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Research Article

Effect of Processing on the Nutritive Value of Fluted Pumpkin Vegetable Leaves (ugu) and Seed Nutrients (*Telfairia Occidentalis*) on the Health of Wister Rats

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Abstract

The effects of processing on the nutritive value of fluted pumpkin vegetable leaves (ugu) and seed Nutrients (*Telfairia occidentalis*) on the health of Wister Rats were investigated. Sixty white Wister strain albino rats were purchased from animal breeding center Obafemi Awolowo University Faculty of Health Science Ile-Ife, Nigeria. Experimental Diets were formulated from Basal, Animal feed (Control), Uncooked ugu leave, Cooked ugu seed, Uncooked ugu seed and Dry ugu leave. The following parameters were carried out on growth response of experimental animal for 21 days, weight of the internal organs of experimental animals were taken after 21 days, The livers were ranged from 2.78g to 3.63g, Kidney were ranged from 0.50g to 0.90g and Heart were ranged between 0.21g to 0. 31g. Nitrogen retention of experimental animals and bioassay of the experimental animals fed on processed fluted pumpkin vegetable leaves and seeds for 21days were favourably comparable.

The results suggests that the experimental rats with cooked ugu sustained better in comparison to the rats with uncooked ugu leave and seed while mortality was reported for diets produced from uncooked ugu leave and uncooked ugu seed on 7th and 10th day of the experiment respectively.

In conclusion unprocessed diets had adverse effect on nutritive value of fluted pumpkin vegetable leaves (ugu) and seed nutrients (*Telfairia occidentalis*) on the health of Wister Rats. Growth Response of rats were improved, weight of the internal organs were increased, the nitrogen retention of and bioassay of the experimental animals for the processed fluted pumpkin vegetable leaves (ugu) and seed nutrients had higher biological values.

Keywords: Health of Wister Rat; Cooked ugu Seeds; Uncooked ugu Seeds

Introduction

Processing of food include cooking, dehydration, drying, freezing and hot dry heating. Processing could improve their digestibility of food, it can also increase taste, appetite, odour, palatability and improves their keeping quality as well as making the roots, leaves and stems safer to eat. The heat applied during cooking can be dry heat for example in baking of cake in an oven or over an open fire, or wet heat as when boiling, steaming or frying [1]. Heating helps to sterilize the food by killing harmful bacteria and other microorganisms and it increases the availability of nutrients. Although not all proteins are denatured by heat but they are more easily digested by proteolytic enzymes; cellulosic cell walls that can broken down by monogastric animals like human beings and some nutritional and anti-nutritional factors such as enzyme inhibitors are inactivated [2]. However, processing may reduce the nutritional value of some root crops as a result of losses and changes in major nutrients, including proteins, carbohydrates, minerals and vitamins. The Benefits of cooking food include upgrading the nutrient value to obtain good odour and taste. Cooking can also be advantageous in many ways, including: making the food tastier breaking down parts of vegetables that would otherwise be indigestible destroying bacteria or other harmful microorganisms making phytochemicals more available, for instance, phytochemicals are more available in cooked tomatoes than in raw tomatoes [3,4]. Phytochemicals are chemicals produced by plants. The two parts seed and leave are vital storage of protein in fluted pumpkin leaves and the major function is the improvement and maintenance of the body tissues which includes the connective tissues, muscles and the nervous systems [4]. Pumpkin leaves contain some amount of protein, which is essential for balancing hormone balancing; tissue repairs and regulates the acidities of body cells and organs which may be hindered by anti-nutrient. The plant has been highlighted for high amounts of phosphorus [5]. The seed part reportedly has high oil content, the high percentage amounts resulting in large amount of Oleic acid, Vitamin A alkaloids, tannins and linoleic acid which makes it capable of treating infertility and improving the fertility. Pumpkin seed has been prescribed for nursing, lactating and mothers due to its lactating properties however must be properly processed to curb or reduce under-five mortality. It helps to lose weight as it makes one satisfied and lowers their

appetite. Researchers have established that vitamin contents are present in this pumpkin vegetable leaves, helps in maintaining healthy tissues, cell, skin. Vitamin C present can be used for treating of wounds; which is more available by process of cooking. Antioxidants property of pumpkin seed are rich in alkaloids, resins, hydrocyanic acid, tannins and flavonoid. It is further reported that it benefits immune system and has anti-inflammatory properties. Pumpkin seeds are rich in antioxidants, known to be effective in the prevention of cancer and other associated health conditions like ulcer [6]. Polysaccharides in fluted pumpkin are broken down through the heat and enzymatic effect hence have ability to prevent diabetes mellitus by reducing the level of glucose in the blood, have been effective in promoting glucose tolerance lowering the blood sugar level and maintain the levels of serum insulin. Hence it is our aim to see the effects of processing on the nutritive value of fluted pumpkin vegetable leaves (ugu) and seed Nutrients (*Telfairia occidentalis*) on the health of Wister Rats [7].

Materials and Methods

Sixty white Wister strain albino rats were purchase from animal breeding center obafemi Awolowo University Faculty of Health Science Ile-Ife, Nigeria. The experimental Animals were ranged from 107 - 129.36g. They were six weeks old. The experimental animals were pick randomly selected and distributed into six groups of ten per group and was caged in a metabolic cage fitted with feeding bottle and plate. They were fed on animal feeds (finisher) for seven days to acclimatize them to the new environment. The experimental animals were again reweighed and distributed into six groups of ten per group. 10g of supplements dietary were supplied daily. The leftover of the dietary samples were carefully recorded and the weights were noted. Weight gain/loss of the experimental animals was taken every three days and graphically sketched as in figure 1. At the end of the experiment, which was twenty-eight days, the experimental animals were anesthetized sacrificed. The organs collected from the animal were heart, kidney and liver were fixed immediately in 10% formyl saline for further experiment such as Nitrogen retention [7].

Ethical consideration

Approval were sorted for sixty albino from the Ethical Review Committee of the Obafemi Awolowo University, Osun State, Ile-Ife, Nigeria.

Results and Discussion

Figure 1 shows the Growth Response of the Experimental Animal for 21 days. Experimental Diets were formulated from Basal, Control, Uncooked ugu leave, Cooked ugu seed, Uncooked ugu seed and Dry ugu leave. The experimental animals were sustained throughout 21 days feeding period on diet Basal, Control, cooked seed and dry ugu leave diets while mortality was reported for diets produced from uncooked ugu seed and and uncooked ugu seed on 7th and 10th day of the animal experiment respectively as shown below on figure 1. This may be due to concentration of anti- nutrients like tannin, saponin, phytate and concentration content present in the unprocessed diet such as uncooked ugu leave, uncooked ugu seed fed to the animals during the experiment [8].

Figure 1 focus on weight of the internal organ, kidney, livers and muscle of the experimental animal for 21 days. There is significant increase in weight of internal organs have been noticed. Experimental Diets were formulated from Basal, Control, Uncooked ugu leave, Cooked ugu seed, Uncooked ugu seed and Dry ugu leave. The livers were ranged from 2.78g to 3.63g, Kidney were ranged from 0.50g to 0.90g and Heart were ranged between 0.21g to 0. 31g. The livers, kidney, and heart of Basal, Uncooked ugu leave and Uncooked ugu Seeds had more or less similar weight, may be due to anti-nutrients present which inhibits growth. Although it has previously reported that basal diet lack lysine and tryptophan which is necessary for growth because it is of maize origin [9]. Dry ugu leave promoted the highest growth while uncooked ugu leave was lowest because the latter were not processed. From figure 1 below, it is revealed that the experimental animals fed on basal, control, cooked seed and dry ugu leave diets were sustained through 21 days, this is because they depend on processed diets while mortality was reported for diets produced from uncooked ugu leave and uncooked ugu seed on 7th and 10th day of the experiment respectively as shown below [10].

Figure 1: Shows the Growth Response of Experimental Animal for 21 days.

Diet	Liver (g)	Kidney (g)	Heart (g)
Basal	2.78 ± 0.0	0.50 ± 0.04	0.26 ± 0.03
Control	3.09 ± 0.02	0.88 ± 0.01	0.30 ± 0.02
Uncooked ugu leave	2.83 ± 0.01	0.65 ± 0.03	0.31 ± 0.01
Cooked ugu seed	3.63 ± 0.02	0.86 ± 0.00	0.31 ± 0.02
Uncooked ugu seed	2.78 ± 0.01	0.53 ± 0.02	0.26 ± 0.01
Dry ugu leave	3.09 ± 0.0	0.90 ± 0.00	0.31 ± 0.02

Table 1: Weight of the Internal Organ of Experimental Animal for 21 days.

Mean ± SD values of five replicates ($p \leq 0.05$).

Table 2 reflected the Experimental Diets from Basal, Control, Uncooked ugu leave, Cooked ugu seed, Uncooked ugu seed and Dry ugu leave gave the values of Tannin mg/100g, ranged between - to 3.2, saponin mg/100g ranged from 0.012 mg/100g to

0.10 mg/100g, phytate ranged between 45 mg to 70 mg/100g and oxalate ranged from 35 mg to 80 mg/100g respectively. The highest retention of anti-nutrient were obtained from uncooked ugu leave and uncooked ugu seed. The lowest retention of anti- nutrient were found in cooked ugu leave and cooked ugu seed. This may be due to the processing and unprocessing nature of the diet. Processing has made nutrients available and improved nutritive value of nutrient, control enzymatic reaction similar to previous report phytochemicals are more available in cooked tomatoes than in raw tomatoes [11].

Code	Tannin mg/100g	Saponin mg/100g	Phytate mg/100g	Oxalate mg/100g
Basal	-	-	-	-
Control	-	-	-	-
Uncooked ugu leave	3.0 ± 00	0.012 ± 0.02	60 ± 0.02	80 ± 0.02
Cooked ugu seed	1.3 ± 0.05	0.08 ± 0.03	30 ± 0.02	35 ± 0.02
Uncooked ugu seed	3.2 ± 0.01	0.014 ± 0.02	70 ± 0.01	82 ± 0.01
Dry ugu leave	1.2 ± 0.03	0.10 ± 0.02	45 ± 0.01	40 ± 0.02

Table 2: Ant-nutrient of the Experimental Diets.

Mean ± SD values of five replicates ($p \leq 0.05$)

Figure 2 represents the Nitrogen Retention of Experimental Animals for 21 days in kidney mg/g, liver mg/g and muscle mg/g. The formulated diet, Basal, Control, Uncooked ugu leave, Cooked ugu seed, Uncooked ugu seed and Dry ugu leave for kidney ranged from 23 to 83 mg/g. kidney ranged between 20 to 83 mg/g and muscle ranged from 20 to 83 mg/g. Processing effects such as cooking, dehydration, drying and freezing could translate protein to amino acid, carbohydrate to monosaccharide and fat to fatty acid hence make the nutrients available to the body system [12-15].

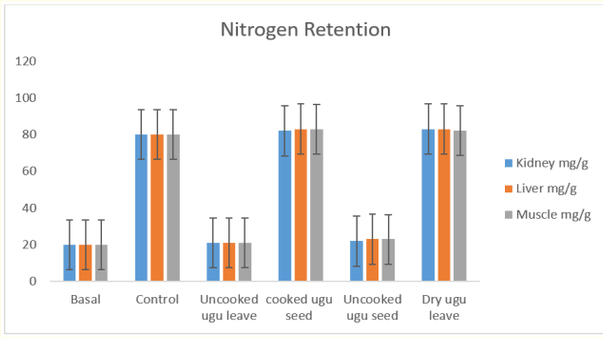

Figure 2: Nitrogen Retention of Experimental Animal for 21 days.

Mean ± SD values of five replicates ($p \leq 0.05$).

Table 3 represents the Bioassay of the Experimental Animals BV, PER, NPR%, and FER Processing effect led to biological value ranged between 75 to 77% and unprocessed uncooked ugu seed, and leave had no biological value, PER, NPR and FER processed had the values for control, cooked ugu seed and Dry ugu leave 3.33, 3.5and 2.10; 3.39, 3.56 and 2.07; 2.10, 2.07 and 2.23 respectively. But unproceesed such as Uncooked ugu seed and Uncooked ugu leave had no biological values, this may be due to anti-nutrient present that is inhibit the growth. The lowest retention of anti- nutrient were found in cooked ugu leave and cooked ugu seed [15-22].

Code	BV%	PER	NPR%	FER	Gained/ Loss
Basal	-	-	-	-	-1
Control	75 ± 0.01	3.33 ± 0.03	3.5 ± 0.01	2.10 ± 0.03	20
Uncooked ugu leave	-	-	-	-	-20
Cooked ugu seed	77 ± 0.02	3.39 ± 0.0	3.56 ± 0.02	2.07 ± 0.02	20.37
Uncooked ugu seed	-	-	-	-	-25.62
Dry ugu leave	76 ± 0.01	3.73 ± 0.03	3.89 ± 0.01	2.23	22.36

Table 3: Bioassay of the Experimental Animals.

Mean ± SD values of five replicates ($p \leq 0.05$).

Figure 3 shows the effects of processing and unprocessing on the nutritive value of fluted pumpkin vegetable leaves (ugu) and seed. Processing of fluted pumpkin vegetable leaves (ugu) and seed were progressed from between 15g and 22.36g while and unprocessing effect on the nutritive value of fluted pumpkin vegetable leaves (ugu) and seed were retrogressed between -1 and -25.62g this may be due to high content of anti-nutrient present that is inhibiting the growth hence could lead to morbidity and mortality of the populace. The lowest retention of anti- nutrient were found in cooked ugu leave and cooked ugu seed hence had growth response [21-26].

Figure 3: Shows the effects of processing and unprocessing on the nutritive value of fluted pumpkin vegetable leaves (ugu) and seed.

Mean ± SD values of five replicates ($p \leq 0.05$).

Conclusion

In conclusion processing has made available nutrient and improve the nutritive value of Fluted Pumpkin vegetable leaves (ugu) and seed nutrients (*Telfairia occidentalis*) on the health of Wister Rats. Processing of fluted pumpkin has improve the growth re-

sponse, internal organs had gained weight, nitrogen retention of and bioassay of the experimental animals were comparable favourable to control diet. The lowest retention of anti- nutrient were found in cooked ugu leave and cooked ugu seed. The high content of anti-nutrient present in the unprocessed diets has proved to inhibit the growth Wister Rats. However could cause adverse heath effect which will eventually lead to morbidity and mortality among the populace.

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