ANTINOCICEPTIVE ACTIVITY OF ANTERDHUM PADHATI MASHI (APM) OF UNRIPE *COCOS NUCIFERA* (PALMAE) HUSK.

A M Baheti[*1], K. R. Khandelwal[2], P. Kumbhar[1], Shikha A. Baheti[3]

[1]MAEER's Maharashtra Institute of Pharmacy, Paud Road, Pune, India- 411038.
[2]. J.S.P.M S Rajarshi Shahu College of Pharmacy and Research, Tathawde, pune –33
[3] Nabira Mahavidyala, Katol
Email: akshaybaheti@rediffmail.com
*Corresponding author.

Summary

Coconut husk mashi is an Ayurvedic formulation prepared by Anterdhum padhati (APM). Though Ayurvedic practitioners use coconut husk mashi, very few scientific reports are available about its claim uses. In the current study the analgesic activity of APM of unripe *Cocos nucifera* husk were demonstrated. The orally administered APM inhibit the acetic acid induced writhing response in mice. Tail flick and hot plate assays demonstrated that treatment of animals with APM induced attenuation in the response of heat stimulus.

Keywords: Coconut husk, Mashi, APM, Analgesic activity

Introduction

Cocos nucifera Linn (Family: Palmae, English: Coconut Palm) is extensively cultivated in southern India and Ceylon. Every Part of the tree is being used for some purpose like food, fuel or timber hence it is called as Kalpravriksha (1). Recent results show that aqueous extracts from husk of Cocos *nucifera* present antimicrobial, antiviral (2) and antileishmanial properties. Coconut husk mashi has antimicrobial, diuretic activity. By chromatographic methods coupled to mass spectroscopy techniques has been demonstrated that drug contain catechin and epicatechin together with condensed tannins (2). These molecules have been associated with analgesic activity (3,4). In this study the antinociceptive action of Anterdhum padhati Mashi (APM) of unripe Coconut husk was assessed.

Methods

Plant material

Cocos nucifera husk was collected from Pune region and identified by Pharmacognosy Department of MAEER's Maharashtra Institute of Pharmacy, Pune.

Preparation of the anterdhum padhati mashi (APM)

Husk was packed in between two earthen pots (*Sharav samput*), which were sealed by *Multtani matti*. It was subjected to *Gajaputa* (heating 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.

Animals

Adult albino mice (18-24 gm, 6 animals per group per treatment) were used for the abdominal constriction test. While healthy albino rats (180-240gm, 6 animals per group per treatment) were used for the tail flick and hot plate tests. The Institutional Animal Ethical Committee approved the protocol of this study.

Acetic acid induced writhing test in mice (5)

Male albino mice were divided in to five groups of 6 animals each. Acetic acid (0.75%) was administered intraperitoneal into the mice of all the groups (10ml/kg) to induce pain. First group of animal received only acetic acid and served as control, Second group received aspirin (100mg/kg) and served as positive control, third, fourth and fifth group received APM 100, 200 and 400 mg/kg respectively. All the extracts were administered orally 15 minutes prior to the administration of acetic acid injection. A significant reduction in the number of constrictions when compared with vehicle treated animals was considered as analgesic response. The contraction of abdominal muscle together with stretching of the hind limbs was cumulatively counted over a period of 20 min, beginning 5 min after acetic acid injection. Antinociceptive activity was expressed as ratio

Control mean- treated mean X 100/Control mean

Hot plate method (6)

Healthy albino rats were divided into five groups each consists of six animals. First group was administered 5% gum acacia at the dose of 5ml/kg and served as control, second group received pentazocine 5mg/kg) and served as positive control, Third fourth and Fifth group received APM 100, 200 and 400 mg/kg respectively. The time of reaction to pain stimulus (interval between placing the rat in the hot plate and the lick and jumped response) of the rat placed on the plate heated at 55 ± 0.5^0C was recorded every hour for duration of 3 h after drug administration.

Tail flick method (7)

The technique described by Davies et al. was adopted. The time taken for the withdrawal of the tail after switching on the current was taken as a latent period, in seconds of tail flicking response. The cut of time for determination of latent period was taken at 10 s to avoid injury to skin. The First and second group received APM 100 and 200 mg/kg. Third group received Naloxone (1mg/kg i.p) while the fourth group received Naloxone + APM (200mg/kg). Tail flick latency in seconds was recorded every 30 min for the duration of 3 h after drug administration.

Statistical analysis

All results are expressed as Mean ± SEM. The data was analyzed statistically using One way ANOVA followed by Post -hoc Dunnett's test. Values of P less than 0.05 were considered significant.

Table 1: Effect of Anterdhum Padhati mashi on acetic acid induced writhing in mice.

Group	Drug	Dose	Writhing count	% inhibition
I	Control	0.75% AA	45.1 ± 1.44	--
II	Aspirin	100mg/kg	25.1 ± 1.19*	44.28
III	APM	100mg/kg	35.8 ± 1.64*	20.65
IV	APM	200mg/kg	33.0 ± 1.15*	26.92
V	APM	400mg/kg	28.0 ± 1.06*	37.99

Values are mean ± SEM (n=6), * $p < 0.01$ compared to control.

Table2: Effect of Anterdhum Padhati mashi on thermal stimulation (Tail flick method) in rats.

Group	Drug	Control	Reaction intervals (Seconds) at time (min)					
			30	60	90	120	150	180
I	APM 100 mg/kg	3.33±0.21	4.43±0.03*	4.66±0.21*	4.60±0.34*	4.83±0.03*	4.0±0.09**	3.5±0.04
II	APM 200 mg/kg	3.5±0.22	5.0±0.36*	6.5±0.22*	6.3±0.21*	5.6±0.21*	5.6±0.21*	5.3±0.21*
III	Naloxone	3.0±0.05	2.0±0.03*	2.1±0.10*	2.16±0.08*	2.33±0.11*	2.5±0.06*	2.66±0.09**
IV	Naloxone + APM 200 mg/kg	3.1 ±0.16	3.83±0.30	3.33±0.21	3.5±0.22	3.1±0.16	3.16±0.30	3.0 ± 0.25

Naloxone (1mg/kg i.p.) was given 10min prior to APM 200mg/kg. Values are mean ± SEM (n=6), * $p < 0.01$,**$p<0.05$ compared to control.

Table 3: Effect of Anterdhum Padhati mashi on thermal stimulation (Hot plate method) in rats.

Group	Drug	Reaction time in seconds		
		1h	2h	3h
I	Control 5% gum acacia	17.1 ± 0.47	17.83 ± 0.30	18 ± 0.36
II	Pentazocine 5mg/kg	20.2 ± 0.66*	25.5 ± 0.42*	29.66 ± 0.55*
III	APM 100mg/kg	18.8 ± 0.30**	19.83 ± 0.16*	20.33 ± 0.61**
IV	APM 200mg/kg	19.8 ± 0.30*	20.83 ± 0.30*	23.66 ± 0.55*
V	APM 400mg/kg	20.5 ± 0.42*	24.16 ± 0.47*	28.0 ± 0.63*

Values are mean ± SEM (n=6), * $p < 0.01$, **$p<0.05$ compared to control.

Results and discussion

APM 100,200 and 400 mg/kg resulted in dose dependent and significant inhibition of acetic acid induced writhing response (Table 1). The writing response induced by acetic acid in animals treated with 100, 200 or 400 mg of APM was decreased by 20.65, 26.92 and 37.99% respectively. For a comparison, treatment of animals with standard drug aspirin (100mg/kg) caused a decrease in the acetic acid induced writhing response of about 44.28%

The ability of antherdhum Padhati Mashi to induce central analgesia was evaluated by temperature based tests. The tail flick reaction time increased significantly in rats after oral administration of APM. Highest analgesic activity is observed at 1 hr. This effect is reverted by treatment with naloxone, suggesting that analgesia induced by APM is mediated by opoid receptors.APM 200mg/kg showed good activity than the APM 100mg/kg (Table 2). The antinociceptive potential of APM was also evaluated by hot plate method. APM showed dose dependent analgesic activity and reaction time of treated animals was significantly higher than control (Table 3). Taken together, these results indicate that the components of APM present central analgesic effects, acting by a dose-dependent manner.

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