

Haematology and Comparative Study of Fluted Pumpkin Leave Vegetable and Seed Nutrients (*Telfairia occidentalis*).

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Received: October 24, 2019; **Published:** November 07, 2019

Abstract

Fluted Pumpkin has been documented for high levels of potassium and iron in its leaf vegetable and edible seed, it is consume for its blood enrichment against anemia patients. The aim of the study is to determine the haematology and compare fluted pumpkin leave and seed nutrients. The formulations combination is as follows Animal Feed, pumpkin Leave and Nitrogen Free Diet (APLN), 10%, 10%, 80%, Animal feed pumpkin seed and Nitrogen Free Diet (APSN) 10%, 10%, 80%, Animal Feed and Nitrogen Free Diet (ANFD) 10%, 10%, 80%, and Nitrogen Free Diet (NFD) 100%. Growth response progressed with APSN 30%, APSN 2% and ANFD 33.5% NFD and retrogressed by 15.9%. The study revealed that heamatology study, such as LYM#-3/UL, LYM%, MCHC g/dl, RBC-6/UL RDW-CV% RDW-CV% was high above the limit compared with the healthy patients. In conclusion vegetables meal such as fluted pumpkin leaf (ugu) contain a high amount of dietary fibre that can help to lose weight. Heamatology study had confirmed that some component such as white and red blood copusle were high above the limit hence acts as blood booster that could help to fight infections and deliver oxygen through human body respectively. However, comparing the leaf with the seed of fluted pumpkin nutrients, the leaf had the best performance. The nutrient content in leaf was favourably compared to control diet in terms of biological values and nitrogen retention.

Keywords: Haematology; Dietary fibre; Fluted pumpkin leave and seed

Introduction

Telfairia occidentalis is a tropical vine grown in West Africa as a leaf vegetable and for its edible seeds [1]. Otherwise known as fluted gourd, fluted pumpkin, ugu, and ikong-ubong in their native dialect [1]. It belongs to Cucurbitaceae family and is an indigenous to southern Nigeria. Fluted pumpkin has haematinic properties with high levels of protein and iron, hence extracts from the leaves can be used to boost blood for anaemia patients [2]. The protein

in fluted pumpkin leaves also helps in the improvement and maintenance of the body tissues which includes the connective tissues, muscles and the nervous systems. Fluted pumpkin leaves contains the amount of protein needed for hormone balancing; tissue repairs and regulates the acidities of body cells and organs [3]. The plant contains high amounts of phosphorus making it useful for keeping off onset of kidney diseases like kidney stone. It consists

of seed part that has high oil content, high amounts of characterized of resulted in anti-oxidative properties such as oleic acid, vitamin A, alkaloids, tannins and linoleic acid which makes it capable of treating infertility in males by boosting the functionality of the testicles for an increased sperm count [4]. Pumpkin seed has been highly recommended for nursing, lactating and mothers due to its lactating properties. Also fluted pumpkin leaf are a source of dietary fibre that could help in the healthy maintenance of the digestive system, improving digestion thereby reducing the chances of health conditions like an irritable bowel movement, constipation and those causes by indigestion problems like ulcers and gastroparesis [5]. It can also help to lose weight as it makes one satisfied and lowers their appetite. Researchers have established that vitamin contents present in this pumpkin vegetable leaves, helps in maintaining healthy tissues, cells, membrane as well as maintaining the skin and vitamin C, treating of wounds. Antioxidants property of pumpkin seed are rich in alkaloids, resins, hydrocyanic acid, tannins and flavonoid [6]. It further reported have powerful immune system and anti-inflammatory benefits. Pumpkin seeds are rich in antioxidants, known to be effective in the prevention of cancer and other associated health conditions like ulcer [7]. It has the ability to prevent diabetes mellitus by reducing the level of glucose in the blood. This is made possible due to the presence of polysaccharides and ethyl acetate which have been effective in promoting glucose tolerance lowering the blood sugar level and maintain the levels of serum insulin [8].

It acts as an anti-diabetic agent, which regulate the blood glucose level also contribute in the boosting of blood in the body system and prevent anaemia due to the presence of iron and other important minerals [9]. Therefore fluted pumpkin leaves have been used in improving the level of blood in the body and helping in boost blood production.

It also aids in the improvement and normal functioning brain, magnesium help brain and nervous system, improving cognitive reasoning, memory loss (Dementia) and other health conditions associated to memory health such as Alzheimer's disease. Adequate magnesium in the body helps in making the teeth stronger and firm [10]. Potassium as one of the minerals it contains which also help in maintaining the bone mineral density which means that helps to make the calcium content in the bones intact avoiding the leaching of the mineral. It prevents osteoporosis, which affects the bones especially in the aged. Fluted leaf pumpkin help in weight reduction

are recommended for its effectiveness in weight management [11]. Fluted Pumpkin leaves have been used locally in the treatment of infertility issues in both men and women. Its content of many vital nutrients and compounds have proven effective in its use to boost/improve sperm count in men and the overall functioning of their testicles. Also it boosts fertility in women and improves post-natal health as it helps lactating mother to adequately feed their babies by increasing breast milk production.

Materials and Methods

Experimental animal procedure

Forty white albinos Wister ranged from 46.55-47.68g were used in the experiment. They were ranged from three to six weeks old. The experimental animals were weighed randomly selected and distributed into four groups of ten per group. Each experimental animal was accommodated in a metabolic cage. They were placed on animal feeds (finisher) for seven days to acclimatize them to the new environment. The experimental animals were again re-weighed and distributed into four groups of ten per group. The quantity of 10g-15g of experimental food supplements dietary were fed to animal daily. Daily consumption of samples was carefully recorded and the weights were noted. Weight gain/loss of the experimental animals was taken every three days as graphical represented as figure 1. Towards the end of the experiment, which was twenty-eight days, the experimental animals were sacrificed. The organs were collected from the animal including, heart, kidney and liver and were fixed immediately in 10% formyl saline for further experiment such as nitrogen retention [12].

Ethical Approval

Forty white albino rats were approved for the experimental analysis by the Animal Ethical Welfare Review Committee of the Obafemi Awolowo University, Osun State, Ile-Ife, Nigeria

Results and Discussion

The data are mean \pm SD values of three determinations with different superscript in a row are significantly different ($P>0.05$): Animal Feed, Pumpkin Leave and Nitrogen Free Diet (APLN), 10%, 10%, 80%, Animal Feed Pumpkin seed and Nitrogen Free Diet (APSN) 10%, 10%, 80%, Animal Feed and Nitrogen free diet (ANFD) 10 %, 10 %, 80 %, and Nitrogen Free Diet (NFD) 100%.

Parameter	APLN	APSN	ANFD	NFD	Limits	Alerts
WBC ^{10⁻³/UL}	8 ^c	6.86 ^b	8 ^c	6.4 ^a	2.5-10.5	M
LYM%	76.13 ^d	72.8 ^c	70.03 ^b	65.33 ^a	20-40	H
MON%	18.16 ^d	12.03 ^b	13.03 ^c	11.23 ^a	1-15	M
GRAN%	13.03 ^a	15.2 ^c	16.2 ^d	23.40 ^b	50-70	L
LYM# ^{-3/UL}	5.8 ^c	4.56 ^b	6.3 ^d	4.03 ^a	0.6-4.1	H
MON# ^{-3/UL}	0.86 ^c	0.66 ^a	1.73 ^d	0.83 ^b	0.1-1.8	M
GRAN# ^{-3/UL}	1.20 ^a	9 ^c	1.3 ^a	1.53 ^b	2.0-7.8	L
RBC ^{-6/UL}	6.18 ^b	5.67 ^a	6.62 ^c	5.96 ^a	3.50-6.50	H
HGBg/dl	10.36 ^a	10.40 ^a	11.43 ^b	10.56 ^a	11-16	M
HCT%	28.76 ^a	28.66 ^a	30.76 ^b	28.23 ^a	36-48	L
MCVfL	49.76 ^b	57.23 ^c	49.36 ^b	48.20 ^a	80-99	L
MCHpg	18.06 ^a	18.3 ^a	18.2 ^a	18.8 ^a	26-32	L
MCHC g/dl	36.56 ^b	35.5 ^b	25 ^a	37 ^c	32-36	H
RDW-SDfL	43.26 ^d	32.8 ^c	20.43 ^a	29.73 ^b	37-54	L
RDW-CV%	15.6 ^a	16.56 ^b	16 ^b	15.0 ^a	11.5-14.5	H
PLT ^{10⁻³/UL}	231 ^b	263 ^c	144 ^a	422 ^d	90-400	M
MPVfL	7.37 ^a	7.3 ^a	9.2 ^c	8.23 ^b	7.4-10.4	L
PDW%	8.8 ^a	8.90 ^a	9.7 ^b	9.3 ^a	10-17	L
PCT%	0.16 ^a	0.19 ^a	9.7 ^b	0.23 ^a	0.10-0.28	M
PLCR%	-	9.2 ^a	18.6 ^b	13.83 ^c	13-43	L

Table 1: Heamatology Parameters of the Experimental Animals.

Sample	Sodium mg/100g	Potassium mg/100g	Calcium mg/100g	Magnesium mg/100g	Iron mg/100g	Zinc mg/100g
Pumpkin leaves	96.3 ^b	352 ^b	21 ^b	35 ^b	3.8 ^b	22.3 ^b
Pumpkin seed	3.8 ^a	342 ^a	12 ^a	6.5 ^a	1.5 ^a	0.14 ^a

Table 2: Mineral Composition of Fluted Pumpkin Leaves and Seed.

The study revealed that Heamatology of study of LYM#^{-3/UL}, LYM%, MCHC g/dl, RBC^{-6/UL} RDW-CV % RDW-CV% of both seed and leaf was high above the limit comparable with that of healthy patients. It has been reported that Fluted pumpkin has haematinic properties with high levels of protein and iron, hence extracts from the leaves can be used to boost blood for anaemia patients [13, 14].

The data are mean \pm SD values of three determinations with different superscript in a column are significantly different ($P > 0.05$): Table 2 reported the Mineral Composition of Fluted Pumpkin Leaves and Seed. Pumpkin leaf had higher Sodium values of 96.3 while Pumpkin seed had lower value of 3.8. Pumpkin leaf had higher value of 352mg/100g of potassium while pumpkin seed had 342mg/100g

while had 342mg/100g of potassium. Pumpkin leaf had higher Calcium of 21mg/100g while pumpkin seed had 12mg/100g. Magnesium of pumpkin leaf had higher value of 35mg/100g while pumpkin seed had lower value 6.5mg/100g. Pumpkin leaf had iron had 3.8mg/100g while of pumpkin seed value 1.5mg/100g and Zinc in pumpkin leaf is higher with value of oil. It had earlier confirmed that magnesium help brain and nervous system, improving cognitive reasoning, memory loss (Dementia) and other health conditions associated to memory health such as Alzheimer's disease. The magnesium in the pumpkin leaf could assist in making the teeth stronger and firm. Potassium is also present in higher quantities according to table 1. It is one of the minerals content that support

the bone mineral density that helps to make the calcium content in the bones intact and avoiding the leaching of the mineral. It is also reported prevents osteoporosis [14-15].

The data are mean \pm SD values of five determinations with different superscript in a column are significantly different ($P>0.05$): Animal Feed, Pumpkin Leaf and Nitrogen Free Diet (APLN), 10%, 10%,

Code	Protein%	Moisture%	Fat%	Ash%	Fibre%	CHO%	Dry Matter%	Energy kcal%
Pumpkin leaf	33.68 ^c	8.46 ^d	0.86 ^b	6.88 ^d	13.30 ^c	36.82 ^b	91.56 ^a	289.66 ^a
Pumpkin seed	36.88 ^d	2.58 ^a	31.56 ^d	3.45 ^a	2.80 ^a	22.73 ^a	97.42 ^d	520.68 ^d
Maize	9.80 ^a	4.56 ^c	0.52 ^a	4.68 ^b	3.80 ^b	78.64 ^d	95.44 ^b	358.6 ^b
Animal Feed	17 ^b	4 ^b	14 ^c	6.5 ^c	3.50 ^b	55 ^c	96 ^c	414 ^c

Table 3: Proximate Composition of Fluted Pumpkin Leaves and Seed.

The data are mean \pm SD values of five determinations with different superscript in a column are significantly different ($P>0.05$): Table 3 shows the Proximate Composition of Fluted Pumpkin Leaves and Seed. Protein content in pumpkin leaf, pumpkin seed, maize and animal feed were between 36.88 and 9.80 respectively. Moisture content were ranged between 4 and 8.46%. Fat content were ranged from 0.52 to 31.56%. Ash content had values between 3.45% and 6.88%. Fibre content were valued between 2.80 and 13.30%. The carbohydrate were ranged between 22.73 and 78.64%. Dry Matter were ranged between 91.56 and 97.42% while is between 289 and 520%. The protein content of fluted pumpkin leaves could also help in the improvement and maintenance of the body tissues which includes the connective tissues, muscles and the nervous systems [14-16]. Pumpkin leaves had the highest protein while maize had the lowest protein. Moisture content in the pumpkin leaf is the highest 8.46% while pumpkin seed had the lowest value of 2.58%. Pumpkin seed had the highest value of fat compared with the other ingredients such as pumpkin leaf which is the lowest. Pumpkin seed are rich in antioxidants are known to be effective in the prevention of cancer and other associated health conditions like ulcer due to its ability to prevent the damages which should have been caused by the oxidative stress in the body [7].

Code	Left Kidney (g)	Right Kidney (g)	Heart (g)	Liver (g)	Muscle (g)
APLN	0.26 ^b	0.30 ^d	0.36 ^c	4.33 ^c	0.5
APSN	0.26 ^b	0.23 ^b	0.86 ^d	3.86 ^b	0.5
ANFD	0.30 ^c	0.26 ^c	0.30 ^b	4.26 ^c	0.5
NFD	0.16 ^a	0.16 ^a	0.23 ^a	3.0 ^a	0.5

Table 4: Internal Organ of the experimental Animals.

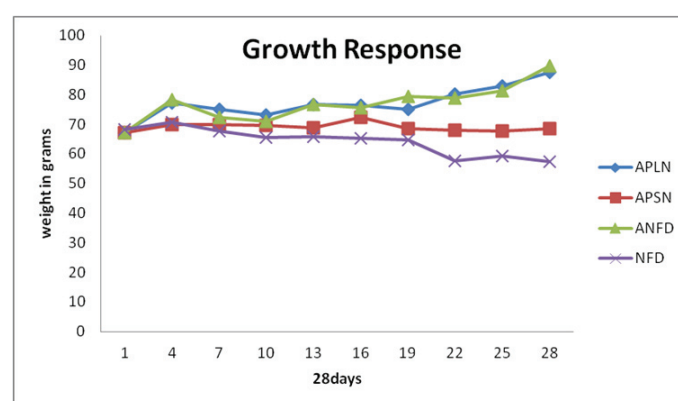


Figure 1: Graphically presentation of Growth response of Fluted Pumpkin Leaves and Seed.

80%, Animal Feed Pumpkin Seed and Nitrogen Free diet (APSN) 10%, 10%, 80%, Animal Feed and Nitrogen Free Diet (ANFD) 10%, 10%, 80%, and Nitrogen free diet (NFD) 100%.

Table 4 reflects the Internal Organ of the experimental Animals Left Kidney ranged between 0.16-30, Right Kidney ranged between 0.16-0.30, Heart also ranged from 0.23-0.86, Liver were ranged from 3-4.33 [13-18].

Code	BV %	NPU%	NPR	PRE	PER
APLN	75 ^b	2.57 ^b	2.5 ^b	40 ^b	2 ^b
APSN	2.5 ^a	0.15 ^a	0.5 ^a	8 ^a	0.14 ^a
ANFD	77 ^c	2.75 ^b	2.9 ^c	44 ^c	2.3 ^c
NFD	-	-	-	-	-

Table 5: Biological values of the experimental Animals.

The data are mean \pm SD values of five determinations with different superscript in a column are significantly different ($P>0.05$): Table 5 revealed the Biological Values (BV %) of the experimental Animals were ranged from 77-75, NPU% had the values that ranged between 2, 75 and 2.57, NPR ranged from 2.5 and 2.9, PRE ranged from 8-44 and PER ranged from 0.14-2.3. Diet NFD had no biological value. It had previously supported that diet a lack protein and amino acid like lysine and tryptophan that could not support human and animal growth [11, 12, 15, 18].

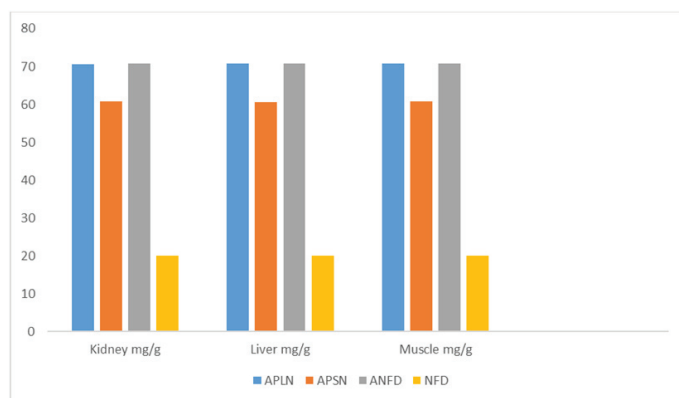


Figure 2: The Nitrogen Retention in various Tissues of the Internal Organ mg/g.

Figure 2 revealed the Nitrogen Retention in various Tissues of the Internal Organ. Kidney mg/g ranged from 20.05- 70.50, liver mg/g ranged between 20.10- 70.78 and muscle ranged from 20.05-2010. The control diet (ANFD) had the highest nitrogen retention values while (NFD) the lowest nitrogen retention values. The nitrogen retention of by the animals fed on basal diet was very low compared to other experimental animal. All Fluted pumpkin vegetable diets have enough nutrients except for basal diet, which could not retained nitrogen. Researchers had previously confirmed that diet (NFD) lack protein and amino acid like lysine and tryptophan that could support human and animal growth [11, 12, 15, 18].

Conclusion

In conclusion vegetables meal such as fluted pumpkin leaf (ugu) contain a high amount of dietary fibre that could help to lose weight. Had confirmed that some component such as white and red blood corpuscle were high above the limit hence could acts as blood booster that could help to fight infections and to deliver oxygen through human body respectively. However, comparative study of leaf and seed of fluted pumpkin nutrient leaves were far better

than its seed protein and were favorable compared to control diet. Fluted pumpkin seed had lower biological value than pumpkin leaf, although it contained high yield of oil which is reported to be antulcer, antioxidant and anticancer. All Fluted pumpkin vegetable diets have enough nutrients except for basal diet, which could not retained nitrogen because it lacks protein and amino acid like lysine and tryptophan that could support human and animal growth.

Acknowledgements

The authors are very grateful to department of Haematology and immunology Obafemi Awolowo University, Ile-Ife, Nigeria for collaboration in this research

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