it can be deduced that sample A is very rich in calcium with about 120% content, while samples B and C also have some calcium content between the range of 40% and 45%. Magnesium is also high in sample A and is of equal percentage in both sample B and C. Samples A, B, C have no noticeable percentage in zinc, copper, nickel, magnesium and iron. Whereas, in phosphorus sample A has about 20%, 40% in B while we have 35% in C.

## CONCLUSION

The present study has shown that the *Vigna acconitifolic* contain appreciable amounts of nutritional composition of high values of protein, crude fibre and ash content in the *Vigna acconitifolic* coat compared to the whole grains and fruits. This study has enlightened that *Vigna acconitifolic* coat contains appreciable amounts of mineral element in calcium, magnesium, iron and zinc which is essential for the body growth and repair of worn out tissues in the body.

## RECOMMENDATION

It is recommended that *Vigna acconitifolic* coat should not be thrown away, that is the part that contains the nutritional potential. This is why ruminant animals that are given *Vigna acconitifolic* coat have healthy skin and grow fast. For those who do not have passion for eating cooked *Vigna acconitifolic*, the whole grains can be dried, milled, and it can be used as *Vigna acconitifolic* cakes

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