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# Effects of Crude Ethanolic Extract of *Anacardium Occidentale* (Cashew) Stem Bark on Renal Clearance in Sprague Dawley Rats

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## ABSTRACT [ENGLISH/ANGLAIS]

The study investigated effects of crude ethanolic extract of *Anacardium occidentale* (EAO) on the renal clearance of Sprague Dawley rats. Twenty four Sprague Dawley rats (180 – 220g, of both sexes) were used for the study. The rats were randomly assigned into three groups of eight animals each. Group A was the control, group B received low dose (1.5 ml) of EAO daily, while group C received the high dose (2.5 ml) of EAO daily for six weeks. Twenty four hours after the last treatment, 24-hour urine sample was collected from each rat. The rats were thereafter sacrificed. Urine and serum creatinine concentrations were determined, and renal clearance was then calculated. The results show that crude ethanolic extract of *Anacardium Occidentale* improves renal clearance

**Keywords:** Anacardium Occidentale, creatinine level, renal clearance, cashew

## RÉSUMÉ [FRANÇAIS/FRENCH]

L'étude a étudié les effets de l'extrait éthanolique brut de *Anacardium occidentale* (EAO) sur la clairance rénale de rats Sprague-Dawley. Vingt-quatre rats Sprague-Dawley (180 - 220g, des deux sexes) ont été utilisés pour l'étude. Les rats ont été répartis au hasard en trois groupes de huit animaux chacun. Groupe A était le contrôle du groupe B, a reçu une faible dose (1,5 ml) de l'EAO quotidienne, tandis que le groupe C a reçu la dose élevée (2,5 ml) de l'EAO par jour pendant six semaines. Vingt-quatre heures après le dernier traitement, l'échantillon d'urine de 24 heures ont été recueillies à partir de chaque rat. Les rats ont ensuite été sacrifiés. L'urine et les concentrations de créatinine sérique ont été déterminées, et la clairance rénale a ensuite été calculé. Les résultats montrent que l'extrait éthanolique brut de *Anacardium Occidentale* améliore la clairance rénale

**Mots-clés:** Anacardium Occidentale, le taux de créatinine, la clairance rénale, noix de cajou

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## INTRODUCTION

Cashew (*Anacardium occidentale*) stem bark is being used in traditional/folklore medicine, and its antihypertensive, hypoglycemic and antitumor properties have been documented [1]. Its protective activity in simultaneous and post-treatment in relation to organ damage as well as its antimutagenicity (i.e. actions against factors causing mutation) has been demonstrated [2]. In addition, glucosidase inhibitor in *Anacardium occidentale* nut shell liquids [1] has been reported to have a unique contribution in passive glucose transport which successfully flattens the post-prandial blood

glucose excursions or reduce hyperglycemia in diabetic rats [3]. Researchers have also reported that cashew fruit exhibits antibacterial activity against the gram-negative bacterium *Helicobacter pylori*, which is now considered to cause acute gastritis and stomach ulcers [4]. Its effectiveness against leishmanial ulcers has also been documented in clinical studies [5, 6].

In this study, we investigated effects of crude ethanolic extract of *Anacardium occidentale* (EAO) on the renal clearance of Sprague Dawley rats.

## MATERIALS AND METHODS

### Plant Materials and Preparation of Extracts

Cashew stem barks were obtained from Department of Botany, Ladoké Akintola University of Technology (LAUTECH), Ogbomoso, Oyo State, Nigeria. The stem barks were cut into smaller pieces and oven dried for two weeks at about 40 °C. They were then grinded into a fine powder. Using 500 ml of ethanol, 400 g of the powdered cashew stem barks were percolated, and the obtained extract was then concentrated (and later dissolved in normal saline) using the exact method previously used by Ofusori [7]. The animals in group B 1.5 ml and 2.5 ml as the plant extract for a period of six weeks.

### Animals and Formation of Treatment Groups

Twenty four adult Sprague Dawley rats (weighing 180 – 200g) were used for this study. The rats 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 hours light-dark cycle) and humidity (70 ± 5%). They were allowed free access to normal rat chow and to clean water. The rats were randomly divided into three groups: A, B, and C. Group A served as the control. Groups B and C were daily administered 1.5 ml and 2.5 ml of the ethanolic extract of *Anacardium occidentale* (EAO) respectively. All the treatments were for six weeks.

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

Twenty four hour urine sample were collected at the end of the six weeks of treatment. Animals were then

sacrificed by cervical dislocation and blood samples were collected. Urine and serum creatinine concentrations were determined using alkaline picrate method described by Jaffe [8]. The Renal clearance was then calculated using the formula "Clearance of Y = (Urine conc. of creatinine X 24 hr Urine volume)/Serum conc. of creatinine" as documented the textbook of medical physiology by Guyton and Hall [9]. Independent samples t-test was used to test for significant difference between each group and the control.

## RESULTS AND DISCUSSION

The results of this study showed that, while low dose of EAO caused increase in blood creatinine concentration, high dose of EAO led to decrease in blood creatinine concentration (Table 1). This inconsistency is probably as a result of the relatively small sample size and the relatively short period of study. Notwithstanding, both the urine creatinine concentration and the renal clearance showed reasonable trends, with higher values seen in the high dose group (Table 1). Since all other sources of variations were properly controlled and the creatinine renal was found be significantly (and in a dose-dependent manner) increased by oral administration of EAO, we conclude that oral administration of EAO (over a period of six weeks) increases renal clearance of creatinine in Sprague Dawley rats. However, this simple study is unable to confirm/suggest the possible mechanisms by which EAO increases renal creatinine clearance in Sprague Dawley rats.

**Table 1:** This table shows effect of crude extract of cashew stem bark on blood creatinine level, urine creatine level, and renal clearance

Groups	Blood Creatinine Concentration (mg/100ml)	Urine Creatinine Concentration (mg/100ml)	Renal Clearance (ml/min)
Group A (Control)	1.3 ± 0.3 16228	21.0.6 ± 0.8848	0.00426 ± 0.000610
Group B (1.5 ml of EAO per day)	1.94 ± 0.304959 *	23.3 ± 1.83030	0.01138 ± 0.00423 *
Group C (2.5 ml of EAO per day)	1.008 ± 0.371.94 *	29.5 ± 1.3038 *	0.1174 ± 0.02711642 *

Results are presented as mean ± standard error of mean; "\*" = "p < 0.05"

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#### CONFLICT OF INTEREST

No conflict of interests was declared by authors.

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