



## Diuretic activity of *Cocos nucifera* husk in rats

A. M. Baheti<sup>1\*</sup>, B. S. Rathi<sup>2</sup>, K. R. Khandelwal<sup>3</sup>, S. L. Bodhankar<sup>2</sup>

1. Department of Pharmacognosy, MAEER's Maharashtra Institute of Pharmacy, Ex-servicemen colony MIT Campus, Kothrud, Pune-38.
  2. Department of Pharmacology, BVDU's Poona College of Pharmacy and Research Center, Pune -38.
  3. Siddhant College of Pharmacy, Talegaon-Chakan Road, Sudumbre, Pune-412109.
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### Abstract:

**Objective:** Husk of *Cocos nucifera* was screened for diuretic properties. **Method:** The diuretic properties of aqueous and alcoholic extract of *Cocos nucifera* husk were evaluated by determination of urine volume, electrolyte concentration and diuretic potency in male albino rats. Different concentrations of aqueous and alcoholic extract (250 mg/kg, 500mg/kg) were orally administered to hydrated rats and their urine output was immediately measured after 5 h of treatment. Frusemide (10mg/kg) was used as reference drug while normal saline (0.9%) solution was used as control. **Result:** Both the extract exhibited dose dependent diuretic property. The onset of diuretic action was extremely prompt (within 1 h) and lasted throughout the studied period (upto 5 h). Both extract caused marked increase in Na<sup>+</sup>, K<sup>+</sup> and Cl<sup>-</sup> level. **Conclusion:** The result of this experiment suggests that *Cocos nucifera* husk extract possessed significant diuretic activity.

**Keywords:** *Cocos nucifera*, aqueous extract, alcohol extract, diuretic activity.

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### 1. Introduction

Plant medicine was commonly used for traditional treatment of some renal diseases and a lot of plants were reported to show significant diuretic activity [1]. Many investigators demonstrated that studies of herbal plant used in traditional medicine as diuretic were in progressive elevation in the last decades [2] and might be a precious tool used in human pathology treatment.

*Cocos nucifera* Linn. (Family: Palmae, English: Coconut palm, Sanskrit: Kalpravriksha,

Deerghavraksha, Hindi: Nariyal) is extensively cultivated in Southern India and Ceylon [3]. Every part of the tree is being used for some purpose like food, fuel or timber; hence it is called as Kalpravriksha [4] meaning tree which provides all the necessities of life.

Husk contains p-cresol, caproic acid, tannins and pectin [5]. Ash of husk contains K<sub>2</sub>O & P<sub>2</sub>O<sub>5</sub> [6]. Antimicrobial activity of husk has been reported [7]. In Ayurveda *Cocos nucifera* husk is claimed to possess diuretic activity (8) but no

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\* Corresponding author  
E-mail: akshaybaheti@rediffmail.com

pharmacological evaluations have been carried out to ascertain the ayurvedic claim. The present investigation is an assessment of diuretic activity of aqueous and alcoholic extracts of *Cocos nucifera* Linn husk.

## 2. Material and methods

### 2.1 Plant material

The husk was collected in January 2001 from Botanical garden of Poona College of Pharmacy, Erandwane, Pune-411038 and authenticated from Department of Botany, Agharkar Research Institute, Pune.

### 2.2 Preparation of extracts

Husk was collected and dried under shade. Husk (1000g) gave 10g of aqueous and 8g of alcohol extract by maceration process at room temperature for 72 h. The extracts were air-dried. The extract obtained was solid residue. Preliminary phytochemical screening was carried out using standard procedure (9).

### 2.3 Animals

Male albino rats (120-180 g) were obtained from National Toxicology center, Pune. They were divided into 6 different groups of 6 animals per group and kept in standardized environmental

conditions. Animal had free access to food and water. Animals were deprived of food 18 h before the experiment.

The Institutional Animal Ethical committee approved the protocol of this study.

### 2.4 Diuretic activity

The method of Lipschitz *et al* (10) was employed for the assessment of diuretic activity. Rats housed in six groups of six animals each were hydrated with 5 ml/kg of water orally prior to drug / extract administration. Normal saline (0.9%) and frusemide (10mg/kg) served as control and standard drug respectively. 250 mg/kg and 500mg/kg of aqueous and alcoholic extract of *Cocos nucifera* were administered orally to animals in each group.

Immediately after dosing the animals were placed in metabolic cages specially designed to separate urine and feces and kept at room temperature. The urine was collected in measuring cylinder up to 5 h after dosing. During this period no water and food was made available to the animals. The urine volume was measured with graduated measuring cylinder.

The parameters taken for each individual rat were total urine volume, urine concentration of Na<sup>+</sup>, K<sup>+</sup>

Table 1  
Diuretic activity of *Cocos nucifera* husk extracts in rat.

Extract/ Drug	Dose mg/kg	Mean Urine volume (ml)	Diuretic Potency	Electrolyte Concentration		
				Na <sup>+</sup>	K <sup>+</sup>	Cl <sup>-</sup>
Aqueous	250	1.10±0.47	0.44	82.3*±1.82	103.6*±1.40	108.7*±1.95
Aqueous	500	1.95±0.75	0.78	99.7±1.55	114.7±2.55	122.0*±1.07
Alcohol	250	1.00±0.39	0.40	80.5*±1.40	79.8 ±0.72	110.6±0.74
Alcohol	500	1.67±0.46	0.67	98.8±1.20	88.0±0.70	134.5*±1.18
Frusemide	10	2.50±0.60	1.00	127.0*±1.42	106.7±1.31	153.1*±0.90
Normal saline	5 ml/kg	0.74±0.47	0.29	98.3±1.71	52.3±1.55	101.2±0.82

Values (except diuretic potency) are mean ± SEM (n = 6), \*p ≤0.01 (ANOVA followed by Dunnett's test) compared with control. Diuretic potency is a ratio of urine volume due to tested drug to that of standard drug.

and Cl<sup>-</sup>. Concentration of Na<sup>+</sup> and K<sup>+</sup> was determined with Flame photometer while Cl<sup>-</sup> concentration was estimated by titrimetrically. The mean urine volumes were determined and diuretic potency was assessed by comparison of urine excretion due to the extracts with respect to the standard drug frusemide.

### 2.5 Statistical analysis

All values are shown as mean SEM. The results were statically analyzed using one way ANOVA followed by Dunnett's test. P ≤ 0.01 was considered significant.

### 3. Result

Preliminary phytochemical screening indicated the presence of tannins, flavonoids saponins and pectin. The result of diuretic activity, presented in Table 1, shows that both the extracts are active and displayed dose dependant diuretic activity. However, activity of aqueous extract is moderately higher than alcohol extract.

### 4. Discussion

The present study indicated that the aqueous and alcoholic extract of *Cocos nucifera* husk at doses

of 250 and 500mg/kg caused dose dependent diuretic activity. At a concentration of 250 mg/kg and 500 mg/kg, the aqueous and alcohol extract gave a mean urine volume of 1.10± 0.47 and 1.95 ± 0.75 and 1.00± 0.39 and 1.67±0.46 after 5 h. respectively.

The aqueous extract (250 mg/kg & 500 mg/kg) produced urine with Na<sup>+</sup>, K<sup>+</sup> and Cl<sup>-</sup> content of 82.3±1.82, 103.6±1.40, 108.7±1.95 and 99.7±1.55, 114.7±2.55, 122.0±1.07 after 5 h respectively where as alcoholic extract at the doses of 250 mg/kg & 500 mg/kg produced 80.5±1.40, 79.8±0.72, 110.6±0.74 and 98.8±1.20, 88.0±0.70, 134.5±1.18 of Na<sup>+</sup>, K<sup>+</sup> and Cl<sup>-</sup> respectively. The diuretic potency of *C.nucifera* extracts was dose dependent (table 1).

On the basis of above results, it can be conclude that both the extract produced diuretic effect with increase in electrolyte concentration in urine. However, further studies are necessary to identify and isolate the active constituents responsible for its diuretic activity and also there is a need to elucidate its mechanism/s of diuretic action.

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