ABSTRACT

The effect of *Gambia albidum* endosperm on the levels of carbohydrates, lipid, and protein in the sera of albino rats was studied. The rats were grouped into four: A, B, C, and D. Group A was fed with 15g of the seed *Gambia albidum* mixed with 83g of poultry feed. Group B was fed with 10g of the endosperm mixed with 90g of the poultry feed, group C was fed with 20g of the seed mixed with 80g of the poultry feed and group D was fed with 100g of poultry feed and water only for seven days. The result showed that there was a significant decrease in the mean body weight of the animals in group A-C fed with the endosperm of *Gambia albidum* compared with those of group D, the control, fed on poultry feed alone. There was also a decrease in the physical activity of the test groups, while the control did not show any noticeable change. The serum levels of carbohydrate, lipid and protein of the animals fed with the seed were significantly higher than the control. From observation, on the test groups, the levels of carbohydrate, lipid and protein were higher in group C (Cholesterol 145.40 ± 10.50mg/dl, glucose 13.8 ± 15.14mm/l, total protein 19.00 ± 1.01g/l) than group A (cholesterol 89.00 ± 9.31mg/dl, glucose 9.80 ± 12.72mm/l, total protein 34.00 ± 9.92m/l) and B (Cholesterol 47.90 ± 8.43mg/l, glucose, 13.10± 14.93mm/l, total protein 20.00 ±1.54g/l). Thus the effect may depend on the quantity of the seed incorporated into the feedstuffs. Generally, there were increased levels of cholesterol and...
protein due to the incorporation of *Gambia albidum* into the feed of the animals used in this study.

**Keywords:** Carbohydrate, Lipid, Protein, *Gambia albidum*.

**INTRODUCTION**

Some parts of plants that are usually wasted are now known to be of importance to man, since they could serve as medicine or food additives. A number of those parts have been used in traditional medicine for many years. Some do seem to work although there may not be sufficient data to confirm their efficacy. It has been postulated that some of these plants parts that are thrown away are also rich in essential nutrients like vitamins, lipids, protein, carbohydrates etc, which could also serve as food supplements. They can also be used in industries.

Quantitative and qualitative analyses of the components of these plant parts show that, they contain good amount of carbohydrate, lipids and protein (John and Michael, 2007). The nopa plants has been found to have medicinal properties, Mexico’s National Institute of Nutrition has described its health benefits, saying among other things, that it can lower, one’s total cholesterol and LDL lipoproteins. It is used in the control of diabetes.

Citrus seed extract is a liquid derived from the seeds and white membranes of grape fruit, while there has been no scientific demonstration of its efficacy; this extract has been claimed by some practitioner of alternative medicine to possess antibacterial, antiviral and antifungal properties, (Wikipedia, 2007). It is also known that parts like the seeds of plants are used as preservation (natural occurring preservative).

Quantitative analysis of components of specific lipid or class of lipid is used as the basis for many lipid determinations. (John and Michael, 2007). Fractional of the intact lipid or of hydrolysis of products are often an integral part of the analytical procedure such the use of phosphorus contents as a measure of phospholipids to the fractionation and quantitative determination of about 17 different phospholipids from which they are derived by selective hydrolysis (John and Michael, 2007).

Fruit peels can be used to produce pectin and aromatic citrus peel oil (Wikipedia, 2007). The fruit peels, and seeds are employed in culinary and traditional medicinal applications (Facciola, 1990). Traditional Chinese medicine uses the dried peel to regulate the energy
that some cultures believe flows through the human body that may cause various ailments such as stomach and respiratory complaints, immune system stress and menstrual cramps, (Arctander, 1994). Two different essential oil are produced. There is the mandarin peel oil from the outer peel and the mandarin petit grain oil, less commonly made from steam distilled leaves twigs, and sometime unripe fruits.

**Aim and objectives**
The aim and objective of this work include

(i) To determine the nutritional value of udala seed (endosperm)
(ii) Application of the components of the seed
(iii) Determine the level of carbohydrate, lipid and protein

**MATERIALS AND METHODS**
The experiment was carried out on male and female albino rats, weighing 140-160g.

**METHODS**
**Collection of Materials**
**Collection of sample**
The fruit *Gambia albida* (udala) used for this project work was obtained from meat market Abakiliki, Ebonyi State. The Pulp was eaten and the seeds collected and dried to constant weight before grinding.

**Animals and treatment**
40 healthy adult albino rats of both sexes were purchased from veterinary department, university of Nigeria, Nsukka; they were housed in metal cages and allowed to acclimatize for 7 days. They were fed thrice daily, morning, afternoon and evening for a period of 7 days before they were sacrificed.

**Collection of serum**
The rats were anaesthetized with chloroform and then sacrificed. The blood was carefully collected into a test tube after sacrifice. The blood was allowed to clot for a period of about 15-20 mins. The specimen was centrifuged at 3000rpm’s for 10mins. The serum was separated from the red cells to avoid interference.
COMPOSITION OF RAT FEED

Table 2

<table>
<thead>
<tr>
<th>Group’s</th>
<th>normal rat ratio</th>
<th>Chrysophilium albidum seed</th>
<th>Total comp</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>90(g)</td>
<td>10(g)</td>
<td>100(g)</td>
</tr>
<tr>
<td>B</td>
<td>85(g)</td>
<td>15(g)</td>
<td>100(g)</td>
</tr>
<tr>
<td>C</td>
<td>80(g)</td>
<td>20(g)</td>
<td>100(g)</td>
</tr>
<tr>
<td>D</td>
<td>100(g)</td>
<td>-</td>
<td>100(g)</td>
</tr>
</tbody>
</table>

DETERMINATION OF TOTAL PROTEIN

The total protein was determined using Weichsebaum and Tietz method (1995).

DETERMINATION OF GLUCOSE

Glucose were determined using Barham and Trinder method (1972).

PROCEDURE

Seven test tubes were selected and pipetteed with 100ul of reagent CO.1 mol/L of phosphate buffer, PH 7. + 11mmol/L phenol + 0.77 mmol/L of 4-aminophenazone + 1.5 ka/L of glucose oxidase + 1.5 kei/L of peroxidase) followed by the addition of 10 of sample on six of the test tubes. The seventh test tube is used as reagent blank. They were incubated at 370C for 5 mins and absorbance read at 546nm against the reagent blank.

Determination of cholesterol

Cholesterol was determined using Fredrick and levy method (1967).

Procedure

Three test tubes were selected and labeled blank, standard and sample. In the standard test tube, 10ul of standard were pipette and 100ul of reagent (0.30mm/L of 4-aminiantipyrine + 6mmol/L of u/ml of cholesterol oxidase + 80mmol/L of pipes buffer, pH 6.8) was added. In the sample test tube, 10ul of sample and 100ul of reagent was pipette and mixed, incubated at 370C for 5mins. The absorbances of the tubes were read at 590nm. This procedure was repeated for other sample.

Determination of triacylglycerol

Triglyceride was determined using enzymatic test glycerol-phosphate oxide method (Jacob et al., 1960).

Procedure

Three test tubes selected and labeled blank, standard and sample. In the standard test tube,
0.01mL of standard were pipette and 1.00ml of triglyceride working reagent (40mM of pipe buffer, ph 7.5 + 6mM of ATP + 5mM of Mgcl2 + 400µ/L of glycerol kinase + 155µ/L of glycerol -3- phosphate oxidase test tube, 0.01mL of sample and 1.00mL of triglyceride working reagent were pipette and mixed and in the blank test tube, 0.01mL of distilled water was pipette. The test tube was incubated at 370C for 5mins and the absorbance read at 546nm. This procedure was repeated for other samples.

Determination of high Density Lipoprotein (HDL) cholesterol
HDL – Cholesterol was determined using Dextran sulphate – mg (ii) method. (Alber et al., 1981).

Procedure
A test tube was selected and pipettes 0.3ml of sample, followed by the addition of a drop of HDL working reagent. (10g/L of Dextran sulphate + 1m of magnesium acetate). They were properly mixed and incubated at 250C for 15mins, followed by centrifugation at 2,000 x g at 15mins. There the supernatant was used to determine the concentration of HDL – cholesterol. Three test tubes were selected and labeled standard sample and blank. In the standard test tube 0.01mL of cholesterol working reagent. In the sample test tube, 0.01mL of the supernatant an 1.00mL of cholesterol working reagent were pipette and mixed and in the blank test tube, 0.01mL of distilled water was pipette. The test tubes were incubated at 370C for 15mins and the absorbance read at 546nm.

Determination of low density lipoprotein (LDL)
Low density lipoprotein can be determined using the difference in values of cholesterol and high density lipoprotein added to the value of triglyceride, and this is divided by the number of samples. This is given as

\[ LDL = \text{CHOLESTEROL} - \text{HDL} + \text{TRYGLYCERIDE} \]

MEASUREMENT OF CHOLESTEROL IN SERUM/PLASMA DIAGNOSTIC VALUE
Cholesterol is a steroid of high molecular weight and possesses the cyclopentanophenanthene skeleton. Dietary cholesterol is partially absorbed and it is also synthesized by the liver and other tissues. It is believed that serum cholesterol is a major cause of atherosclerosis and coronary heart disease and well as a source of other serum lipids such as triacylglycerols. Atherosclerosis characterized by the deposition of
cholesterol and cholesteryl esters from the plasma lipoprotein into the wall of the artery (Murray et al., 2003). In some other disease condition prolonged elevated levels of very low density lipoprotein (VLDL), chylomicron remnant, or LDL (low density lipoprotein) occur in the blood. These disease conditions are diabetes mellitus, hypothyroidism and other condition of hyperlipidemia. These often followed by premature of more severe atherosclerosis (Illingworth, 2000).

According to (Murray et al., 2003) cholesterol is transported in plasma by lipoproteins and it is excreted in changed into the bile or after transformation to bile acid (salt). Cholesterol is eliminated from the body per day, approximately 1g in concentration. It is excreted into the feces after conversion to bile acid, rohiles the remainder and it excreted as cholesterol (Murray et al., 2003).

RESULTS

Average WEIGHT OF ANIMALS

<table>
<thead>
<tr>
<th>Day of feeding</th>
<th>Average Group A</th>
<th>Group B</th>
<th>Group C</th>
<th>Group D</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>111.0 ± 11.40</td>
<td>11.0 ± 14.82</td>
<td>115.0 ± 10.00</td>
<td>117.0 ± 14.83</td>
</tr>
<tr>
<td>2.</td>
<td>111.0 ± 11.40</td>
<td>117.0 ±14.83</td>
<td>115.0 ± 10.00</td>
<td>12.0 ± 14.01</td>
</tr>
<tr>
<td>3.</td>
<td>114.6 ± 11.33</td>
<td>121.4 ±14.80</td>
<td>121.2 ± 10.98</td>
<td>126.6 ± 14.90</td>
</tr>
<tr>
<td>4.</td>
<td>115.8 ±11.61</td>
<td>122.0 ±14.94</td>
<td>12.4 ± 10.01</td>
<td>127.8 ± 14.90</td>
</tr>
<tr>
<td>5.</td>
<td>118.0 ± 11.98</td>
<td>124.2 ±15.01</td>
<td>125.4 ± 9.99</td>
<td>12.4 ± 14.83</td>
</tr>
<tr>
<td>6.</td>
<td>119.2 ± 11.97</td>
<td>124.0 ±14.33</td>
<td>127.0 ± 9.90</td>
<td>132.4 ± 14.95</td>
</tr>
<tr>
<td>7.</td>
<td>121.6 ± 12.00</td>
<td>125.0 ±14.14</td>
<td>130.0 ± 9.95</td>
<td>134.6 ± 14.98</td>
</tr>
</tbody>
</table>

Mean value ± standard deviation.

The average weight of the animals in the test groups where constant during the beginning of the week then increased as time went on. While the average weight of the animas in group D (control) were increasing from the onset till the end of the administration. The changes in weight in the test group were less than that of the control group. These changes in body weight could be as a result of a decrease in their blood level during the administration of the seeds which could also lead to sluggishness in movement.

A = the group fed with 15g of chrysophyllum albidum seeds
B = the group fed with 10g of chrysophyllum albidum seeds
C = the group fed with 20g of chrysophyllum albidum seeds
D = the control group
Result of lipid profile

<table>
<thead>
<tr>
<th>Group</th>
<th>Cholesterol Mg/dl</th>
<th>HDL Mg/dl</th>
<th>TRIG Mg/dl</th>
<th>LDL Mg/dl</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>89.00 ± 9.31</td>
<td>23.90 ± 6.71</td>
<td>50.30 ± 7.50</td>
<td>2.00 ± 4.50</td>
</tr>
<tr>
<td>B</td>
<td>47.90 ± 8.43</td>
<td>34.60 ± 7.02</td>
<td>30.560 ± 6.93</td>
<td>8.8 ± 3.81</td>
</tr>
<tr>
<td>C</td>
<td>145.4 ± 10.50</td>
<td>66.00 ± 7.83</td>
<td>103.80 ± 8.82</td>
<td>36.60 ± 5.02</td>
</tr>
<tr>
<td>D</td>
<td>129.4 ± 16.21</td>
<td>88.00 ± 12.50</td>
<td>91.00 ± 13.4</td>
<td>26.50 ±7.50</td>
</tr>
</tbody>
</table>

Values are mean ± standard deviation.

After 7 days of administration of the seeds the average level of cholesterol in group A and B were found to be lower than that of group D, same was also found in the levels of HDL (High Density Lipoprotein). Triacylglyceride and LDL (Low Density Lipoprotein). But the average level of cholesterol HDL, LDL and Triacyglycerol were found to be higher in group C then in group D.

RESULT OF GLUCOSE AND TOTAL PROTEIN

<table>
<thead>
<tr>
<th>GROUP</th>
<th>GLUCOSE Mm/l</th>
<th>TOTAL PROTEIN g/l</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>9.80 + 12.72</td>
<td>34.00 + 9.92</td>
</tr>
<tr>
<td>B</td>
<td>13.10 + 14.93</td>
<td>2.00 + 1.54</td>
</tr>
<tr>
<td>C</td>
<td>13.80 + 15.41</td>
<td>19.00 + 1.01</td>
</tr>
<tr>
<td>D</td>
<td>10.40 + 13.14</td>
<td>29.00 + 7.52</td>
</tr>
</tbody>
</table>

CHAPTER FIVE
DISCUSSION AND CONCLUSION

DISCUSSION

In this work, the effect of the seeds of *Chrysophyllum albibum* on the serum levels of carbohydrate, lipid, protein in albino rats was studied for one week (7 days).

There were changes in the body weight of rats in all groups. The rats in group D (the control) gained more weight than the other rats in the test groups. During the period of feeding, the animals fed with the seeds of *Chrysophyllum albibum* showed a decrease in physical actives, food and water intake. The actual biochemical mechanism responsible for these observations is not clearly known at this state of the research. However, they may be attributed to a disruption of normal metabolic pattern by the chemical constituent of the extracts.

Generally there was decrease in body weight (mean weight) of animals in the test groups compared to the animals of the control group. This decrease in body weight may be due to the reported decrease in food intake (Agbafor, 1999), or the weight decrease may be referred to as an index of toxicity (Al-mammary *et al.*, 2000).
From the result, the Serum concentrations of Cholesterol, total protein and glucose in the test groups (A, B and C) were significantly higher (P<0.05) than the control. The exact reason for this increase in level of Cholesterol total protein and glucose is obscure but could indicate the presence of carborhydrate, lipid and the seeds *Chrysophyllum albibum*. According to Obasi (1991), the tasteless Seeds of *Chrysophyllum albibum* from Nigeria were analyze and found to contain 316g/kg carbohydrates, 364g/kg proteins and 52g/kg fixed oil on dry weight basis.

The result in table 4.2 shows that the level of cholesterol in group C is higher than that of Group A and B and the control group. This result suggests that the level of cholesterol increases with an increase in the concentration of the seeds. This was also seen in the level of triacylglycerol.

The result table 4.2 also shows that the Serum level of HDL is significantly (P<0.05) higher than the level of LDL. LDL is referred to as bad cholesterol and HDL is seen as good cholesterol. Cholesterol is not soluble in the blood so it binds to the HDL for migration from the blood, to the liver. But LDL accumulates and deposits in the blood veins and increases the risk of Heart attack (Edwards and Ericsson, 1999).

**CONCLUSION**

The comparative effect of *Chrysophyllum albibum* albidum on the average weight of rats showed significant decrease (P<0.05) in the experimental rats of group B fed with 10g of the seed compared to the rats of group C fed with 20g of the seed. This shows that increased proportion of the seed, increased the weight of the experimental rats. The weight of the experimental rats also showed a significant increase (P<0.05) in the serum concentration of cholesterol compared to the control.

**REFERENCE**


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