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Diuretic activity of coconut husk *Mashi*—an Ayurvedic formulation

BS Rathi[2], AM Baheti[1]*, KR Khandelwal[3], SR Parakh[1] & SL Bodhankar[2]

*[1]Department of Pharmacognosy, MAEER's Maharashtra Institute of Pharmacy, Ex-servicemen colony, MIT Campus, Kothrud, Pune 412 038, Maharashtra

[2]Department of Pharmacology, BVDU's Poona College of Pharmacy and Research Center, Pune 412 038

[3]Siddhant College of Pharmacy, Talegaon-Chakan Road, Sudumbre, Pune 412109, Maharashtra

Email: akshaybaheti@rediffmail.com

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Coconut husk *Mashi* is an Ayurvedic formulation prepared by *Anterdhum Padhati* (APM) and *Bahirdhum Padhati* (BPM). Though, Ayurvedic practitioners use coconut husk *Mashi* for diuretic activity, no systematic studies are reported with regard to the verification of the traditional medicinal claims of *Mashi*. The present study was undertaken to investigate and rationalize the diuretic activity of APM and BPM in experimental rats. The diuretic properties of APM and BPM were evaluated by determination of urine volume, electrolyte concentration and diuretic potency in male albino rats. Different concentrations of *Mashi* (250 mg/kg, 500 mg/kg) were orally administered to hydrated rats and their urine output was immediately measured after 5hrs of treatment. Frusemide (10 mg/kg) was used as reference drug while normal saline (0.9%) solution was used as control. BPM exhibited dose dependent diuretic property and APM failed to show activity. The onset of diuretic action was extremely prompt (within 1hr) and lasted throughout the study period (up to 5 hrs). BPM at 500 mg/kg displayed highest activity with potency value of 0.92 and same dose of APM gave a value of 0.24. BPM caused mark increased in Na^+, K^+ and Cl^- level. The results suggest that BPM possess significant diuretic activity.

Keywords: *Anterdhum Padhati*, Ayurvedic drug, *Bahirdhum Padhati*, Coconut husk, Diuretic activity, *Mashi*

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Ayurvedic medicines are largely based upon herbs, either single ingredient or in combination (polyherbal) having specific diagnostic and therapeutic principles[1]. According to *Ayurveda*, *Panchmahabutas* are present in every *Dravya*. When the balance of this *Panchmahabutas* in the body is altered, person suffers from disease. Due to conversion of *Dravya to Mashi*, the *Parthiv* and *Aapya* part in that *Dravya* is lost and only *Taijas* and *Vayaviya* parts remain. So, these *Dravyas* are used in the treatment of various diseases of *vatavimargagaman* (disorder in which percentage and/or position of gas in the body altered). *Mashi* can be prepared by two methods: *Bahirdhum Padhati* (BPM) and *Anterdhum Padhati* (APM). *Mashi* formulation has been used by *Ayurvedic* practitioners for therapeutic use such as *Krushna sarpa mashi* for vitiligo, *Kurmakapal mashi* for baldness, coconut *mashi* for antiemetic and diuretic activity[2-4]. In the present study, coconut (*Cocos nucifera* Linn.) husk *Mashi* was screened for diuretic properties. Plant medicines are traditionally used for the treatment of some renal diseases and have also been reported to show significant diuretic activity[5,6]. Ayurvedic practitioners use coconut husk *mashi* for diuretic activity. The study provides a valuable insight into the claimed pharmacological activity of coconut husk *mashi*.

Methodology

The husk was collected in January 2001 from Botanical garden of Poona College of Pharmacy, Erandwane, Pune and authenticated from Botany Department of Agharkar Research Institute, Pune. Husk was collected and dried under shade. *In Bahirdhum Padhati Mashi* (BPM) method of preparation, dried coconut husk were heated in earthen pot at 145-155°C with continuous stirring till white fumes ceases to come out. *In Anterdhum Padhati Mashi* (APM) method, husk was packed in between two earthen pots (*Sharav samput*), which were sealed by *Multtani matti*. It was subjected to *Gajaputa* (heating

*Corresponding author

into *kund* filled with cow dung cake) in *Gajaputa kund* for 50 min. When *Gajaputa* became *swangsheet* (cool), *sharav* was taken out of *kund* and *Mashi* was collected. 1000 gm husk gave 5.97 gm *Bahirdhum Padhati Mashi* and 31.63 gm *Anterdhum Padhati Mashi*. Preliminary phytochemical screening was carried out using standard procedure and both the *Mashi* were subjected for quantitative analysis[7]. Male albino rats (120-180 gm) obtained from National Toxicology Center, Pune, divided into 8 different groups of 6 animals per group were kept in standardized environmental conditions. Animal had free access to food and water. Animals were deprived of food and water 18 hrs before the experiment. The Institutional Animal Ethical Committee approved the protocol of this study.

Standard method was employed for the assessment of diuretic activity[8]. Rats housed in six groups of six each were fasted and deprived of water for 18 hrs prior to the experiment. Normal saline (0.9%) and frusemide (10 mg/kg) served as control and standard drug, respectively. 250 mg/kg BPM and 500mg/kg APM of coconut husk were administered orally to animals in each group. Immediately after dosing, animals were placed in metabolic cages specially designed to separate urine and faeces and kept at room temperature. The urine was collected in measuring cylinder up to 5 hrs 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^+, K^+ and Cl^-. $Na^+$and K^+ concentration was determined with Flame photometer while Cl^- 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. All values are shown as mean SEM. The results were statically analyzed using one-way ANOVA followed by Dunnett's test. $P \leq 0.05$ was considered significant.

Table 1—Quantitative analysis of *Bahirdhum Padhati Mashi* (BPM) and *Anterdhum Padhati Mashi* (APM)

S No	Inorganic radicals	Estimated percentage in APM	Estimated percentage in BPM
1	Sodium	0.88	6.711
2	Potassium	1.640	12.304
3	Chloride	Nil	2.910
4	Lead	0.005	0.002
5	Arsenic	Nil	Nil
6	Carbonate	0.760	7.0302

Results and discussion

Preliminary phytochemical screening indicated the presence of tannins and flavonoids. The result of quantitative analysis is presented in Table 1. Inorganic radicals like sodium, potassium, carbonate and chlorides were found more in BPM. Both the extracts displayed dose dependant diuretic activity (Table 2). At a concentration of 250 mg/kg, BPM gave a mean urine volume of 1.20±0.50 and APM gave 0.30±0.23. BPM at 500 mg/kg, caused urine output similar to that of frusemide with diuretic potency 0.92. APM failed to show diuretic activity. BPM of coconut husk at 250 and 500 mg/kg doses caused a dose dependent increase of urinary water and electrolytes in normal rats. On the basis of above result, it is concluded that BPM produced diuretic activity with increase electrolyte excretion.

Table 2—Diuretic activity of *Cocos nucifera* Linn. husk extract in rat

Extract/ Drug	Dose mg/kg	Mean urine volume ml)	Diuretic potency	Electrolyte concentration		
				Na^+	K^+	Cl^-
Bahirdhum Padhati Mashi	250	1.20±0.50	0.48	102.0±1.82*	79.4±1.40*	110.2±1.95*
Bahirdhum Padhati Mashi	500	2.30±0.75	0.92	127.1±1.55	108.9±2.55	134.7±1.07*
Anterdhum Padhati Mashi	250	0.30±0.23	0.12	80.5±1.40*	79.8±0.72	100.6±0.74
Anterdhum Padhati Mashi	500	0.60±0.15	0.24	98.8±1.20	88.0±0.72	104.5±1.40*
Frusemide	10	2.50±0.60	1.00	127.0±1.42*	106.7±1.31	153.1±1.90*
Normal saline	5 ml/kg	0.74±0.47	0.29	98.3±1.71	52.3±1.55	101.2±0.70

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.

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