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Biochemical Effects of Goko Cleanser Herbal Mixture on the Kidney of Adult Female Wistar Rats

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Abstract:

Medicinal plants have shown to possess some biological constituents that have significant effect in man. This study was carried out to evaluate the effect of herbal mixture (Goko Cleanser) on the kidney of adult female Wistar rats. A total of twenty-five animals weighing 160g - 280g were used. The rats were randomly selected into five groups of five (5) each. The groups were designed as group 1-5. Group 1 served as control group, group 2 took 1000mg/kg of the herbal mixture, group 3 took 1500mg/kg of the herbal mixture, group 4 took 2000mg/kg and group 5 took 4000mg/kg. The result show that Goko Cleanser herbal mixture possesses tannin, saponin and flavonoids as its phytochemical constituents. The creatinine level had a significant ($P<0.05$) increase in test groups 2 - 4 when compared to the control group; while in group 5, there was no significant increase ($P>0.05$) increase compared to the control group. The urea level had no significant increase ($P>0.05$) in the test group when compared to the control group. The food intake was measured daily. Result from food intake in week 1 showed that there was no significant ($P>0.05$) increase in the test groups when compared to the control group. In week 2, there was significant ($P<0.05$) decrease in group 4 and 5, while there was no significant ($P>0.05$) increase in group 2; and no significant ($P>0.05$) decrease in group 3 compared to the control group. In week 3, there was a significant ($P<0.05$) decrease in food intake in the treated groups when compared to the control group; and there was a significant ($P<0.05$) decrease in body weight in groups 2, 4 and 5 while group 3 had no significant ($P>0.05$) decrease. Hence, the results from this study show that Goko Cleanser herbal mixture possesses dose-dependent toxic effect on the kidney,

Key Words: Goko Cleanser, Kidney, Wistar Rats, Phytochemical Constituents

Introduction:

Herbal mixtures have been the strength of traditional medicine for years now. In recent times, many authors have conducted several researches works on herbal mixtures to determine its therapeutic effects (Udochukwu et al., 2015; Amandeep et al., 2015; Huzaifa et al., 2014; Feng et al., 2014; Gazuwa et al., 2013; Ekor, 2013; Akinjogunla et al., 2011; and Nnodim et al., 2010). Over three quarter of the world's population is using herbal medicine with an increasing trend globally. In addition, herbal medicine may be beneficial but not completely harmless (Oreagba et al, 2011). Goko cleanser is an herbal mixture used for the treatment of various kinds of diseases and infections. Its contents include: Vernonia amygdalina, Cajanus cajan, Zingiber officinale, Allium sativum, Saccharum officinarum, Caramel. Scientist has conducted individual researches on the above herbal content or a combination of two to determine their positive or negative effect. However, arguments have been raised on the combination of these various herbs into a herbal mixture. Vernonia amygdalina one of the herbal content of the mixture is a member of the Asteraceae family, is a small shrub that grows in tropical Africa. It is commonly called Bitter leaf in English because of its bitter taste and it is locally known as Onugbu in Igbo. The infusion of the leaf induces the haemolysis of mammalian erythrocyte in vitro with Human-SS having the highest susceptibility (Akinjogunla et al., 2011; and Udochukwu et al., 2015). Cajanus cajan commonly called pigeon pea, is a perennial legume from the family fabaceae. Its seeds have become a common

food grain in Asia, Africa and Latin America. It is a major source of protein. In combination with cereals, pigeon pea makes a well-balanced human food. It is locally called Otili in Yoruba. The glycemic profile of the aqueous extract of Cajanus cajan leaves significantly increases the fasting blood glucose levels of normal rats (Pal et al., 2011).

Zingiber officinale is commonly called ginger and locally known as Atale in Yoruba. It is a flowering plant, in the family Zingiberaceae whose rhizome, ginger root or simply ginger, it is widely used as a spice or a folk medicine. It is a herbaceous perennial which grows annual 9m tall bearing narrow green leaves and yellow flowers. If consumed raw in large amounts, it causes intestinal blockage and inflammatory bowel disease in people with gastric ulcers (Nnodim et al., 2010). Allium sativum is commonly known as garlic and locally called Ata in Yoruba and Tafarnuwa in Hausa. It is a specie in the onion genus – allium. Its close relative includes onion and shallot. It was known to ancient Egyptians and has been used for both culinary and medicinal purposes. It adversely causes haemorrhaging if consumed with prescribed anticoagulants. It may also cause menstrual irregularities (Huzaifa et al., 2014; and Gazuwa et al., 2013). Saccharum Officinarum is commonly known as sugar cane locally called Okpete in Igbo, Ireke in Yoruba and Rake in Hausa. It causes excessive urination and indigestion when consumed in large quantity (Amandeep et al., 2015; and Feng et al., 2014). The kidney is a urinary organ, ovoid in shape and reddish brown in colour. It measures approximately 10cm in length, 5cm in width and 2.5cm in thickness. The kidney functions to remove excess water, salt and waste of protein metabolism from the blood while returning nutrients and chemicals to the blood (Moore and Dalley, 2006). The kidney is the main site for diabetes and renal cysts which can lead to kidney failure. Unhealthy herbal mixtures can cause kidney disease. Different herbs have been found to be useful to humans as they are used in the treatment of various ailments, however most of these have been abused by individuals or organizations that produce different herbal mixtures and sell them with different claims of efficacy. Most of these claims may be unverified and thus could pose serious threats to the general human health and body functions. Though these herbal mixture is widely used in the treatment of various ailments around the world, there is still no knowledge on its exact effect on various body structures and functions. Therefore, this study aims at investigating the specific biochemical effect of this herbal mixture (Goko Cleanser) on the kidney using female Wistar rats as experimental models.

Methodology:

Location of the Study:

This study was carried out in the animal house of the Department of Anatomy, Nnamdi Azikiwe University, Nnewi Campus, Anambra State, Nigeria. The animals procured from Sanitas Animal Farm, Ekwulumili, were made to acclimatize for a period of two weeks at the animal house of Anatomy department, Nnamdi Azikiwe University, Nnewi campus after which the test substance was administered for a period of 21 days.

Materials:

25 Female Wistar rats, Goko Cleanser Herbal Mixture, Standard rat feed, Plastic cages with iron netting, Animal weighing balance, Oral cannula, Sets of EDTA treated sample bottles, 10ml syringe (Disposable), Distilled water, Latex gloves and Cotton wool.

Experimental Animals:

The experimental animals were twenty-five adult female Wistar rats weighing between 160-280g. The rats were differentiated by colour marks peculiar to each group. They were kept in plastic cages with iron netting in standard conditions and fed properly with normal growers' mesh which was produced by Premier Feed Mills Co. Limited (A subsidiary of Flour Mills Nigeria Plc). The rats were divided into five groups, with group 1, 2, 3, 4 used as the test group while Group 5 served as the control group. All rats were weighed prior to the commencement of administration and subsequently weighed weekly (once a week) using animal weighing balance (CAMRY IILBXOZ).

Collection and Identification of the Herbal Mixture:

The herbal mixture (Goko cleanser) was purchased from a pharmacy shop around Nnamdi Azikiwe University Teaching Hospital Nnewi. Phytochemical Analysis was carried out to determine the components of the herbal mixture at the Pharmacological Laboratory in Nnamdi Azikiwe University, Agulu Campus.

Phytochemical Analysis of the Herbal Mixture (Goko Cleanser):

This includes both the quantitative and qualitative analysis of the herbal mixture Goko cleanser.

Qualitative Analysis:

- Saponin – Moderately present
- Tannin – Trace / Mildly present
- Flavonoid – Trace / Mildly present
- Alkaloid, steroid, Tapernoid, cardiac glycoside, protein, and carbohydrate are all negative.

Chemical tests were carried out on the aqueous extract and powdered specimens using standard procedures to identify constituents as described by Solowara (1993), Trease (1989) and Harborne (1973).

Test for Saponins:

About 2g of the powdered sample was boiled in 20ml of distilled water in a water bath and then filtered. 10ml of the filtrate was mixed with 5ml of distilled water and shaken vigorously for a stable persistent froth. The frothing was mixed with 3 drops of olive oil and shaken vigorously, then observed for the formation of emulsion.

Test for Tannins:

About 0.5g of the dried powdered sample boiled in 20ml of water in a test tube and then filtered a few of 0.1% ferric chloride was added and observed for brownish or a blue-black colouration.

Test for Flavonoids:

Three methods were used to determine the presence of flavonoids in the plant sample (Solowara, 1993; Harborne, 1973).

- 5ml of dilute ammonia solution were added to a portion of the aqueous filtrate of each plant extract followed by addition of concentrated H_2SO_4. A yellow colouration observed in each extract indicated the presence of flavonoids. The yellow colouration disappeared on standing.
- Few drops of 1% aluminium solution were added to a portion of each filtrate. A yellow colouration was observed indicating the presence of flavonoids.
- A portion of the powdered plant sample was in each case heated with 10ml of ethyl acetate over a steam bath for 3min.The mixture was filtered and 4ml of the filtrate was shaken with 1ml of dilute ammonia solution. A yellow colouration was indicating a positive test for flavonoids.

Test for Steroids:

2ml of acetic anhydride was added to 0.5g ethanolic extract of each sample with 2ml H_2SO_4. The colour changed from violet to blue or green in some samples indicating the presences of steroids.

Test for Terpenoids (Salkowski Test):

5ml of each extract was mixed in 2ml of chloroform, and 3ml concentrated H_2SO_4 was carefully added to form a layer. A reddish-brown colouration of the interface was formed to show positive results for the presence of terpenoids.

Test for Cardiac Glycosides (Keller-Killani Test):

5ml of each extract was treated in 2ml of glacial acetic acid containing one drop of ferric chloride solution. This was underlayed with 1ml of concentrated sulphuric acid. A brown ring of the interface indicates deoxysugar characteristics of cardenolides. A violet ring may appear below the brown ring while in the acetic acid layer, a greenish ring may form just gradually throughout thin layer.

Quantitative Analysis:

Alkaloid Determination Using Harborne (1973) Method:

5g of the sample was weighed in a 250 beaker and 200ml of 10% acetic acid in ethanol was added and covered and allowed to stand for 4 hours. This was filtered, and the extract was concentrated on a water bath to one-quarter of the original volume. Concentrated ammonium hydroxide was added drop-wise to the extract until the precipitation was complete. The whole solution was allowed to settle, and the precipitate was collected and washed with dilute ammonium hydroxide and filtered. The residue is the alkaloid, which was dried and weighed.

Tannin Determination by Van-Buven and Robinson (1981) Method:

500mg of the sample was weighed into a 50ml plastic bottle. 50ml of distilled water was added and shaken for 1 hour in a mechanical shaker. This was filtered into a 50ml volumetric flask and made up to the mark. Then 5ml of the filtered solution was pipetted out into a test tube and mixed with 2ml of 0.1M $FeCL_3$ in 0.1NHCl and 0.008M potassium Ferro-cyanide. The absorbance was measured at 120nm within 10 minutes.

Saponin Determination:

The method used was that of Obadoni and Ochuko (2001). The samples were ground and 20g of each were put into a conical flask and 100cm of 20% aqueous ethanol were added. The samples were heated over a hot water bath for 4hours with continuous stirring at about 550c.The mixture was filtered, and the residue re-extracted with another 200ml 20% ethanol. The combined extracts were reduced to 40ml over water bath at about 90^0C. The concentrate was transferred into a 250ml separatory

funnel and 20ml of diethyl ether was added and shaken vigorously. The aqueous layer was recovered while the ether layer was discarded. The purification process was repeated. 60ml of n-butanol was added. The combined n-butanol extracts were washed twice in 10ml of 5% aqueous sodium chloride. The remaining solution was heated in a water bath. After evaporation the samples were dried in the oven to a constant weight, the saponin content was calculated as percentage.

Flavonoid Determination by the Method of Bohm and Kolpal-Abyazan (1994):

10g of the plant sample was extracted repeatedly with 100ml of 80% aqueous methanol at room temperature. The whole solution was filtered through Whatman filter paper number 42 (125mm). The filtrate was later transferred into a crucible and evaporated into dryness over a water bath and weighed to a constant weight.

Result of Phytochemical Analysis:

Phyto-constituents	Goko Cleanser herbal mixture
Saponin	++
Flavonoids	+
Tannin	+
Alkaloid	-
Steroid	-
Cardiac glycoside	-
Protein	-
Carbohydrate	-

++ (Moderately present), + (Mildly present), - (Absent)

Toxicity Test of Goko Cleanser (Calculation of Ld50):

Acute Toxicty Study:

The median lethal dose (LD50) of Goko Cleanser herbal mixture was carried out in the Department of Anatomy, Faculty of Basic Medical Science, Nnamdi Azikiwe University, Nnewi. This was determined using the modified method of Dietrich Lorke (1983). In this study, a total of 13 rats were used. They received the extract via oral route and it was carried out in two phases.

Phase I:

Nine (9) rats were used and they were grouped into three made of three adult Wistar rats.
Group 1 received 10mg/kg
Group 2 received 100mg/kg
Group 3 received 1000mg/kg
The animals were observed over a period of 24hrs for mortality. From the result of phase 1, the second phase was carried out.

Phase II:

Group 1 received 1200mg/kg
Group 2 received 2600mg/kg
Group 3 received 3900mg/kg
Group 4 received 5000mg/kg
The animals were monitored over a period of another 24hrs for mortality. The median lethal dose was obtained at this phase.

PHASE	DOSE	DEATH	OBSERVATION
1	10mg/kg	0/3	Nil
	100mg/kg	0/3	Nil
	1000mg/kg	0/3	Nil
2	1200mg/kg	0/1	Nil
	2600mg/kg	0/1	Calm and no death occurred
	3900mg/kg	1/1	Died within 48 hours
	5000mg/kg	1/1	Died within 24 hours

$LD_{50} = \sqrt{a \times b}$
A = Maximum dose with 0% mortality (2600mg/kg)
B = Minimum dosed with 100% mortality (3900mg/kg)
LD_{50} of Goko Cleanser = $\sqrt{2600 \times 3900}$ = 3184.34mg/kg
LD_{50} of Goko Cleanser = 3184.34mg/kg

Preparation of Stock Solution:

200ml of Goko Cleanser was oven dried at 50ºC and the concentrated Goko cleanser was measured to be 5g.

5g of Goko cleanser was dissolved in 100mls of distilled water to get a stock solution 50mg/ml.

1g = 1000mg

5g = 5000mg = 5000mg/100ml

Stock Solution =50mg/ml

$$\text{Using} = \frac{\text{Weight of Animal} \times \text{Dose [kg]}}{\text{Stock}}$$

Drug Administration:

The drugs were administered to the rats in the test group orally using an oral cannula with rubber tubing, while rats in the control group received distilled water and grower feed. The extracts were administered once daily within the hours of 08:00am and 09:00am. All rats in both control and test group were allowed free access to food and water, throughout the experimental period.

Experimental Protocol:

Before administration, the rats were weighed, and their weight ranged between 160-320g.They were then divided into five experimental groups according to their body weight from highest to lowest with five in each group labelled Group 1-5. The experimental groups 2-5 received different doses of drug as follows:

- Group 1 – Control
- Group 2 – Received 1000mg/kg of Goko cleanser
- Group 3 – Received 1500mg/kg of Goko cleanser
- Group 4 – Received 2000mg/kg of Goko cleanser
- Group 5 – Received 4000mg/kg of Goko cleanser.

Collection of Blood Samples:

The experimental animals were anaesthetized by chloroform inhalation, followed by cervical dislocation and 2.0ml of blood were collected from the animals through ocular puncture and were placed in lithium heparin bottles for Alt and Asp analysis.

Precautions:

- This work ensured sterility of instruments throughout the experiment.
- This work ensured that equal volumes of blood were collected from the rats
- This work ensured that different bottles were used for different blood samples.
- This work ensured the proper labelling of each bottle

Kidney Function Test:

UREA ANALYSIS: Quantitative determination of the urea in the experimental rat serum was achieved using diacetyl monoxime method.

Principle of the method

Urea reacts directly with diacetyl monoxime under strong acidic conditions to give a yellow condensed product. The reaction is intensified by the presence of ferric ions and thiosemicarbazide. The intense red colour formed is measured at 540nm/ yellow green filter.

Creatinine Analysis:

Blood samples were collected from each rat and kept in lithium heparin bottles and were used for urea creatinine analysis. The test was carried out at chaste laboratory traffic light Nnewi. Quantitative determination of the creatinine in the experimental rat serum was achieved using Jaffe-slot method.

Principle of the method:

Creatinine present in the serum or plasma directly reacts with alkaline picrate resulting in the formation of a red colour, the intensity of which is measured at 505nm/green filter. Protein interference is eliminated using sodium lauryl sulphate. A second absorbance reading after acidifying with 30% acetic acid corrects for non-specific chromogens in the samples.

Statistical Analysis:

Data were analyzed using Statistical Package for Social Sciences (SPSS) version 16, while experimental results were expressed as mean ± standard error mean (S.E.M) using one-way analysis of variance (ANOVA), followed by post hoc LSD multiple comparison and values were considered significant at $P<0.05$.

Results:

Table 1: Effect of Goko Cleanser Herbal Mixture on Urea and Creatinine Level after 21 days of treatment

		MEAN	*±SEM*	*P-VALUE*
Urea (mmol/L)	GROUP 1 (Control)	4.12	±0.20	
	GROUP 2 (1000mg Goko Cleanser)	4.67	±0.11	0.355
	GROUP 3 (1500mg Goko Cleanser)	5.07	±0.12	0.120
	GROUP 4 (2000mg Goko Cleanser)	4.92	±0.86	0.186
	GROUP 5 (4000mg Goko Cleanser)	4.97	±0.08	0.161
Creatinine (µmol/L)	GROUP 1 (Control)	91.75	±2.42	
	GROUP 2 (1000mg Goko Cleanser)	123.75	±2.42	0.000
	GROUP 3 (1500mg Goko Cleanser)	107.25	±4.76	0.007
	GROUP 4 (2000mg Goko Cleanser)	111.00	±4.88	0.001
	GROUP 5 (4000mg Goko Cleanser)	101.75	±1.70	0.062

All values were represented as mean and SEM and data were analysed using one-way ANOVA using multiple comparison and values were considered significant at $P<0.05$.

The result above revealed that there was an insignificant increase in the mean level of Urea when comparing control (4.12±0.20), with all treated groups 2(4.67±0.11), 3(5.07±0.12), 4(4.92±0.86) and 5(4.97±0.08), while that of Creatinine level there was an increase in the mean level when comparing control (91.75±2.42) with all treated groups, however the increase was more significant in group 2(123.75±2.42) and 4(111.00±4.88) then followed by group 3(107.25±2.42) while that of group 5 (101.75±1.70) was not significant.

Table 2: Effect of Goko Cleanser Herbal Mixture on food intake after three weeks of treatment

		MEAN	*±SEM*	*P-VALUE*	*F-VALUE*
Food intake					
Week 1	GROUP 1(CONTROL)	28.50	±2.98		
	GROUP 2 (1000mg of Goko Cleanser)	29.72	±2.03	0.671	
	GROUP 3 (1500mg of Goko Cleanser)	30.22	±1.64	0.551	0.232
	GROUP 4 (2000mg of Goko Cleanser)	31.12	±1.21	0.368	
	GROUP 5 (4000mg of Goko Cleanser)	29.52	±1.66	0.722	
Week 2	GROUP 1(CONTROL)	30.75	±1.49		
	GROUP 2 (1000mg of Goko Cleanser)	32.07	±2.02	0.529	
	GROUP 3 (1500mg of Goko Cleanser)	29.12	±1.21	0.442	28.130
	GROUP 4 (2000mg of Goko Cleanser)	20.25	±0.32	0.000	
	GROUP 5 (4000mg of Goko Cleanser)	14.25	±1.63	0.000	
Week 3	GROUP 1(CONTROL)	46.50	±3.88		
	GROUP 2 (1000mg of Goko Cleanser)	24.50	±0.64	0.000	
	GROUP 3 (1500mg of Goko Cleanser)	23.87	±0.59	0.000	38.401
	GROUP 4 (2000mg of Goko Cleanser)	20.25	±0.85	0.000	
	GROUP 5 (4000mg of Goko Cleanser)	13.75	±1.65	0.000	

All data were analyzed using one-way ANOVA and values were considered significant at $P<0.05$. Result from the table above revealed that there was an increase in food intake of the animals in week 1 for all test groups 2 (29.72±2.03), 3 (30.22±1.64), 4 (31.12±1.21) and 5 (29.52±1.66) when compared to the control group (28.50±2.98). The increase in food intake was not significant. In week 2, there was a decrease in food intake when compared to the control (46.50±3.88) with the test group 2 (32.07±2.02), 3 (29.12±1.21), 4 (20.25±0.32) and 5 (14.25±1.63), but the decrease in food intake was significant in group 4 and 5. In week 3, there was a significant decrease in food intake in group 2 (24.50±0.64), 3 (23.87±0.59), 4 (20.25±0.85) and 5 (13.75±1.65) when compared to the control group (46.50±3.88).

Table 3: Effect of Goko Cleanser Herbal Mixture on the Initial and Final body weight after 21 days of treatment

		MEAN	*±SEM*	*P-VALUE*	*T-VALUE*
Group 1 (CONTROL)	Initial	200.00	±16.32		
	Final	235.00	±9.57	0.035	-3.656
Group 2 (1000mg of Goko Cleanser)	Initial	210.00	±25.16		
	Final	182.50	±17.01	0.049	3.220
Group 3 (1500mg of Goko Cleanser)	Initial	192.50	±12.50		
	Final	162.50	±4.78	0.069	2.777
Group 4 (2000mg of Goko Cleanser)	Initial	220.00	±11.54		
	Final	162.50	±6.29	0.007	6.734
Group 5 (4000mg of Goko Cleanser)	Initial	255.00	±22.17		
	Final	147.50	±4.78	0.025	4.196

All values were analyzed using dependent T-test and values were considered significant at $P<0.05$.
Result from the table above shows that, there was an increase in the body weight in control group when compared to the Initial (200.00±16.32) and Final (235.00±9.57) body weight, and this increase was significant. In group 2, there was a decrease in the body weight when compared to the Initial (210.00±25.16) and Final (182.50±17.01) body weight, and the decrease was significant. In Group 3, there was a decrease in the body weight when compared the Initial (192.50±12.50) and Final (162.50±4.78) body weight, the decrease was not significant. In group 4, there was a decrease in the body weight when compared to the Initial (220.00±11.54) and Final (162.50±6.29) body weight, the decrease was significant. In group 5, there was a decrease in the body weight when compared to the Initial (255.00±22.17) and Final (147.50±4.78) body weight, the decrease was significant.

Figure 1: Bar chart showing the effect of Goko Cleanser herbal mixture on Urea level after 21 days of treatment

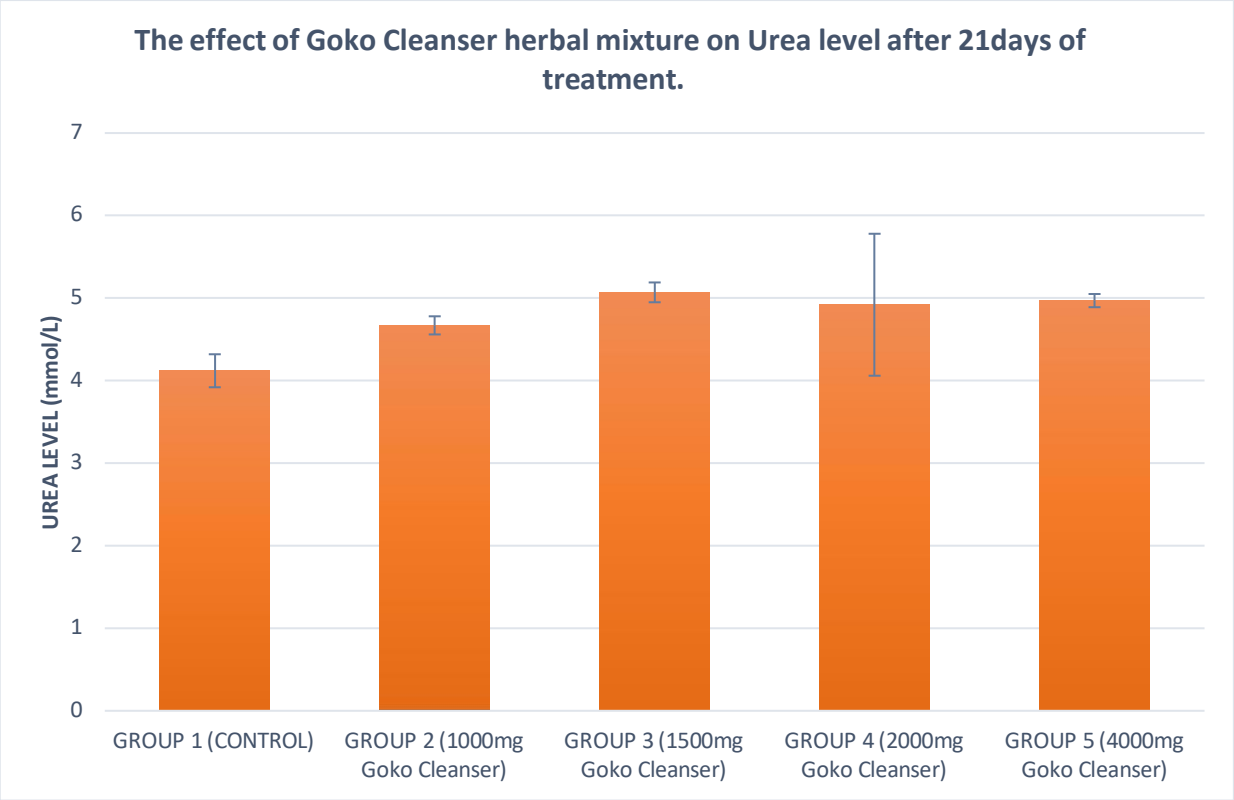


Figure 2: Bar chart showing the effect of Goko Cleanser herbal mixture on Creatinine level after 21 days of treatment

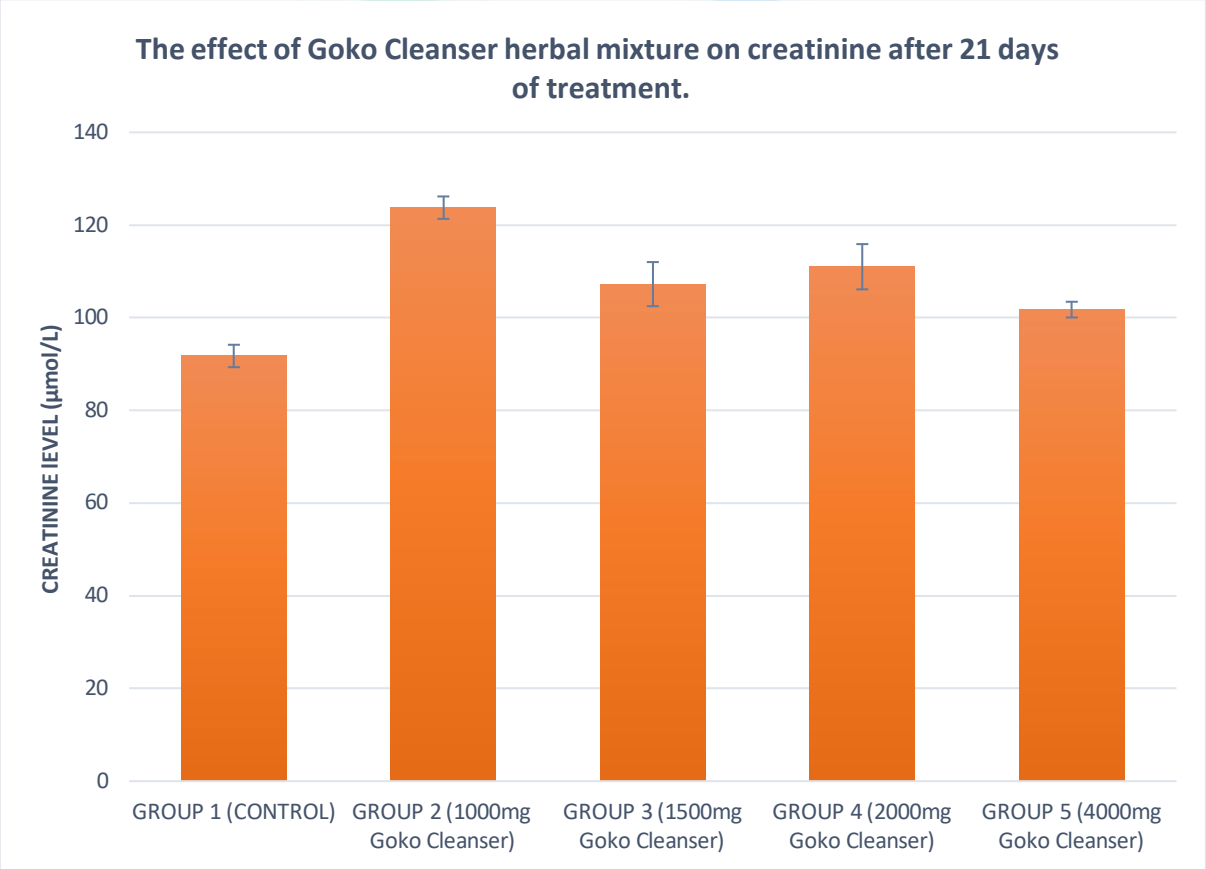


Figure 3: Bar chart showing the effect of Goko cleanser herbal mixture on food intake for week 1

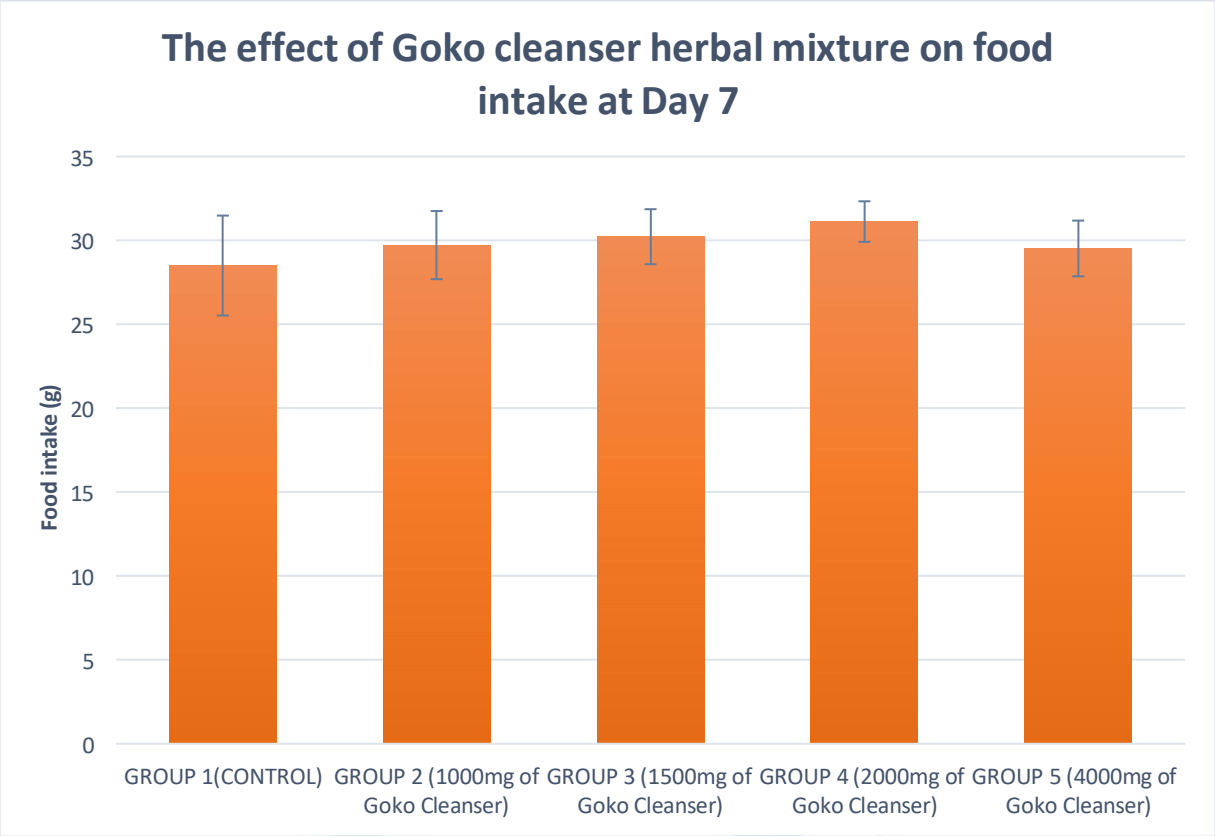


Figure 4: Bar chart showing the effect of Goko cleanser herbal mixture on food intake for week 2

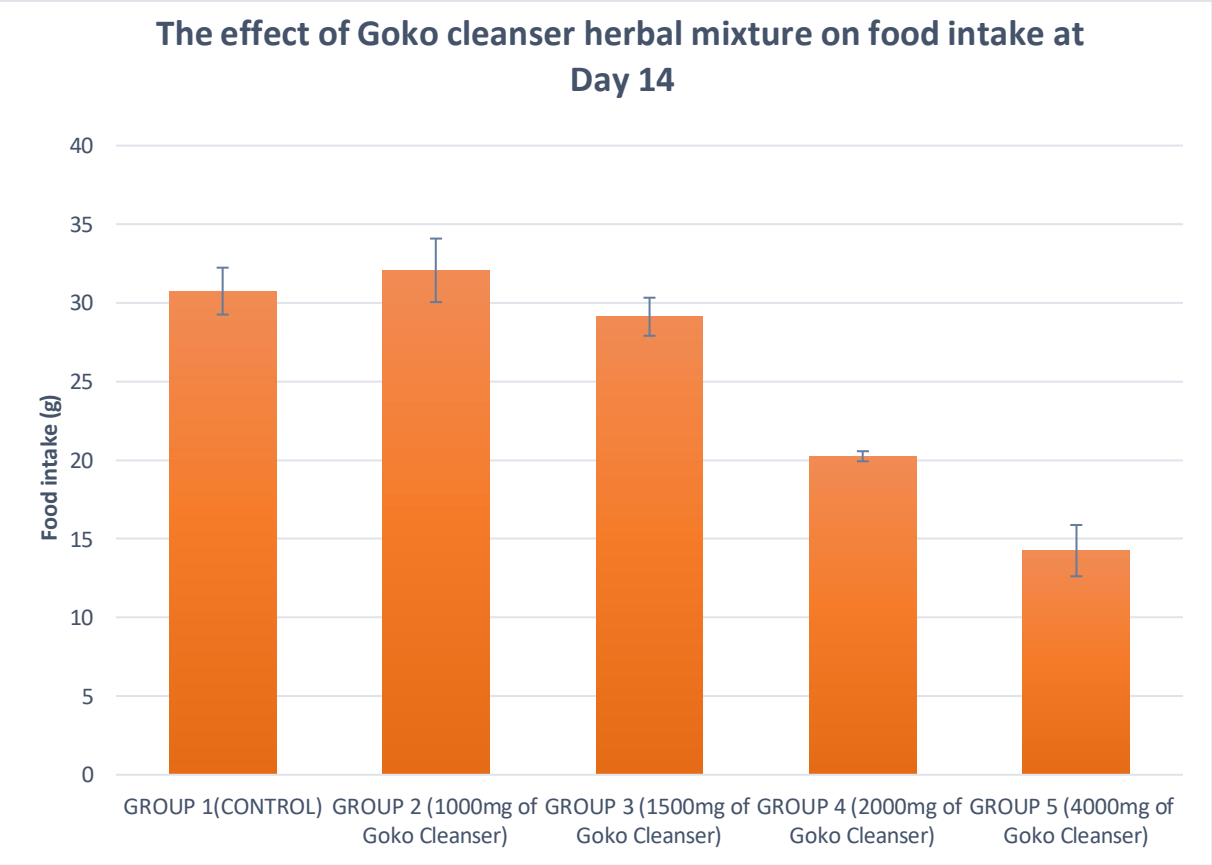


Figure 5: Bar chart showing the effect of Goko cleanser herbal mixture on food intake for week 3

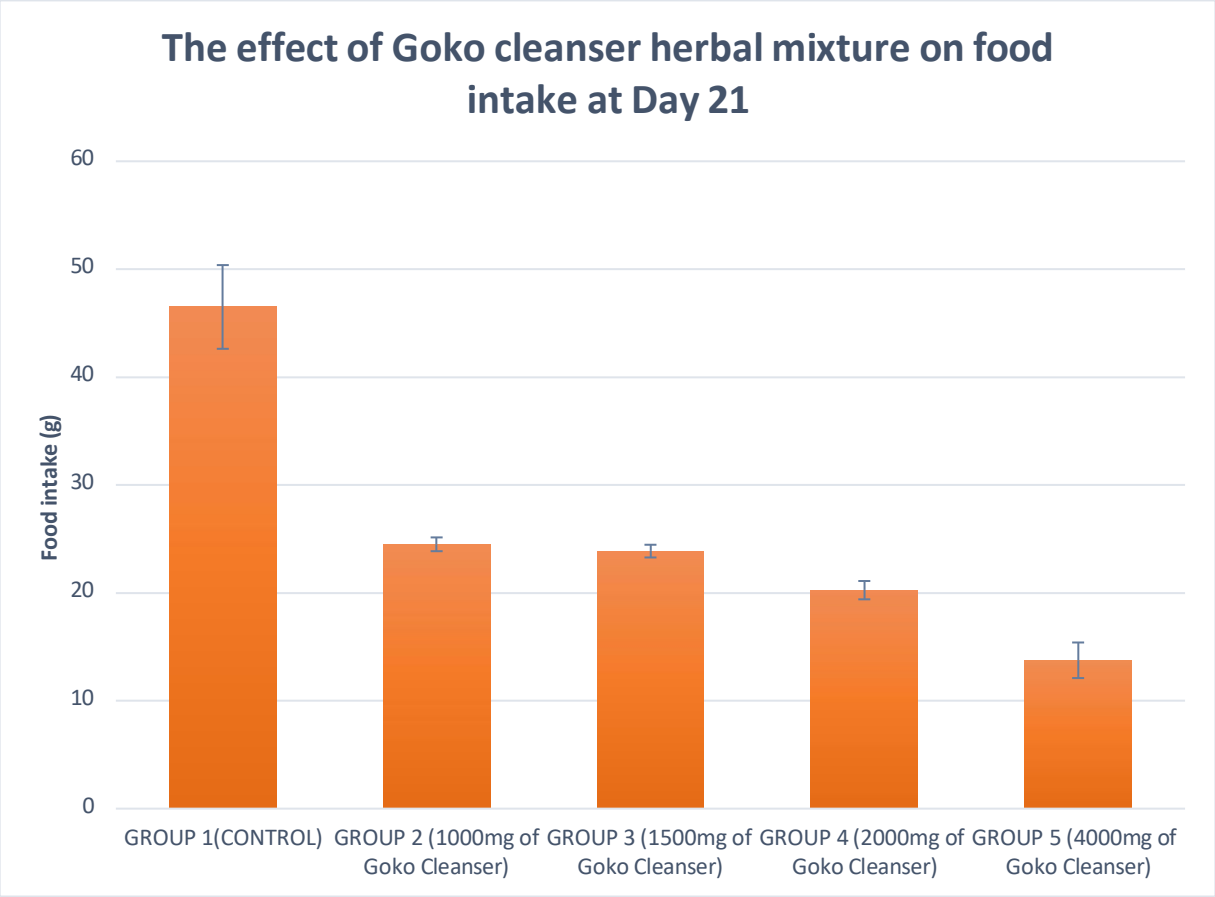
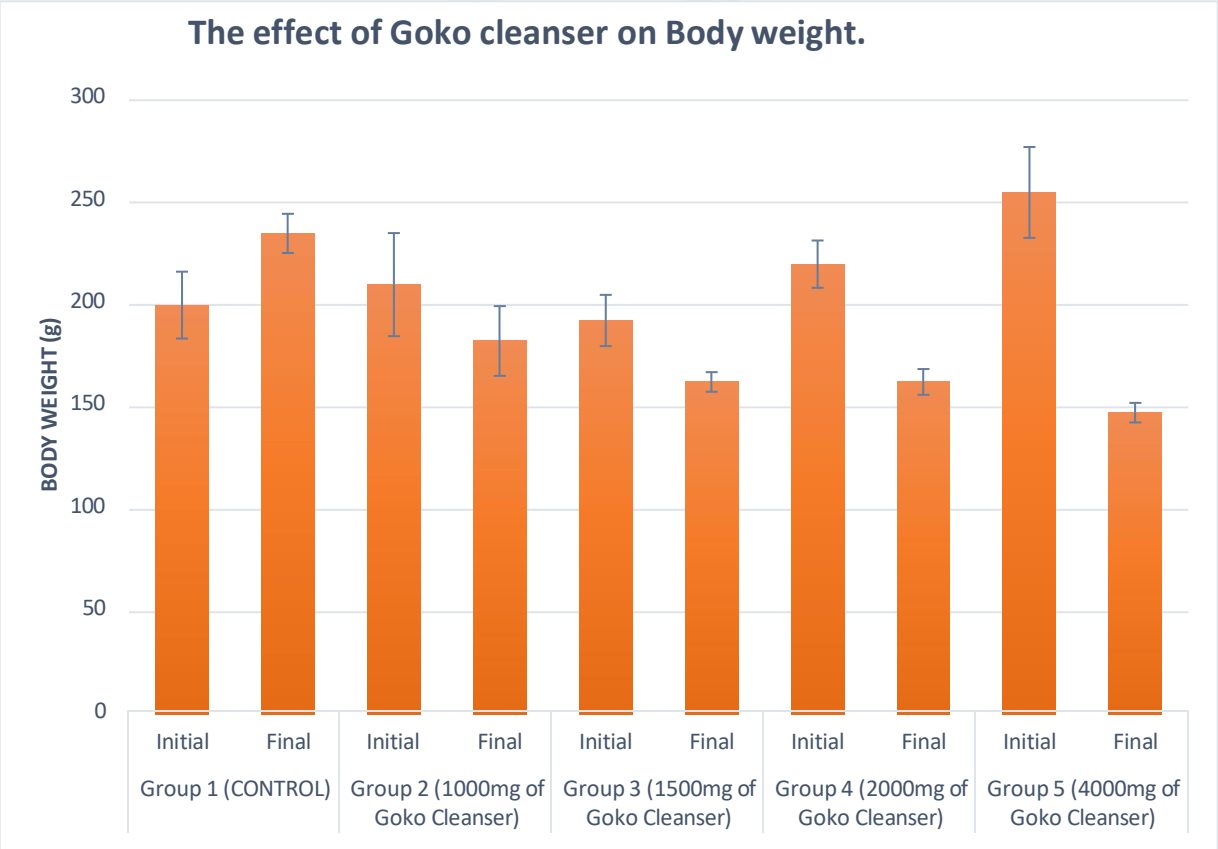


Figure 6: Bar chart showing the effect of Goko cleanser herbal mixture on Body weight



Discussion:

Medicinal plants are of great importance to the health of individuals and communities. The medicinal value of these plants lies in some of the phytochemical constituents that produce definite physiological actions in humans. The most important of these bioactive compounds of these plants are alkaloids, tannins, flavonoids and phenolic compounds (Hill, 1952). Many of these constituents are been used by man as spices and food plants and also possess medicinal values for pregnant and nursing mothers (Okwu, 1999; 2001). Goko cleanser a poly-herbal mixture which constitutes of several medicinal plants is not an exception; however, its effects are not elucidated. In this present study, the phytochemical screening of qualitative and quantitative estimation of the percentage of the crude yield of chemical constituents of Goko cleanser was examined which shows that the herbal mixture was rich in saponins, tannin and flavonoids. However, the quantitative biochemical analysis showed that saponins contain about 7.35%, alkaloids about 0.2% and flavonoids about 4% of the herbal mixture. The saponins, flavonoids, and tannin have shown to possess medical activity as well as exhibiting physiological activity. This result corresponds with studies by Akinjogunla *et al.*, (2011) and Udochukwu *et al.*, (2015), which noted the presence of Saponin, tannin and flavonoids in aqueous leaf extract of *Vernonia amygdalina;* also a study conducted by Huzaifa *et al*., (2014) and Gazuwa *et al*., (2013) which noted that aqueous extract of *Allium sativa* possess these phyto-chemicals (tannins, saponins and flavonoids); and a study by Amandeep *et al*., (2015) and Feng *et al*., (2014) which noted that *Saccharum officinarum* possess high content of Flavonoids. Findings from this study revealed there was no significant increase in Urea level in the treated groups. However, for Creatinine level, there was a significant increase in the treated groups when compared with the control group. The possible mechanism of action could result from the toxic substances present in the herbal mixture, thus leading to disruption of the biochemical and physiological actions of the kidney, since an increase in Creatinine and Urea serves as biomarkers for kidney damage. The amount of creatinine is usually constant, so that elevated levels indicate diminished renal function only, since it is easily excreted by the kidneys (Loeb, 1991). This contradicts work done by (Atangwho *et al*., 2007) which reported that there was a significant reduction in urea and creatinine level in diabetic rats when treated with ethanolic extract of *V. amygdalina*. Result from this present study shows that Goko cleanser herbal mixture cause a significant decrease in body weight and food intake, this could be as a result of the presence of some chemical constituent which can cause inhibitory effects on the appetite centre, thereby causing a decrease in food intake.

Conclusion:

Findings from this present study show that Goko Cleanser herbal mixture possess toxic effect on the kidney on dose dependent, and also cause a decrease in body weight and food intake.

Recommendation:

From this study, we may proceed to recommend that the intake of Goko Cleanser should be minimized as it has no specific dosage. Also, further research needs to be done to determine a particular dose that will be less toxic on the kidney. In addition, patients who seek to take this herbal mixture (Goko Cleanser) should endeavour to always visit the doctor each time they have health issues.

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