



IN VITRO SCREENING OF ANTI LICE ACTIVITY OF THREE DIFFERENT LEAVES

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ABSTRACT

Growing patterns of pediculocidal drug resistance towards head louse laid the foundation for research in exploring novel anti lice agents from medicinal plants. In the present study, various leaf extracts were tested against the head louse *Pediculus humanus capitis*. A filter paper diffusion method was conducted for determining the potential pediculocidal and ovicidal activity of methanolic extracts of *Anogessius acuminata*, *Solanum pubescens*, *Gymnosporia emerginata* leaves. The findings revealed that *Anogessius acuminata* and *Solanum pubescens* possess excellent anti lice activity with values ranging between 70% and 88% where as *Gymnosporia emerginata* extracts showed moderate pediculocidal effects. All the results were well comparable with benzyl benzoate. These results showed the prospect of using *Anogessius acuminata* and *Solanum pubescens* leaves extracts against *Pediculus humanus capitis* in different situations of emergence of resistance to synthetic anti lice agents.

KEYWORDS: *Anogessius acuminata*, *Solanum pubescens*, *Gymnosporia emerginata*, Anti lice activity, Filter paper bioassay, Head louse.

INTRODUCTION

Pediculus humanus capitis, otherwise called as the human head louse, infestation is a major concern in public health- associated problem. Head lice are ectoparasites and its infestation due to unhygienic conditions has negatively affected the society for decades, back to the earliest Homosapiens. The condition is distributed around the world invading various ethnic groups with no restrictions of sex and socioeconomic status [1].

In Malaysia people buy costly products in combating head lice and the money they plough into annually seems greater when they realize that the products they used were apparently ineffective [2]. This lack of efficacy is due to the emergence of resistance by the head louse to synthetic compounds and researchers were aimed on the search of new substitutes to synthetic ingredients, such as phytoconstituents obtained from plant sources [3,4].

PLANT INTRODUCTION

MATERIALS AND METHODS

PLANT MATERIAL

Fresh leaves of *Anogessius acuminata*, *Solanum pubescens*, *Gymnosporia emerginata* were collected from S.V. University, Tirupati, Andhra Pradesh, India, were authenticated by Dr. K. Madhava Chetty. A voucher specimen has been deposited at the herbarium. The leaves were washed under tap water to remove debris and dried under shade for 10 days. The dried leaves were size reduced to coarse powder in a mill [5].

EXTRACTION

The coarse powder leaves of *Anogessius acuminata*, *Solanum pubescens*, *Gymnosporia emerginata* (1000g) were extracted successively with petroleum ether an methanol by soxhlet extraction technique [6].

All the extracts were concentrated using rotary vaccum evaporator and kept in a desicator until further studies. The color, consistency and percentage yield were observed.

COLLECTION OF HEAD LICE

Adults of *Pediculus humanus capitis*, were collected from children between the age group of 8-12 by combing through sections of the scalp using a clean comb. After combing, the lice were carefully removed from the teeth of the comb into plastic boxes. All the subjects had not been treated with any anti-lice products for the preceding three months.

ANTI LICE ACTIVITY

Petroleum ether and Methanol extracts of *Anogessius acuminata*, *Solanum pubescens*, *Gymnosporia emarginata* were tested for pediculocidal activity by filter paper diffusion method [7]. All the extracts were dissolved in distilled water to obtain three different concentrations (5%, 10%, & 20%) After careful selection under a dissecting microscope, the adult's nymphs were identified and separated from nymphs. All the test organisms were divided into 16 groups (5 lice each) and were placed on a filter paper at the bottom of petridish and kept open. A 0.5ml of each test sample was poured on the test organisms and allowed to spread as a thin layer of four centimeters square. Group I was treated with 0.5ml distilled water and served as control. Group 2 to group 08 received 0.5ml various concentrations of methanol extracts of *Anogessius acuminata*, *Solanum pubescens*, *Gymnosporia emarginata*. Group 09 to group

11 were treated with 0.5 ml of 5%, 10% and 20% benzyl benzoate 25%w/v(Rid ped). All the petridishes were set aside for 1 hour in a dark chamber at 26 ± 0.5 and $70 \pm 1\%$ humidity [8].

At the end of 1 hour, the dishes were taken out and applied 0.5ml of distilled water and further placed in the chamber under condition mentioned above. After 18 hours, the dishes were observed under a dissecting microscope for any possible movement of lice and absence of any movement were considered dead [9]. All the treatment was triplicate.

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RESULTS

The color, consistency and percentage yield of petroleum ether and methanol extracts of *Anogessius acuminata*, *Solanum pubescens*, *Gymnosporia emarginata* were recorded in the table1. All the extracts displayed concentration (5%, 10% & 20%) dependent activity among which *Anogessius acuminata*, *Solanum pubescens* extracts showed higher mortality followed by *Gymnosporia emarginata* and was well comparable with standard.

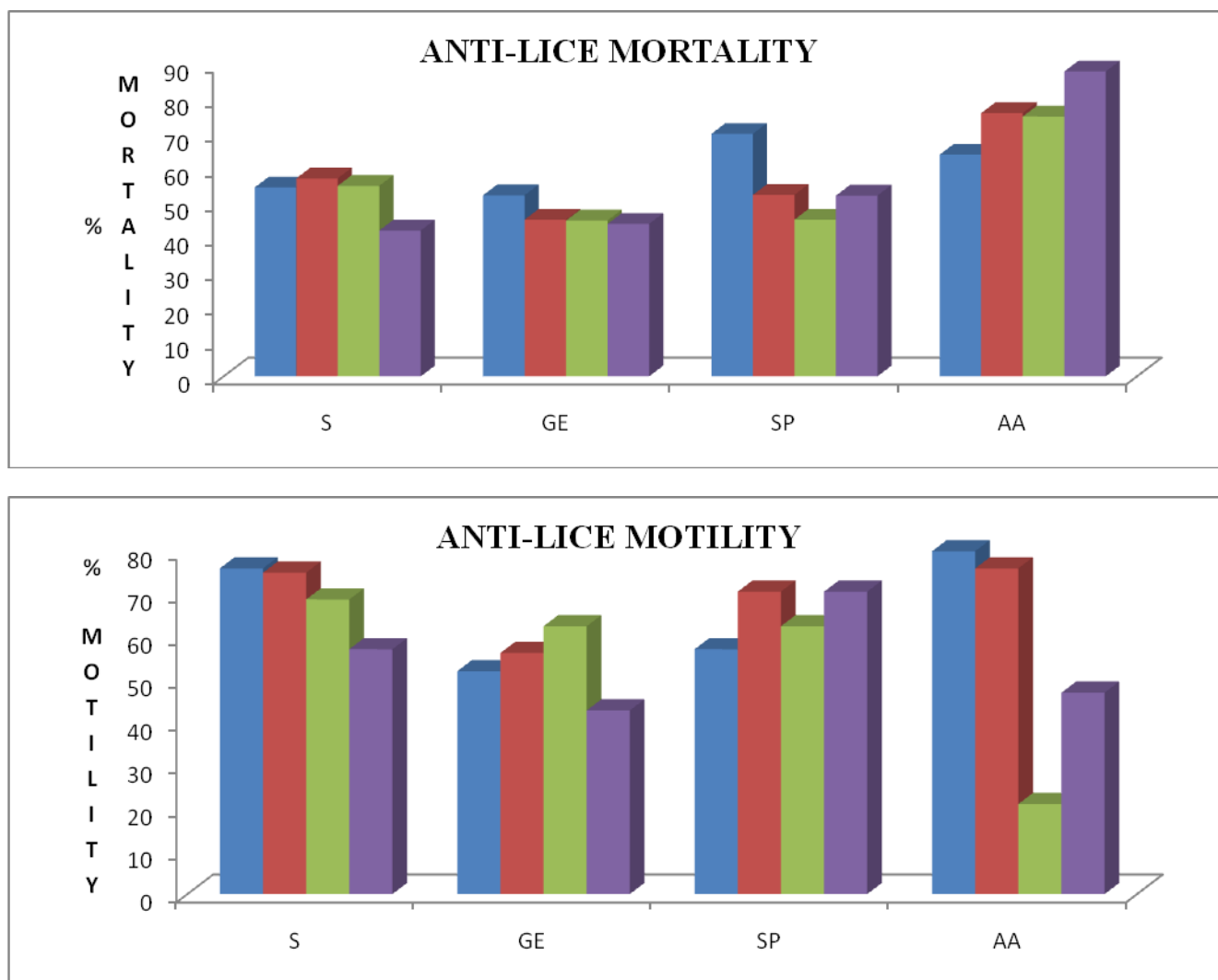
TABLE 1: THE COLOUR, CONSISTENCY AND PERCENTAGE YIELD OF EXTRACTS

EXTRACTS	COLOR	CONSISTENCY	PERCENTAGE YIELD (%) (w/w)
Methanolic extract of <i>Gymnosporia emarginata</i> .	Brownish-Black	Dry mass	7.0%
Methanolic extract of <i>Solanum pubescens</i> .	Greenish Brown	Sticky mass	2.1%
Methanolic extract of <i>Anogessius acuminata</i> .	Brown	Sticky mass	5.7%

TABLE 2: EFFECT OF DIFFERENT LEAF EXTRACTS AGAINST PEDICULUS HUMANUS CAPITIS ADULTS AND NYMPHS.

S.NO	TEST SAMPLE	CONCENTRATION	AVERAGE MOTILITY (%)	AVERAGE MORTALITY (%)
1.	Control	--	--	--
2.	Standard	5%	76%	54.54%
		10%	75%	57.14%
		20%	68.75%	55%
		30%	57.14%	42.10%
3.	Methanolic extract of <i>Gymnosporia emarginata</i>	5%	52%	52.27%
		10%	56.25%	45.23%
		20%	62.5%	45%
		30%	42.85%	44%
4.	Methanolic extract of <i>Solanum pubescens</i>	5%	57.14%	70%
		10%	70.58%	52.38%
		20%	62.5%	45.23%
		30%	70.58%	52.17%
		10%	76%	76%
		20%	21%	75%
		30%	47%	88%

Fig 1. Comparison of anti lice activity of different plant extracts with standard



DISCUSSION

The use of *Anogessius acuminata*, *Solanum pubescens*, *Gymnosporia emerginata* methanolic extracts for controlling lice infestation has been authenticated from the excellent results obtained after screening various extracts for potential anti lice. Oils from natural sources, such as eucalyptus, marjoram, spearmint, peppermint, sage, rose wood, clove bud and cinnamon bark have exhibits significant pediculocidal activity in filter paper bioassays [10-13].

Another study carried out on school children revealed that 20% petroleum ether extract of custard apple seeds killed 95.3% of head louse [14]. The findings of study showed excellent anti-lice activity of methanolic extract of *Anogessius acuminata*, *Solanum pubescens*, *Gymnosporia emerginata* which may be due to the presence of these sterol derivatives responsible for the enhanced penetration and bio-availability of oil components into the body of louse. Penetration of extracts into the alimentary tract of lice could be ignored since all the extracts was applied on lice placed on the filter paper

which also subsequently avoided immense dissemination of active constituents into the cuticle when the compound is directly applied to the insect skin [15].

Additionally, the lice was not exposed in an enclosed environment with the petridish kept open which limits the possibility of volatile agents getting absorbed through the spiracles. For synthetic pediculocidal agents, the residue which remains in the head even after rinsing with water gives an enhanced control against lice but also noted for the development of resistance for lice [16,17]. Natural extracts from medicinal plants has been noticed for its safe and effective use, and appearance of resistance pattern were minimal due to its different mode of action [18,19] which greatly supports the safe use of the extracts as a potent anti lice agent.

Hence, the results obtained from this research present a promising scenario for using *Anogessius acuminata*, *Solanum pubescens*, *Gymnosporia emerginata* leaf extract as an effective alternative for treating human head lice.

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