



Nutritional Evaluation, of Water and Amaranth Vegetable Leaves for Resuscitation of Covid 19 Patients

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Abstract

Vegetables are important protective food and highly beneficial for the maintenance and improvement of human health and prevention of disease like covid 19. The aim of the work was to evaluate the nutritional potential of water-leave and amaranth vegetable leaves for quick recovery of covid 19 patients. The composition of the Diets were as follows: Basal 50%, Casein 30%, Amaranth Vegetable 10% (1). Basal 50%, Casein 30%, Water leave Vegetable 10% (2), Basal 50% Casein 30% Amaranth Vegetable 5% Water leave Vegetable 5% (3), Basal 50% Casein 30% (4) and Basal 100% (Diet 5). The Dietary was giving to 50 albino rats that were divided into five of ten in each group experimental animals. The results revealed that Biological values was ranged between 60 to 86, NPU from experimental diets calculated was ranged from 2 to 3.5, NPR was ranged from 1.8 to 3.3, PRE, was ranged from 1.6 to 2.8. Vegetable was rich in mineral, vitamin and fiber that could be used as recovery diet for animals and human health, also can be applied to build up, protect and repair damage tissue of the body of covid 19 patients Vegetable is highly beneficial for the maintenance of human health and prevention of disease, however could be used to recover from covid 19 patients.

Keywords: Experimental Animals; Water and Amaranth Vegetable Leaves; Resuscitate Covid 19 Patient

Introduction

The coronavirus disease (COVID-19) was caused by a new strain of coronavirus (SARS-CoV-2) that was unknown to humans. It came to the knowledge of WHO on the 31st of December, 2019 in Wuhan, China [1]. The sickness start from slight illness and transformed to a major sickness. People that were prone to this sickness include children, people above 40 years, pregnant women also people with as high blood pressure, heart problems or diabetes) were appear to be more vulnerable to COVID 19 [1]. The COVID-19 incubation period of is 14 days, the time between exposure to the virus and symptom, onset, is on average a week, but can incubate period is 2 weeks hence quarantine time suggested to be in place for 2 weeks, from the last contact to a confirmed case [1]. Vegetables are parts of plants that are succulent part consumed by both humans' and animals as food. The original meaning of vegetables was referred to all edible plant matter, including the flowers, fruits, stems, leaves, roots, and seeds [2-4]. Vegetables contained valuable food ingredients which can be utilized to supplement COVID-19 patients' diets. Vegetable leaves are called the storage points for many phytonutrients, antioxidants, minerals and vitamins which could contribute immensely to human health and their wellness [5]. Amaranth leaves contain only traces of fats hence lack cholesterol hence however could be used in weight reduction programs [6]. The leaves and stems contain a good amount of soluble and insoluble dietary fibers. Fresh 100 g of leaf amaranth contains 29%

of recommended daily intake (RDI) of iron and 23 calories/100g. Micro nutrient such as iron, zinc and copper are essential trace element found in amaranth that is required by the COVID-19 patients' human body for production of red blood cell (RBC's) [6]. Fresh amaranth leaves are one of the richest sources of vitamin-C of 100 g of fresh leaves carry 43.3 mg or 70% of recommended daily intake (RDI) of this vitamin. Vitamin-C is reported to be more powerful water-soluble antioxidant which plays accelerate wound healing and help fight against viral infections [6,7]. Amaranth has several vital antioxidant vitamins like vitamin-A of 2917 IU or over 97% of daily recommended levels per 100 g and [7]. Vitamin-A is present in vegetable however vital for maintaining healthy mucosa, skin maintenance, and is essential factor for ocular (eye) health, and flavonoids is present in vegetables which help to protect lung and oral cavity cancers. Amaranth vegetable leave have the highest concentrations of vitamin-K of all the edible green-leafy vegetables, 100 g of fresh greens leave will provides 1140 µg or 950% of daily vitamin-K requirements activity in the bone cells. Vitamin-k is noted to play a vital role in strengthening of the bone mass by promoting osteoblastic. Vegetables also has been established to be a prevention to patients with *Alzheimer's disease* by preventing the neuronal damage in the brain. B-complex such as folates, vitamin-B₆ (pyridoxine), riboflavin, thiamin (vitamin B-1), and niacin are reportedly present in vegetable. Folate in vegetable rich diets help prevent neural tube defects in the newborns babies. Potassium

is a major mineral element occurred in the spinach, an important components of the cell and body fluids that helps regulate heart rate and blood pressure [8,9]. Water leave (Talinum triangulare) is another Golden herbaceous plant which is believe to be underrated and undervalued plants in Nigeria [10]. Some culture even regard waterleaf as weed that could grows all year round, though it grows more during the rainy season. Waterleaf vegetable comes uniquely in green colour and pink flower which grows as its bud [11]. Waterleaf vegetables has so many health benefits including taken as dried herbs, juice, infusion and delicacies in Nigeria and various part of the leaves and stems are consumed as veggies in some parts of the country [12]. Research had shown that it can inhibit proliferation of cancerous cells and shrink tumors. Studies have been shown that it is cerebral-protective potential and its consumption enhances brain activities and protect brain tissues, good remedy for insomnia- sleeping disorder [13,14]. Waterleaf is very beneficial could be taken as vegetable, Waterleaf juice supplies natural vitamins, minerals and liquids from vegetables in every home, it calms down inflammations in the body, addition of the leaves in our food is taken as a diuretic, also could be used to curing prostate enlargement when the roots are boiled helps to regulate hypertension and diabetes is also good and safe for pregnant women and growing children and could boosts their blood levels [15-17]. Water leaf contains more proteins compare to cashew nuts, it has more pectin, a food fiber that helps digestion compare to apples. Waterleaf also have high level of vitamin such as vitamin A B C, essential amino acids, omega 3-fatty acids, resins, iron, calcium, copper, lead, manganese and zinc carotenoids, alpha and beta tocopherols [15-18]. Measures was suggested which are Washing of your hands, Cover your mouth and nose when you cough or sneeze. Avoid touching your face. Stay at home if you are sick, this article will go in-depth on nutritional evaluation, of water and amaranth vegetable leaves that could lead to resuscitation of covid 19 patients [1,19-22].

Ethical consideration

Fifty Wister rats were randomly selected for the experiment and approval was obtained from the Animal Ethical Welfare Review Committee of the Obafemi Awolowo University, Ile-Ife, Osun State, Nigeria.

Materials and Methods

Animal Experimentation procedure

The method of Ibironke., *et al.*, [1,19-22] was adopted. Fifty Wister albino rats of both sexes were obtained from the Faculty of Pharmacy, Obafemi Awolowo University, Ile-Ife, Osun State, Nigeria. The weights and ages of white albino rats were ranged from 60-70 g and were between 3-6 weeks old, respectively. The experimental animals were randomly weighed selected and distributed into five groups of ten animals per group and were housed in a metabolic cage. They were fed on animal feeds for seven days to acclimatize them to the new environment. The experimental animals were placed on the experimental diets for a period of 28 days. Water and food were administered *ad libitum* to the experimental animal. During the period of the experiment, daily feed intake was recorded and

the weights of the experimental animals were taken every three days. Seven days to the end of the experiment, the faeces and urine of the experimental animals in the different groups were collected separately. Urine was stored inside a bottle per group containing 6N HCl to preserve it, prior analysis, and the faeces were dried in an oven at 60 °C for 12 hours, cooled, weighed and stored inside a sealed polythene, per group. At the end of the 28 days, the animals were weighed, anaesthetized and sacrificed. Tissue samples including liver, kidney` and plantaris muscles were removed, Nitrogen in the faeces and urine were determined by the micro Kjeldahl method [14-17]. The organs collected from the animal including heart, kidney and liver was fixed immediately in 10% formyl saline for further experiment such as Nitrogen retention [1,19,22].

Bioassay calculations

The Food efficiency Ratio (FER), Protein Efficiency Ratio (PER), the Net Protein Retention (NPR) and Protein Retention Efficiency (PRE) were calculated using the formula given below:

$$\text{The Food Efficiency Ratio} = \frac{\text{Gain in body weight (g)}}{\text{Food intake (g)}}$$
$$\text{Protein Efficiency Ratio (PER)} = \frac{\text{weight gain of test animal (g)}}{\text{Protein consumed by the test animal (g)}}$$
$$\text{Net Protein Retention (NPR)} = \frac{\text{weight gain of test animal (g)} + \text{Average Weight Loss of Animal}}{\text{Protein consumed by the test animal (g)}}$$

Statistical analysis

Statistical analysis of the data was carried out using the one-way Analysis of Variance (ANOVA) technique (SPSS 17 for windows) and the differences was separated using Duncan’s Multiple Range Test (DMRT) at a level considered to be significant at $p < 0.05$.

Results and Discussions

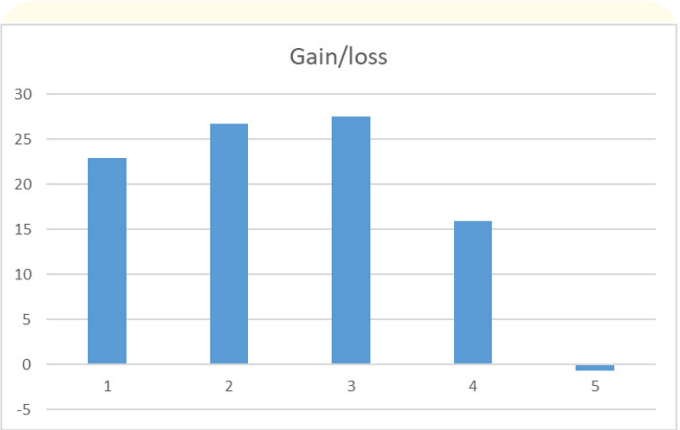


Figure 1: Depict the bar chart of the experiment animal gain and loss.

Figure 1 shows the bar chart of the experiment animal gain and loss during twenty eight days figure 1-4 were progressive 15.89-27.48g but diet 5 was regressed by 0.78. When compare diet 5 with other diets 1-4. The biological value of protein of normal maize is accompany with low quality protein. Also earlier reported to be deficient in some essential amino acids such as lysine, tryptophan and threonine and, therefore, needs protein supplementation from

legume and animal protein Vegetables are rich sources of tocopherols, carotenoids, vitamin A, B, C, K, thiamine, riboflavin, niacin, alpha and beta however could be used as a supplement diet to resuscitate Covid 19 patients [1,19-22].

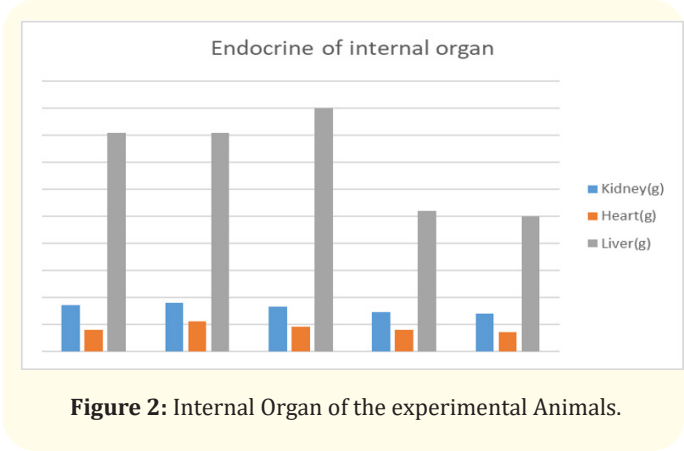


Figure 1 depicts the bar chart of the experiment animal gain and loss during twenty eight days of the Experimental Animals.

Mean \pm SD values of three determinations with different superscript in a column are significantly different ($P < 0.05$); Basal 50% , Casein 30% , Amaranth Vegetable10% (1). Basal 50% , Casein 30% , Water leave Vegetable 10% (2). Basal 50% Casein 30% Amaranth Vegetable 5% Water leave Vegetable 5% (3) Basal 50% Casein 30% (4) and Basal 100% (5).

Group	Kidney(g)	Heart(g)	Liver(g)
1	0.86	0.40	4.04
2	0.90	0.55	4.04
3	0.83	0.46	4.50
4	0.73	0.40	2.60
5	0.70	0.35	2.50

Table 1

Mean \pm SD values of three determinations with different superscript in a column are significantly different ($P < 0.05$); Basal 50% , Casein 30% , Amaranth Vegetable10% (1). Basal 50% , Casein 30% , Water leave Vegetable 10% (2). Basal 50% Casein 30% Amaranth Vegetable 5% Water leave Vegetable 5% (3) Basal 50% Casein30% (4) and Basal 100% (5).

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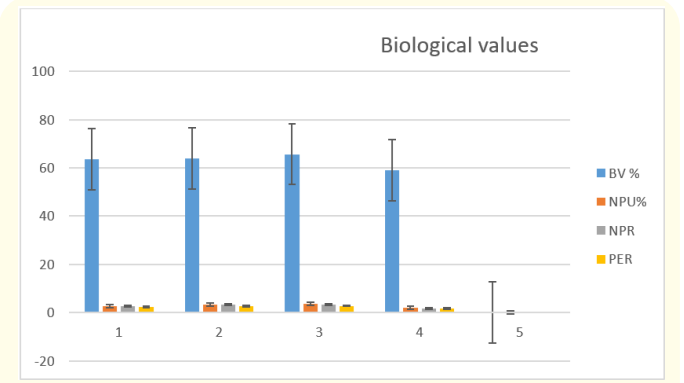


Figure 3: Biological values of the experimental animals.

Group	BV %	NPU%	NPR	PER
1	63.65	2.8	2.7	2.3
2	63.86	3.3	3.2	2.7
3	65.68	3.5	3.3	2.8
4	59	1.9	1.8	1.6
5	-	-	-	-

Table 2: Biological values of the experimental animals.

Group	Kidney mg/g	Liver mg/g	Muscle mg/g
1	84.35	84.30 \pm .01 ^c	83.32 \pm .02 ^c
2	83.56 \pm .01 ^e	83.50 \pm .02 ^e	83.48 \pm .01 ^e
3	83.38 \pm .02 ^c	83.36 \pm .02 ^d	83.35 \pm .03 ^d
4	80.68 \pm .03 ^b	80.64 \pm .03 ^b	80.66 \pm .02 ^b
5	20.70 \pm .02 ^a	20.70 \pm .01 ^a	20.30 \pm .03 ^a

Table 4: The nitrogen retention of the experimental animals.

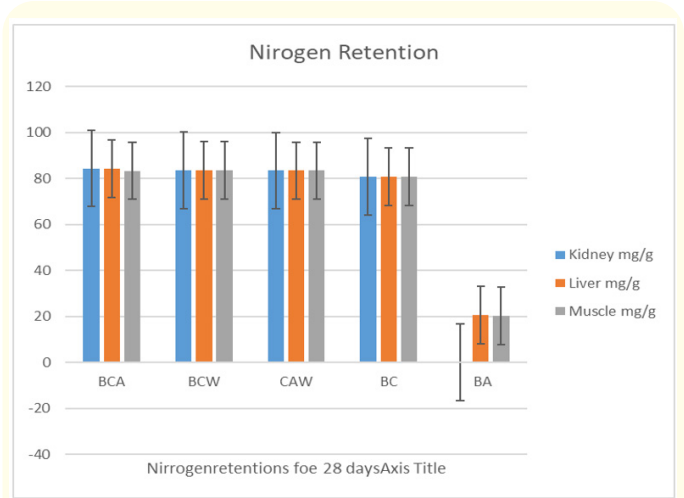


Figure 4

Mean \pm SD values of three determinations with different superscript in a column are significantly different ($P < 0.05$); Basal 50% , Casein 30% , Amaranth Vegetable10% (1). Basal 50% , Casein 30% , Water leave Vegetable 10% (2). Basal 50% Casein 30% Amaranth

Vegetable 5% Water leave Vegetable 5% (3) Basal 50% Casein30% (4) and Basal 100% (5). Vegetables are rich sources of tocopherols, carotenoids, vitamin A, B, C, k, thiamine, riboflavin, niacin, alpha and beta however could as supplement be used to resuscitate Covid 19 patients.

Discussion

Table 1 cited the internal organ of the experimental animals such as kidneys was ranged from 0.70-.086, hearts was ranged from 0.36-0.55, and livers were ranged between 2.6-4.04g. Comparing protein diets 1-4 to non-protein diets. The biological value of maize non-protein diet and generally cereal is low and not of quality owing to the fact that its protein is deficient in certain essential amino acids such as lysine, tryptophan and threonine and, therefore, needs protein supplements from legume and animal protein [16-20]. Vegetables have been established to be rich sources of tocopherols, carotenoids, vitamin A, B, C, K, thiamine, riboflavin, niacin, alpha and beta hence could be used supplement be used to resuscitate Covid 19 patients [1,19-22].

Table 2 reported the Biological values of the experimental Animals, biological value ranged from 59-63.86, NPU ranged from 1.9-3.5, NPR ranged from 1, 8-3.3, PER ranged from1.6-2.8 from but all the parameters for basal diets were nil but this is because maize non- protein diet 5 is of quantity but has no quality protein, is also deficient in essential amino acids such as lysine, tryptophan and threonine however could be fortified with legume or animal protein, low protein earlier reported for cereal Vegetables are rich sources of tocopherols, carotenoids, vitamin A, B, C, K, thiamine, riboflavin, niacin, alpha and beta however could as supplement be used to resuscitate Covid 19 patients [1,19-22].

Table 3 revealed the nitrogen retention of the experimental animals kidney was ranged from 20-84.3 mg/g, diet 4 is the highest while diet 5 is the lowest, liver ranged was from 20.70-84.30 mg/g the liver for diet 1 is the highest while diet 5 is the lowest and 20.30-83.48 mg/g. also diet 2 has the highest reading while the lowest reading is 5. The biological value of protein of maize which diet 5 composed is low owing to the fact that its protein is deficient in essential amino acids such as lysine, tryptophan, and threonine. Therefore, diet 5 needs protein supplementation from legume and animal protein origin Vegetable have been reported to be rich sources of tocopherols, carotenoids, vitamin A, B, C, K, thiamine, riboflavin, niacin, alpha and beta however could as supplement be used for resuscitation Covid 19 patients [1,19-25].

Conclusion

Vegetable leaves have been confirmed to be an important and protective food. Vegetable containing diets that is highly beneficial for health improvement and prevention of diseases and could lead to and quick recovery of COID 19 Patients. Vegetable leaves (Water and amaranth) are valuable food ingredients which can be utilized to supplement Covid-19 Patients diets. Vegetables confirmed to be

rich sources of tocopherols, carotenoids, vitamin A is good for eye sight vitamin B was confirmed to help to prevent neural tube defects in the newborn, Vitamin C is powerful water-soluble, easily digestible, is an antioxidant which could plays a vital role in wound healing and help fight against viral infections, K could to help prevent neural tube defects in the newborn baby.

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