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 infec-
-
tions 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 maint-
-
tenance 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 repar-
-
s 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

Citation: Samson Ishola Ibironke, Isaac Owotomo. (2019). Haematology and Comparative Study of Fluted Pumpkin Leave Vegetable and Seed Nutrients (Telfairia occidentalis). Archives of Nutrition and Public Health 1(2).
of seed part that has high oil content, high amounts of characterized
of resulted in anti-oxidative properties such as oleic acid, vitamin A,
alcaloids, 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 condi-
tions 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 fla-
vonoid [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 asso-
ciated 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 in-
sulin [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 anemia 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 as-
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 es-
pecially 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 albino 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 care-
fully recorded and the weights were noted. Weight gain/loss of the
experimental animals was taken every three days as graphical rep-
resented 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 analy-
isis by the Animal Ethical Welfare Review Committee of the Obafemi
Awolowo University, Osun State, Ile-Ife, Nigeria

Results and Discussion
The data are mean ±SD values of three determinations with differ-
ent 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%.

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and Seed Nutrients (Telfairia occidentalis). Archives of Nutrition and Public Health 1(2).
The study revealed that Haematology of study of LYM#-3/UL, LYM%, MCHC g/dl, RBC-6/UL RDW-CV % RDW-CV% of both seed and leave 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 ±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 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 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 leave 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

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**Table 1:** Heamatology Parameters of the Experimental Animals.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>APLN</th>
<th>APSN</th>
<th>ANFD</th>
<th>NFD</th>
<th>Limits</th>
<th>Alerts</th>
</tr>
</thead>
<tbody>
<tr>
<td>WBC 10^-3/UL</td>
<td>8&lt;sup&gt;c&lt;/sup&gt;</td>
<td>6.86&lt;sup&gt;b&lt;/sup&gt;</td>
<td>8&lt;sup&gt;c&lt;/sup&gt;</td>
<td>6.4&lt;sup&gt;a&lt;/sup&gt;</td>
<td>2.5-10.5</td>
<td>M</td>
</tr>
<tr>
<td>LYM%</td>
<td>76.13&lt;sup&gt;d&lt;/sup&gt;</td>
<td>72.8&lt;sup&gt;c&lt;/sup&gt;</td>
<td>70.03&lt;sup&gt;b&lt;/sup&gt;</td>
<td>65.33&lt;sup&gt;a&lt;/sup&gt;</td>
<td>20-40</td>
<td>H</td>
</tr>
<tr>
<td>MON%</td>
<td>18.16&lt;sup&gt;d&lt;/sup&gt;</td>
<td>12.03&lt;sup&gt;b&lt;/sup&gt;</td>
<td>13.03&lt;sup&gt;c&lt;/sup&gt;</td>
<td>11.23&lt;sup&gt;a&lt;/sup&gt;</td>
<td>1-15</td>
<td>M</td>
</tr>
<tr>
<td>GRAN%</td>
<td>13.03&lt;sup&gt;a&lt;/sup&gt;</td>
<td>15.2&lt;sup&gt;b&lt;/sup&gt;</td>
<td>16.2&lt;sup&gt;d&lt;/sup&gt;</td>
<td>23.40&lt;sup&gt;b&lt;/sup&gt;</td>
<td>50-70</td>
<td>L</td>
</tr>
<tr>
<td>LYM#-3/UL</td>
<td>5.8&lt;sup&gt;c&lt;/sup&gt;</td>
<td>4.56&lt;sup&gt;b&lt;/sup&gt;</td>
<td>6.3&lt;sup&gt;d&lt;/sup&gt;</td>
<td>4.03&lt;sup&gt;a&lt;/sup&gt;</td>
<td>0.6-4.1</td>
<td>H</td>
</tr>
<tr>
<td>MON#-3/UL</td>
<td>0.86&lt;sup&gt;d&lt;/sup&gt;</td>
<td>0.66&lt;sup&gt;c&lt;/sup&gt;</td>
<td>1.73&lt;sup&gt;d&lt;/sup&gt;</td>
<td>0.83&lt;sup&gt;b&lt;/sup&gt;</td>
<td>0.1-1.8</td>
<td>M</td>
</tr>
<tr>
<td>GRAN#-3/UL</td>
<td>1.20&lt;sup&gt;c&lt;/sup&gt;</td>
<td>9&lt;sup&gt;c&lt;/sup&gt;</td>
<td>1.3&lt;sup&gt;d&lt;/sup&gt;</td>
<td>1.53&lt;sup&gt;b&lt;/sup&gt;</td>
<td>2.0-7.8</td>
<td>M</td>
</tr>
<tr>
<td>RBC-6/UL</td>
<td>6.18&lt;sup&gt;b&lt;/sup&gt;</td>
<td>5.67&lt;sup&gt;b&lt;/sup&gt;</td>
<td>6.62&lt;sup&gt;d&lt;/sup&gt;</td>
<td>5.96&lt;sup&gt;a&lt;/sup&gt;</td>
<td>3.50-6.50</td>
<td>H</td>
</tr>
<tr>
<td>HGBg/dl</td>
<td>10.36&lt;sup&gt;c&lt;/sup&gt;</td>
<td>10.40&lt;sup&gt;b&lt;/sup&gt;</td>
<td>11.43&lt;sup&gt;b&lt;/sup&gt;</td>
<td>10.56&lt;sup&gt;a&lt;/sup&gt;</td>
<td>11-16</td>
<td>M</td>
</tr>
<tr>
<td>HCT%</td>
<td>28.76&lt;sup&gt;c&lt;/sup&gt;</td>
<td>28.66&lt;sup&gt;a&lt;/sup&gt;</td>
<td>30.76&lt;sup&gt;b&lt;/sup&gt;</td>
<td>28.23&lt;sup&gt;a&lt;/sup&gt;</td>
<td>36-48</td>
<td>L</td>
</tr>
<tr>
<td>MCVfl</td>
<td>49.76&lt;sup&gt;b&lt;/sup&gt;</td>
<td>57.23&lt;sup&gt;c&lt;/sup&gt;</td>
<td>49.36&lt;sup&gt;b&lt;/sup&gt;</td>
<td>48.20&lt;sup&gt;a&lt;/sup&gt;</td>
<td>80-99</td>
<td>L</td>
</tr>
<tr>
<td>MCHpg</td>
<td>18.06&lt;sup&gt;a&lt;/sup&gt;</td>
<td>18.3&lt;sup&gt;a&lt;/sup&gt;</td>
<td>18.2&lt;sup&gt;a&lt;/sup&gt;</td>
<td>18.8&lt;sup&gt;b&lt;/sup&gt;</td>
<td>26-32</td>
<td>L</td>
</tr>
<tr>
<td>MCHC g/dl</td>
<td>36.56&lt;sup&gt;a&lt;/sup&gt;</td>
<td>35.5&lt;sup&gt;b&lt;/sup&gt;</td>
<td>35&lt;sup&gt;a&lt;/sup&gt;</td>
<td>37&lt;sup&gt;c&lt;/sup&gt;</td>
<td>32-36</td>
<td>H</td>
</tr>
<tr>
<td>RDW-SDfL</td>
<td>43.26&lt;sup&gt;d&lt;/sup&gt;</td>
<td>32&lt;sup&gt;d&lt;/sup&gt;</td>
<td>20.43&lt;sup&gt;a&lt;/sup&gt;</td>
<td>29.73&lt;sup&gt;b&lt;/sup&gt;</td>
<td>37-54</td>
<td>L</td>
</tr>
<tr>
<td>RDW-CV%</td>
<td>15.6&lt;sup&gt;a&lt;/sup&gt;</td>
<td>16.56&lt;sup&gt;a&lt;/sup&gt;</td>
<td>16&lt;sup&gt;b&lt;/sup&gt;</td>
<td>15.0&lt;sup&gt;c&lt;/sup&gt;</td>
<td>11.5-14.5</td>
<td>H</td>
</tr>
<tr>
<td>PLT10^-3/UL</td>
<td>231&lt;sup&gt;b&lt;/sup&gt;</td>
<td>263&lt;sup&gt;c&lt;/sup&gt;</td>
<td>144&lt;sup&gt;a&lt;/sup&gt;</td>
<td>422&lt;sup&gt;d&lt;/sup&gt;</td>
<td>90-400</td>
<td>M</td>
</tr>
<tr>
<td>MPVfl</td>
<td>7.37&lt;sup&gt;a&lt;/sup&gt;</td>
<td>7.3&lt;sup&gt;c&lt;/sup&gt;</td>
<td>9.2&lt;sup&gt;a&lt;/sup&gt;</td>
<td>8.23&lt;sup&gt;b&lt;/sup&gt;</td>
<td>7.4-10.4</td>
<td>L</td>
</tr>
<tr>
<td>PDW%</td>
<td>88&lt;sup&gt;b&lt;/sup&gt;</td>
<td>8.90&lt;sup&gt;a&lt;/sup&gt;</td>
<td>9.7&lt;sup&gt;b&lt;/sup&gt;</td>
<td>9.3&lt;sup&gt;a&lt;/sup&gt;</td>
<td>10-17</td>
<td>L</td>
</tr>
<tr>
<td>PCT%</td>
<td>0.16&lt;sup&gt;c&lt;/sup&gt;</td>
<td>0.19&lt;sup&gt;a&lt;/sup&gt;</td>
<td>9.7&lt;sup&gt;b&lt;/sup&gt;</td>
<td>0.23&lt;sup&gt;c&lt;/sup&gt;</td>
<td>0.10-0.28</td>
<td>M</td>
</tr>
<tr>
<td>P.LCR%</td>
<td>-</td>
<td>9.2&lt;sup&gt;c&lt;/sup&gt;</td>
<td>18.6&lt;sup&gt;b&lt;/sup&gt;</td>
<td>13.83&lt;sup&gt;c&lt;/sup&gt;</td>
<td>13-43</td>
<td>L</td>
</tr>
</tbody>
</table>

---

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

<table>
<thead>
<tr>
<th>Sample</th>
<th>Sodium mg/100g</th>
<th>Potassium mg/100g</th>
<th>Calcium mg/100g</th>
<th>Magnesium mg/100g</th>
<th>Iron mg/100g</th>
<th>Zinc mg/100g</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pumpkin leaves</td>
<td>96.3&lt;sup&gt;b&lt;/sup&gt;</td>
<td>352&lt;sup&gt;a&lt;/sup&gt;</td>
<td>21&lt;sup&gt;a&lt;/sup&gt;</td>
<td>35&lt;sup&gt;a&lt;/sup&gt;</td>
<td>3.8&lt;sup&gt;b&lt;/sup&gt;</td>
<td>22.3&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Pumpkin seed</td>
<td>3.8&lt;sup&gt;a&lt;/sup&gt;</td>
<td>342&lt;sup&gt;a&lt;/sup&gt;</td>
<td>12&lt;sup&gt;d&lt;/sup&gt;</td>
<td>6.5&lt;sup&gt;a&lt;/sup&gt;</td>
<td>1.5&lt;sup&gt;a&lt;/sup&gt;</td>
<td>0.14&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

---

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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 ±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 leave, 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. Pump-
kkin 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].

The data are mean ±SD values of five determinations with different
superscript in a column 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%.

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].

The data are mean ±SD values of five determinations with different
superscript in a column 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%.

Table 4 reflects the Internal Organ of the experimental Animals

<table>
<thead>
<tr>
<th>Code</th>
<th>Left Kidney (g)</th>
<th>Right Kidney (g)</th>
<th>Heart (g)</th>
<th>Liver (g)</th>
<th>Muscle (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>APLN</td>
<td>0.26b</td>
<td>0.30d</td>
<td>0.36c</td>
<td>4.33c</td>
<td>0.5</td>
</tr>
<tr>
<td>APSN</td>
<td>0.26b</td>
<td>0.23b</td>
<td>0.86d</td>
<td>3.86b</td>
<td>0.5</td>
</tr>
<tr>
<td>ANFD</td>
<td>0.30c</td>
<td>0.26c</td>
<td>0.30b</td>
<td>4.26c</td>
<td>0.5</td>
</tr>
<tr>
<td>NFD</td>
<td>0.16a</td>
<td>0.16a</td>
<td>0.23c</td>
<td>3.0c</td>
<td>0.5</td>
</tr>
</tbody>
</table>

Table 4: Internal Organ of the experimental Animals.

---

Citation: Samson Ishola Ibironke, Isaac Owotomo. (2019). Haematology and Comparative Study of Fluted Pumpkin Leave Vegetable and Seed Nutrients (Telfairia occidentalis). Archives of Nutrition and Public Health 1(2).
The data are mean ±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 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 leave, 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**

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**References**


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