

THE EFFECT OF ORAL ADMINISTRATION OF THE MIXTURE OF HONEY AND GARCINIA KOLA ON THE KIDNEY OF WISTAR RATS

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Abstract

Aim: Honey and Garcinia kola have long been used separately by the traditional medical practitioners as remedies for cough and other ailments. Recently, a combination of both as a remedy for cough is common. This work was intended to see the effect of this synergy on the kidney.

Methods: Twenty five Wistar albino rats weighing 180±10g were grouped into 5 (A, B, C, D, E) of 5 rats each. They were fed twice daily for 14 days with a mixture of G. kola and honey: 0.16g/kg + 0.5ml, 0.20g/kg + 0.5ml, 0.24g/kg + 0.5ml, 0.28g/kg + 0.5ml and normal feeds respectively. The rats were sacrificed on the 15th day and blood and kidneys were taken for biochemistry and histology respectively.

Results: Sodium, potassium, chloride, bicarbonate, urea, creatinine, as well as the histology of the kidney of the test rats were not significantly different from the control rats.

Conclusion: Oral intake of one nut Garcinia kola along with about 5 ml honey twice daily for 14 days has no adverse effect on the kidney.

Key words: Honey, Garcinia kola, Liver, Medicinal plant

INTRODUCTION

Honey is a sweet substance obtained from bees and has long been used as a remedy for certain ailments such as gastric disturbances, ulcers and asthma. It has also been used as an antibiotic and as an antiseptic (Grotte, 1998). It promotes wound healing and circulatory system (Pand, 2014). It has also been used for the treatment of chronic rhinosinusitis (Philip, 2014) and for sore throat and cough (Chris, 2014) as well as an ointment for rashes and burns (Vanghn, 2001). Honey is a mixture of sugar and other compounds principally carbohydrates; fructose 38.25%, glucose 31.30%, macros 7.10%, sucrose 1.3%, high sugar 1.5% and water 17.20% (Russell, 2000). Honey is used as an additive to a variety of food and beverages not only for its sweetness but because it counteracts

microbial spoilage of food. Garcinia kola seed has a bitter astringent and resinous taste. The seed of G. kola has been used to prevent and treat colic and headache (Ayensu, 1978). Iwu, (1991) has also used the plant for the treatment of jaundice, high fever, as a purgative and for the treatment of liver disorders because of its antihepatotoxic and antioxidant activities. In fact Iwu et al., (1990) regarded the plant as a wonder plant because every part of it from the bark, leaves, root, wood to the seed has medicinal value. Traditionally, the plant is used for the treatment of skin infections in Liberia and Congo. In Sierra Leone, the roots and bark are taken for sexual dysfunction and stomach pain (Braid, 1991). Adesanya et al., (2007) confirmed its use as a spermatogenic agent in

rats. Its alkaloid and bioflavonoids content are said to relax muscles (Braid, 1989). *G. kola* stem bark contains a complex mixture of phenolic compounds such as bioflavonoid, xanthenes and benzophenone (Iwu and Igboko, 1982) as well as several organic compounds which confer on it some antimicrobial and antifungal properties (Bohn, 1968). *Garcinia kola* is found in rain forest and swamps and grows to about 12m in height. It is a perennial crop that grows in West and Central Africa (Vivien et al., 1985). Recently, the locals have combined oral administration of the mixture of honey with *Garcinia kola* in the treatment of cough. Its side effects on the kidney have not been investigated. This work therefore investigated the effect of a mixture of one *G. kola* nut and about 5ml honey when taken twice daily for 14 days on the kidney of Wistar rats.

MATERIALS AND METHODS

Preparation of *Garcinia kola*

Five nuts of *G. kola* were obtained from Owo, Ondo State, Nigeria. They were weighed and dried in an open air oven at 56°C for 48 hours. The coat was removed and the nut cut into very tiny bits with a sharp knife and further dried for 72 hours at 56°C. The tiny bits were milled to obtain a fine powder which was used for the experiment.

Administration of the Mixture

Twenty five Wistar albino rats weighing 180±10g were obtained from the Animal House, Delta State University, Abraka and acclimatized

for 14 days. They were grouped into 5 of 5 rats each. Each rat in Group 1 had oral administration of a mixture of *G. kola* 0.16g/kg and 0.5ml honey twice daily for 14 days. Each rat in Group 2 had a mixture of 0.20g/kg *G. kola* and 0.5ml honey for a similar period as Group 1. The same for Groups 3 and 4 which had 0.24g/kg *G. kola* and 0.5ml honey, 0.28g/kg *G. kola* and 0.5ml honey respectively. The Group 5 was the control. The mixture was not administered to Group 5. All the rats had access to water and feeds ad libitum. The rats were sacrificed on the 15th day and blood was collected into lithium heparin bottles, while the kidneys were fixed in 10% formol saline for 24 hours.

Biochemistry

The blood samples were centrifuged slowly for 10 minutes and the sera separated from the red blood cells into clean bottles. The sera were analyzed for sodium and potassium with the flame photometer, while chloride, bicarbonate, urea and creatinine were analyzed with standard biochemical methods.

Histology

Thin sections were cut from the tissues and processed by the paraffin wax method using the automatic tissue processor (Histokinette). Sections, 4µm thick were cut with the Rotary microtome (Tissue Tek), stained with hematoxylin and eosin and examined with the light microscope.

RESULTS

Biochemistry

Table 1: Renal function test on test and control rats

Group	Na ⁺ (mmol/L)	K ⁺ (mmol/L)	Cl ⁻ (mmol/L)	BCO ₃ (mmol/L)	Urea mmol/L	Creatinine µmol/L
1	134±3	5.1±0.3	98±2	29±3	13±3	56±3
2	137±3	5.4±0.2	99±3	15±2	12±4	57±4
3	137±3	5.3±0.4	100±3	15±3	13±4	57±3
4	138±4	5.4±0.3	100±3	20±3	14±4	56±4
Control	138±4	5.4±0.3	100±3	13±2	10±3	56±3

Group 1 (0.16g/kg *G. kola* and 0.5ml honey), Group 2 (0.20g/kg *G. kola* and 0.5ml honey), Group 3 (0.24g/kg *G. kola* and 0.5ml honey), Group 4 (0.28g/kg *G. kola* and 0.5ml honey), Control (Untreated group).

There was no significant difference in the parameters studied between the control blood samples and the treatment groups.

Histology

No evidence of inflammatory reaction or distortion of the cyto architecture of the renal tissue was observed in all the treatment Groups (A, B, C, D) when compared with the Control Group E

For several centuries, traditional medical practitioners have recommended honey for the treatment of several ailments as well as a food additive. *Garcinia kola* has also been used for similar purposes. Practitioners claimed they successfully treated diseases with these substances. Recent researchers also claimed that they have successfully used them for the treatment of several ailments. Honey has been used by Pand, (2014) for wound healing and improved circulatory system, while Philip, (2014) used it for the treatment of chronic rhinosinusitis, Chris, (2014) used it for the treatment of sore throat and cough, as well as an ointment for rashes and burns (Vanghn 2001). The seed of *G. kola* contains 1-3, 8-11 benzophenones, *Garcinia* biflavonones (GB-1, GB-2) and kolaflavonone (Cotterih et al., 1978). Apigenin based flavonoids represent 60% of the total flavonoids present in the diethyl ether fraction of *G. kola* seeds (Iwu and Igboko, 1982). The seed of *G. kola* has similarly been used to prevent and treat colic and headache (Ayensu, 1978), jaundice, high fever and liver disorders (Iwu, 1991), skin infections, sexual dysfunction and stomach pain (Braid, 1991) and as a spermatogenic agent (Adesanya et al., 2007). Several biochemical and microbiological experiments have been performed to determine the effects of these substances on humans and rats. These are well documented. Recently, traditional medical practitioners often treat dry coughs with a mixture of 5ml pure honey with one nut *Garcinia kola*. The *G. kola* may be eaten over a period of 30 minutes followed by oral administration of the pure honey. This may be taken twice daily for up to 5 days. The antibacterial activity of the mixture of aqueous *G. kola* extract and honey was investigated by Akinnibosun and Itedjere (2013). They observed that the synergistic use of aqueous *G. kola* extract and honey mixture was more effective in inhibiting bacterial growth than the separate use of aqueous *G. kola* extract and honey. Kagbo and Ejebe, (2009) stated that *Garcinia kola* stem bark was used by traditional medical practitioners in Ogoni, Nigeria, to treat dysmenorrhea and burns and that the decoction and infusion of the stem bark was often taken without any standardized measurement which resulted in over dosage because of the large amounts taken. It was for this reason that they investigated the acute toxicity profile of *G. kola* and found the 24 hour LD₅₀ value to be

358mg/kg. Not much work has been done on the synergic effect of the mixture of honey and *G. kola* on animal and human tissues, hence, this research. While there is evidence that the mixture could be used for the treatment of certain ailments, its level of toxicity to the kidney has not been determined. It is obvious that excessive intake of drugs and other products have adverse effects, sometimes lethal, this work is limited to the recommended dosage by the traditional medicine healers who give one nut which is eaten over a period of about 30 minutes followed with about 5 ml of honey. The results of this experiment suggest that a mixture of one nut *G. kola* and 5ml honey has no injurious effect on the kidney.

CONCLUSION

Moderate intake of the mixture of one nut of *G. kola* and 5ml pure honey does not have adverse effects on the kidney.

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