

Integrity of Renal Function of Guinea Pigs Treated with Aqueous Root Extract of *Telfairia Occidentalis*

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ABSTRACT

The study investigated the effects of the aqueous root extract of *Telfairia occidentalis* on renal functions by examine Serum Urea, Serum Creatinine and Serum Electrolytes of Guinea pigs . A total of 10 Guinea pigs were randomly selected into two (2) groups A and B which were treated with 1ml of distilled water and 200 mg/kg of *Telfairia occidentalis* for period of Six (6) weeks of experiment respectively. Animals were sacrificed by cervical dislocation after the last administration and Blood sample was collected for Serum creatinine concentrations, Serum Electrolytes and Serum urea examination. Results obtained revealed an insignificant changes in the renal function as indicated by the observed parameters.

Keywords : Renal function, Guinea pigs, *Telfairia occidentalis*, Antinutrient

INTRODUCTION

Traditional medicinal plants are therapeutic resources used by the population of the continent specifically for health care, which may also serve as starting materials for drugs (Sofowora, 1993). Medicinal plants contain biologically active chemical substances such as saponins, tannins, essential oils, flavonoids, alkaloids and other chemical compounds (Harborne, 1973; Sofowora, 1996) which have curative properties. Some parts of *Telfairia occidentalis* such as leaf, stem and seed are said to have so many medicinal uses (Gbile, 1986). The young leaves sliced and mixed with coconut water and salt are stored in a bottle and used for the treatment of convulsion in ethno medicine (Gbile, 1986). The leaf extract is useful in the management of cholesterolemia, liver problems and impaired defense immune systems (Eseyin et al., 2005a, b). The essential amino acids contents compared favorably with those of important legumes (Aisegbu, 1987). The amino acid profile of *Telfairia occidentalis* had also been shown to be very rich and includes alanine, aspartate, glycine, glutamine, histidine, lysine, methionine, tryptophan, cystine, leucine, arginine, serine, threonine, phenylalanine, valine, tyrosine and isoleucine (Tindall, 1968; Fasuyi, 2006). Iweala and Obidoa (2009) reveal that the long term feeding of *Telfairia occidentalis*-supplemented diet caused a significant increase in weight of animals which may be due to its content of rich nutrients. The darkish green leafy vegetable leaves of *Telfairia occidentalis* and extracts (such as aqueous and ethanol extracts) from the leaves have been found to suppress or prevent the production of free

radical and scavenge already produced free radical, lower lipid peroxidation status and elevates antioxidant enzymes (such as superoxide dismutase and Catalase) both in vitro and in vivo (Obboh et al., 2004, 2006; Nwanna and Obboh, 2007; Adaramoye et al., 2007; Iweala and Obidoa, 2009; Kayode et al., 2009; Kayode et al., 2010). *Telfairia occidentalis* has also be found to protects and ameliorates oxidative brain and liver damaged induced by malnutrition in rats (Kayode et al., 2009, 2010). Nwanna and Obboh (2007) reported the hepatoprotective property of polyphenol extracts of *Telfairia occidentalis* leaves on acetaminophen induced liver damaged. Obboh (2005) reported that both aqueous and ethanolic extracts of *T. occidentalis* leaves protect the liver cells against garlic-induced oxidative damage. However, the aqueous extract is more effective than the ethanolic extracts, which could be attributed to the higher antioxidant activity of the aqueous extracts of *T. occidentalis* leaves. Hepatoprotective effects of *Telfairia occidentalis* leaves have been reported by Eseyin et al. (2005b), Iweala and Obidoa (2009) and Kayode et al. (2010). However, the root is recorded to contain some antinutrients that are poisonous to body organs. The roots are used as rodenticide and an ordeal poison (Gill, 1992). It was found out that root of *Telfairia occidentalis* had very high levels of antinutrients: oxalate (2600 mg/100 gDM), cyanides (84.2 mg/100 gDM), tannins (60.1 mg/100 gDM) and phytates (84.4 mg/100 gDM) and may constitute potent human poisons (Akwaowo, 2000). It has been hypothesized that the root may be nephrotoxic (Ekanem et al, 2010). It has also been tested that the root contains heavy chemicals in the sequence: Fe (1.67 µg/g) > Cu (0.53µg/g) > Mn (0.25µg/g) > Zn (0.09 µg/g) > Pb (0.03µg/g) (Edem et al, 2009). This study is therefore aimed at investigating the effects of the aqueous root extract of *Telfairia occidentalis* on renal functions by examine Serum Urea, Serum Creatinine and Serum Electrolytes.

MATERIALS AND METHOD

Animals and Formation of Treatment Groups

Ten 10 guinea pigs (weighing 350–351 g) were used for this study. The animals were kept in the Animal house of the Department of Anatomy, Ladoké Akintola University of Technology and were maintained under standard laboratory conditions of temperature (25 ± 4 °C); light (approximately 12-12 hour's light-dark cycle) and humidity ($70 \pm 5\%$). They were allowed free access to normal Animal chow and to clean water. The Animals were randomly divided into Two (2) groups: A, B. Group A served as the control. Groups B was daily administered 200 mg/kg of the aqueous root extract of *Telfairia occidentalis* respectively. All the treatments were for Six weeks.

Extract preparation;

The root of *Telfairia occidentalis* was obtained from Ibadan, authenticated at the Department of Botany, Ladoké Akintola University, Ogbomoso. The identified root was air dried at room temperature and grinded using an electric blending machine into powdered form, dissolved in distilled water for 24 hours and then filtered. The filtrate was concentrated using a water bath maintained at 70 °c, the concentrate was dissolved in phosphate buffered saline for dosage preparation and media for administration and preserved in refrigeration throughout the experimental period.

Extract Administration; The administration of the extract was totally by gavages, proper concentrations were administered by the use of metal oropharyngeal canula. The administration of *Telfairia occidentalis* root extract was done once daily at 0700 hour for period of Six (6) weeks. 10 Guinea Pig were divided into two groups (A and B) of 5 animals each. Group A served as control and was given 1ml of distilled water daily for Six weeks; Group B was given 200 mg/kg body weight of aqueous root extract of *Telfairia occidentalis* daily for six weeks.

Animal Sacrifice, Collection of Samples and Data, and Statistical Analysis

Animals were sacrificed by cervical dislocation and blood samples were collected, serum creatinine concentrations were determined using alkaline picrate method described by Jaffe. Serum Electrolytes and serum urea were determined according to the method described by Guyton and Hall 2001. Independent samples t-test was used to test for significant difference between treated group and the control.

RESULT AND DISCUSSION

TABLE I: Showing the Effects of Root Aqueous Extract of *Telfairia occidentalis* on Serum Urea, Serum Creatinine and Serum Electrolytes

	CONTROL	HIGH DOSE
Serum Urea	4.5±0.45 (mg/100ml)	61±0.45
Na+	11.0±0.46 (mg/100ml)	121±0.46
K+	8.7±0.86 (mg/100ml)	11.4±0.86
Cl-	86±0.96 (mg/100ml)	93±0.96
HCO ₃ ⁻	32±0.41 (mg/100ml)	38±0.52
Serum Creatinine (mg/100ml)	0.5±0.83	0.7±0.83

Results are presented as mean ± standard error of mean; “p < 0.05”

The result shows no significant changes in Serum Urea, Serum Creatinine and Serum Electrolytes; Sodium ion (Na⁺), Potassium ion (K⁺), Chloride ion (Cl⁻), Hydrogen trioxocarbonate ion (HCO₃⁻) and Creatinine when compare with the control. This shows that the aqueous root extracts of *Telfairia occidentalis* has no significant effects on renal function of guinea pigs treated with high dose of 200 mg/kg. Renal functions parameters are of great importance in renal functioning; this helps to maintain the renal values of the renal functions parameters (Singh, 2006). The *Telfairia Occidentalis* roots contain anti nutrients and minerals which are oxalate, cyanide, tannins, phytates which are poisonous (Ekpeme et al,1998).

This study revealed that the aqueous extract of root of *Telfairia occidentalis* has no significant effect on the renal functions parameters of guinea pig treated with 200 mg/kg for six weeks of administration. The root of *Telfairia occidentalis* is recorded to contain some antinutrients that are poisonous to body organs. The roots are used as rodenticide and an ordeal poison (Gill, 1992). It was found out that root of *Telfairia occidentalis* had very high levels of antinutrients: oxalate (2600 mg/100 gDM), cyanides (84.2 mg/100 gDM), tannins (60.1 mg/100 gDM) and phytates (84.4 mg/100 gDM) and may constitute potent human poisons (Akwaowo, 2000). This study does not agree with the work of Ekanem et al, 2010 who hypothesized that the root may be nephrotoxic (Ekanem et al, 2010) as the result in this study revealed no significant changes in the parameters used in determines the renal function. The darkish green leafy vegetable leaves of *Telfairia occidentalis* and extracts (such as aqueous and ethanol extracts) from the leaves have been found to suppress or prevent the production of free radical and scavenge already produced free radical, lower lipid peroxidation status and elevates antioxidant enzymes (such as superoxide dismutase and

Catalase) both in vitro and in vivo (Obboh et al., 2004, 2006; Nwanna and Obboh, 2007; Adaramoye et al., 2007; Iweala and Obidoa, 2009; Kayode et al., 2009; Kayode et al., 2010). This work which uses the aqueous root extract of *Telfairia occidentalis* as opposed to the leaf extract used by previous authors mentioned, agreed with their findings in maintaining the renal integrity in close proximity with the control rats.

CONCLUSION

Telfairia Occidentalis aqueous root extract shows that the high dose administered on the animals (guinea pigs) have no adverse effects on renal functions parameters

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