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***Invitro* Screening of *Myristica Fragrans* Houtt Fruit Pulp for Anti-Lice Activity**

Surendra Kumar M*, Reshma M Rajan, Nusrath C, Dilshad Ahamed Pulikal, Sabeer PA and G Babu

Department of Pharmacognosy, Devaki Amma Memorial college of Pharmacy, Chelembra, Pulliparamba post, Malappuram Dt. Kerala.

ABSTRACT

Pediculus humanus capitis commonly known as human head lice is one of the major problems among the feminine gender in countries like India, who loves to grow hairs. Though, these are not direct agents of any disease, they may cause considerable impact on health of humans. The present study aims at exploring the anti-lice property of three different extracts of *Myristica fragrans* Houtt against the human head lice. Alcoholic, aqueous and hydro alcoholic extracts of pulp of *Myristica fragrans* Houtt was evaluated against the human head lice at five different concentrations such as 5%, 10%, 15%, 20% and 25%. All the extracts shows dose dependent activity and hydro alcoholic extract was found to be more potent than that of the other two extracts. The results were comparable to that of the standard drug benzyl benzoate at 5%, 10%, 15%, 20% and 25%.

Keywords: *Myristica fragrans*, *Pediculus humanus capitis*, anti-lice and benzyl benzoate.

***Corresponding author**

INTRODUCTION

The head lice *Pediculus humanus capitis* is an ectoparasite confined to the scalp of hair of humans and its infestation is due to unhygienic conditions. Infestations are especially common among school children in both developed and developing countries. These conditions are distributed around the world with no restrictions of sex [1]. *Pediculus humanus capitis* infection cause skin irritation, pruritus and sleep loss as well as occasional secondary bacterial infection. Although the symptoms are relatively mild, infestation by *P.humanus capitis* has resulted in various social, mental and economic problems [2]. To control human head lice they primarily depends on the synthetic pediculocides but their repeated use results in development of resistance [3]. The human head louse is a grey-white tiny animal, which ranges about 2mm-3mm in length. The life-span of a female louse is 30days; within itself it will get mature and produces 7-10 eggs (nits) per day. These nits are attached with a glue-like substance and after 6-10 days, the nits hatch as nymphs and become adults in 10 days [4].

Nutmeg (Myristicaceae) is a tropical evergreen tree that can grow 25 feet tall. The tree itself has dark glossy leaves and produces yellow flowers before the fruits appear. The plant is native of Moluccas, now cultivated in many tropical countries of both hemispheres. In India it is grown in Tamil nadu. *Myristica fragrans* Houtt is composed of the skin, flesh, seed and mace. The main constituents of *Myristica fragrans* fruit have been found to be alkyl benzene derivatives (myristicin, elemicin, safrole. etc), terpenes, alpha-pinene, myristic acid, trimyristicin, volatile oil, fixed oil and starch [5-6]. Nutmeg is very well known for its abortifacient action. The drug also possess antimicrobial, cytotoxic, antioxidant, antiinflammatory effects to a major extend [7]. So far, there is a lack of scientific reports that indicate the anti-lice activity of this plant against human head lice. The present study aims at exploring the anti-lice activity of *Myristica fragrans* Houtt fruit pulp against human head lice *Pediculus humanus capitis*.

MATERIALS AND METHODS

Plant Material

The unripe fruits of *Myristica fragrans* Houtt were collected from Malappuram district of Kerala, India. The same was authenticated by **Dr A.K Pradeep**, Herbarium curator, Department of Botany, Calicut University, Malappuram.

Extraction

Ethanollic Extract

The coarse powder *Myristica fragrans* Houtt fruit pulp was extracted by hot continuous extraction technique using a soxhlet apparatus using 95% ethanol. The extract was concentrated using a rotary flash evaporator and kept in a desiccator.

Aqueous and Hydro-alcoholic Extracts

Both the aqueous and hydro alcoholic extracts were prepared using maceration technique. For the hydro alcoholic extract (1:1) of 95% ethanol and water is used. Both the extracts were concentrated and dried in desiccator.

Collection of Head Lice

Adults and nymphs of *Pediculus humanus capitis* were collected from females of age group 18-22 by combing through sections of scalp using a clean comb. The subjects were selected on the basis that, they were not been treated with any anti-lice treatment in the preceding three months. After combing, the lice were carefully removed from the teeth of comb and put into plastic boxes [8].

Anti-lice Activity

The study was done by filter paper diffusion method [9]. The extracts and benzyl benzoate was dissolved separately in distilled water to obtain 5 different concentrations (5%, 10%, 15%, 20% and 25%). After careful selection under a dissecting microscope, the adults and nymphs of *Pediculus humanus capitis* were identified and separated. All the test organisms in a ratio of 3/2 (adults/nymph) were divided into 21 groups (5 lice each) and were placed on a filter paper at the bottom of petridish and kept open. A volume (0.5 ml) of each test samples was poured on the test organisms and allowed to spread as a thin layer of 4cm². Group I was treated with 0.5 ml distilled water and served as control, Group II - VI received 0.5ml of various concentration (5%, 10%, 15%, 20% and 25%) of aqueous extract. Similarly, Group VII - XI received ethanolic extracts (5%, 10%, 15%, 20% and 25%). The Group XII - XVI were treated with hydro-alcoholic extracts (5%, 10%, 15%, 20% and 25%) at different concentrations. Whereas, Group XVII - XXI received benzyl benzoate at 5 different concentrations (5%, 10%, 15%, 20% and 25%). All the petri dishes were set aside for 1 hr in a dark chamber at 26±0.5 and 70± 1% humidity.

At the end of 1 hr, the dishes were taken out and 0.5ml of distilled water was applied and further placed in the chamber under the condition mentioned above. After 18 hr, the dishes were observed under a dissecting microscope for any possible movement of lice and absence of any movement were considered dead [10-12].

RESULTS AND DISCUSSIONS

The present study was carried out to evaluate the anti-lice property of *Myristica fragrans* Houltt fruit pulp. Anti-lice activity of the various extracts viz., alcoholic, aqueous and hydro alcoholic (50:50) was carried out using filter paper diffusion method at 5%, 10%, 15%, 20% and 25%. Benzyl benzoate was used at the same concentrations as reference standard. The study was evaluated against human head lice, *Pediculus humanus capitis* with 5 lice of adults and nymphs (3/2). Both alcoholic and hydro alcoholic extract exhibited significant anti-lice

activity, whereas the aqueous extract was found to be little effective. All the extracts exhibited dose dependent activity and the results were comparable with the standard, benzyl benzoate. The results were exhibited in table 01.

Table 01: Anti-lice activity of various extracts of *Myristica fragrans* Hoult

Group	Treatment	Concentrations	Mean Percentage mortality
I	Control (Distilled water)	-	00.00
II	Aqueous extract	5%	20.00
III		10%	20.00
IV		15%	20.00
V		20%	20.00
VI		25%	46.66
VII		Alcoholic extract	5%
VIII	10%		46.66
IX	15%		60.00
X	20%		66.66
XI	25%		73.33
XII	Hydro alcoholic extract	5%	20.00
XIII		10%	40.00
XIV		15%	46.66
XV		20%	80.00
XVI		25%	86.66
XVII	Benzyl benzoate	5%	60.00
XVIII		10%	60.00
XIX		15%	86.66
XX		20%	93.33
XXI		25%	100.00

Lice infections are a very common problem throughout the world and most of the currently available synthetic pediculicidal agents in the market are cost effective and expensive. These agents are found to be sometimes neurotoxic also [2]. Plants always serve to be a rich source for treatment of various diseases and disorders of human system. In our day to life they are gaining much more importance because of their broad range of pharmacological actions [13]. Natural source remains a boon to meet out these necessities with less or non toxic and cost effective. 100% mortality of human head lice, *Pediculus humanus capitis* was observed with benzyl benzoate standard drug, whereas the maximum average mortality for the *Myristica fragrans* Hoult fruit pulp was seen with hydro alcoholic extract at 25% with 86.66%. However, all the extracts were found to be anti-lice effective dose dependently.

CONCLUSIONS

From the current study it is clearly seen that *Myristica fragrans* Hoult fruit pulp possess significant activity dose dependently, which were comparable to the standard drug benzyl benzoate. However, the anti-lice effect of this drug may attributed due to hydro-lipophilic constituents since, the maximum mortality was observed with the hydro alcoholic extract only.

Isolation and evaluation of these phytoconstituents for anti-lice activity may lead to a novel drug of natural origin.

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