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### **Ethnobotanical Survey of Mosquito Repellent Plants in Attappady, Kerala**

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#### **ABSTRACT**

Tribes of different countries are known to use plants and plant products for different purposes. Mosquitoes are one of the dreaded insects acting as vectors of several diseases. The present Ethnobotanical survey was to find out the use of different plants as insect repellents by the different tribal folks in Attappady - Irulas, Mudugas and Kurumbas. Ten families in 13 hamlets were selected randomly to find out the use of mosquito repellents. A well structured questionnaire was used for the study. The survey was carried out from July 2015 to June 2016. Fourteen different locally available plants were used by the tribal folk of all the thirteen hamlets to ward off mosquitoes. Their opinions were recorded.

**KEYWORDS:** Attappady, Tribes, Mosquito repellent plants, Ethnobotany

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## **INTRODUCTION**

The dreaded mosquitoes continue to be a major public health problem because of their role as vectors of various diseases like Dengue, Chikungunya, Malaria, Filariasis, Japanese Encephalitis etc. Mosquitoes because of their biting nature are a nuisance to both man and animals. It is here that the role of repellents receives significance. From time immemorial many plants have been used as repellents of various insect species. Herbal repellents repel mosquitoes and thus reduce man-vector contact<sup>1,2</sup>. Traditional knowledge of repellent plants needs to be documented because of comparatively less or no side effects. In order to document traditional knowledge about plants that have repellent activity, a survey was conducted in Attappady, a tribal belt of Kerala.

## **MATERIALS AND METHODS**

### ***Materials***

130 families from different Hamlets of Attappady occupied by 3 tribal communities- Irulas, Mudugas and Kurumbas, Questionnaire, Camera (to record audio, video and click photographs), pen, a UG student who was a resident of Attappady well versed in the tribal language and having knowledge of English and Malayalam also accompanied to help with translation of the tribal language.

### **Survey Area**

Attappady is a tribal belt bordered by Coimbatore district in Tamil Nadu in the East, Nilgiris in the North, Palakkad taluk in the South and Mannarkkad Taluk and Ernad taluk in the west. The area lies at an elevation of 2460 ft to 5459 ft. Thirteen hamlets (Cholakkad, Gottiarkandi, Aanakkallu, Chemmannur, Vaidhyarkada, MeleChundappatti, Elachivazhi, Thachampadi, Vallamaari, Sholayur, Narasimuk, Kottaimedu and Kaavundikkal) were selected randomly from the three Panchayaths Agali, Pudur and Sholayur for the present survey. Main ethnic groups inhabiting the study area are Irula, Muduga and Kurumba. Out of the 13 hamlets selected, one hamlet was inhabited by Mudugas, one by Kurumbas and the rest eleven hamlets were inhabited by Irulas. Overall 130 families were contacted which comprised 10 families of Mudugas, 10 families of Kurumbas and 110 families of Irulas.

## **METHODOLOGY**

A well structured questionnaire was prepared to document traditional knowledge of Insect plant repellents. Surveys were conducted from July 2015 to June 2016. While contacting each respondent, the importance of documentation and benefits of knowledge sharing was explained. The

answers given were clearly noted down in the questionnaire, audios were recorded, wherever necessary videos were taken and help of the translator was also sought for final documentation.

## **RESULTS**

All the members of 130 families (10 families in each Hamlet) were contacted at Attappady. This includes 1 Muduga hamlet, 1 Kurumba hamlet and 11 Irula hamlets. In these hamlets, plant species commonly used as mosquito repellents were recorded.

In Attappady, the use of plant repellents to ward off insects especially mosquitoes is a common practice among the three communities namely Irulas, Mudugas and Kurumbas. While Mudugas opined the use of *Azadiractaindica*, *Buteamonosperma*, *Cassiafistula*, *Zingiberzerumbet* and *Elephantopus scaber*, the Kurumbas used *Azadiractaindica*, *Ricinus communis* and *Vitex negundo* to ward off insects. Irulas used 10 species of plants and plant parts to keep away insect pests. They reported the use of *Azadiractaindica*, *Gliricidia sepium*, *Ricinus communis*, *Curcuma longa*, *Ocimum americanum*, *Glycosmis pentaphylla*, *Cocos nucifera*, *Calotropis procera*, *Cymbopogon citratus* and *Vitex negundo* to repel insects from their houses (Table 1) Burning of bark of different trees available nearby the dwelling area was followed by inhabitants of the seven hamlets included in the present study. Fumigation with coir, palm leaves etc. in the evening hours was practised by most of the residents of cholakkad, Chemmannur, Vaidyarkada, Thachampadi, Sholayur and Narasimukku. *Azadiractaindica* was used by members of all tribes. 14 families from different hamlets reported the use of *Azadiractaindica* either as the whole leaf or burned along with other plants. *Ricinus communis* and *Ocimum americanum* were used by inhabitants of 4 hamlets. *Curcuma longa* and *Vitex negundo* plant parts were used as insect pest repellents by some of the families inhabiting 3 hamlets under study. *Gliricidia sepium* and *Glycosmis pentaphylla* leaves were fumigated by members of 2 hamlets. Hamlets which were dry during major part of the year had no mosquito problems and hence inhabitants of Vallamari reported that they did not use any mosquito repellents. Some of the Inhabitants of Vaidarkada, Narasimukku, kottaimedu and Gottiyarkandi also opined the absence of mosquito problem in the houses. Those hamlets which were near the towns had the access to chemical repellents and hence the inhabitants of Cholakkad, Aanakkallu, Melechundappatti and Thachampadi were using mosquito coils and liquidators during the seasons when mosquitoes were prevalent (Tables-1 & 2).

Table1: Plants with mosquito repellent activity used in different hamlets by various tribes of Attappady, Kerala

Hamlets	<i>Azadiractaindica</i>	<i>Gliricidiasepium</i>	<i>Ricinuscommunis</i>	<i>Curcuma longa</i>	<i>Zingiberzerumbet</i>	<i>Elephantopusscaber</i>	<i>Buteamonosperma</i>	<i>Ocimumamericanum</i>	<i>Glycosmispentaphylla</i>	<i>Cocosnucifera</i>	<i>Cassia fistula</i>	<i>Calotropisprocera</i>	<i>Cymbopogoncitratus</i>	<i>Vitexnegundo</i>	Chemical repellent	Bark of trees	No mosquitoes
Cholakkad	*				*	*	*				*				*	*	
Chemmannur										*						*	
Aanakkallu															*	*	
Vaidhyarkada	*									*							*
MeleChundappatti	*			*											*		
Elachivazhi								*						*			
Thachampadi		*							*	*			*		*	*	
Vallamaari																	*
Sholayur	*			*				*	*	*				*		*	
Narasimuk			*					*				*					*
Kottaimedu		*	*														*
Kaavundikkal			*	*				*								*	
Gottiyarkandi	*		*											*			*

Table -2: Plants and plant parts used and mode of application

S.No.	Species	Family	Habit	Plant part	Mode of application
1.	<i>Azadiractaindica</i>	Meliaceae	Tree	Leaf	Smoke, keeping whole plant
2.	<i>Gliricidiasepium</i>	Fabaceae	Shrub	Leaf	Smoke
3.	<i>Ricinuscommunis</i>	Euphorbiaceae	Shrub	Leaf, Seed	Smoke, application of oil
4.	<i>Curcuma longa</i>	Zingiberaceae	Herb	Rhizome	Smoke
5.	<i>Zingiberzerumbet</i>	Zingiberaceae	Herb	Leaf, Rhizome	Smoke, hanging
6.	<i>Buteamonosperma</i>	Fabaceae	Tree	Leaf	Smoke
7.	<i>Ocimumamericanum</i>	Lamiaceae	Herb	Whole plant	Smoke, keeping whole plant
8.	<i>Glycosmispentaphylla</i>	Rutaceae	Herb	Leaf	Smoke
9.	<i>Cocosnucifera</i>	Palmaceae	Tree	Coirpith, Leaf	Smoke
10.	<i>Cassia fistula</i>	Fabaceae	Tree	Leaf	Smoke
11.	<i>Calotropisprocera</i>	Asclepiadaceae	Herb	Whole plant	keeping whole plant
12.	<i>Cymbopogoncitratus</i>	Poaceae	Herb	Whole plant	keeping whole plant
13.	<i>Vitexnegundo</i>	Verbenaceae	Shrub	Leaf	Smoke
14.	<i>Elephantopusscaber</i>	Asteraceae	Herb	Leaf	Smoke

## DISCUSSION

Irula, Muduga and Kurumba tribes of Attappady mentioned the use of *Azadiractaindicato* ward off mosquitoes;Neem is known to have insecticidal activities. The results of present works are in agreement with the studies on the use of *Azadiractaindica*, as mosquito repellentby the residents of North Eastern Tanzania<sup>3</sup>. There are reports of the use of Neem by Irula tribes of Kodiakkarai reserve forests<sup>4</sup>. The use of Neem by the Arian and Batwal tribes of Punjab was also reported<sup>5</sup>.Neem is also used as Mosquito repellent by the tribes of Uttar Pradesh<sup>6</sup>.The residents of different hamlets in Attappady were burning barks of different trees locally available to repel mosquitoes from their

houses. Coir pith contains lignocelluloses. Fumigation of plants like *Nyctanthes arbor-tritis* L., *Ocimum* species and *Glycosmispentaphylla* with coirpith by the tribal people of Odisha was reported<sup>7</sup>. The present study revealed that people of different hamlets in Attappady also use *Cocosnuciferacoirpith* and leaf as fumigants to keep away mosquitoes especially in the evening hours. *Ricinuscommunis* was used by Kurumbas and Irulasas mosquito repellents. The use of *Ricinuscommunis* as repellent against ticks, mosquitoes and bedbugs by the people of Bechoborekebele of Ethiopia, was reported<sup>8</sup>. Tribes of MeleChundappati, Sholayur and Kaavundikkal had reported the use of *Curcumalonga* as fumigants and the whole plant of *Ocimum* to repel mosquitoes and other insects. There are reports of the use of *Ocimum* sps. by residents of different states of Southeast Nigeria<sup>9</sup> and also by most of the tribes of Africa<sup>10,11</sup>. The use of *Ocimum* sps. and *Curcumalonga* by people of Nigeria to repel mosquitoes was reported.<sup>12</sup>

The use of *Vitexnegundo* as mosquito repellent by the people of Sringeri, Karnataka was reported<sup>13</sup>. Studies revealed the use of *Vitexnegundo* by Irula tribes of Kodiakkarai reserve forests<sup>4</sup>. The Kurumbas as well as Irulas of different hamlets in Attappady have reported the use of parts of *Vitexnegundo* as mosquito repellents. The inhabitants of Cholakkad hamlet use *Buteamonosperma* to keep away mosquitoes. There are reports of the use of *Buteamonosperma* by tribal inhabitants of Attappady and Vakkodan hills of Kerala<sup>14</sup>. The tribes inhabiting two hamlets Thachampady and sholayur in Attappady, used *Glycosmispentaphylla* leaf as fumigants against mosquitoes. This plant was also used as repellent by non tribal residents of this area. Use of this plant by the tribal people of Odisha was reported<sup>7</sup>. Out of the 14 repellent plants listed in this study, the following 5 plants viz. *Cassia fistula*, *Calotropisprocera*, *Zingiberzerumbet* and *Elephantopusscaber* and *Cymbopogon citrates* by the tribes of Attappady is a new revelation. There is no reliable documented literature mentioning the use of these 5 plants by tribes elsewhere. This is the highlight of the study and the first documentation.

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**Fig. 1: Author with a respondent at Attapady tribal settlement**



**Fig.2: Author and translator at a hamlet in Attapady with a respondent**