

Evaluation of Repellents, Herbal and Fungal Products

Insecticidal and repellent properties of some plants to mosquitoes are well-known. Phytochemicals obtained from huge diversity of plant species are an important source of safe and biodegradable chemicals, which could be screened for mosquito repellent and insecticidal activities.

Neem Oil as Mosquito Repellent

Azadirachta indica, commonly known as neem in India, has been used in various ways since ancient times. Dried neem leaves are commonly used in villages for protection against infestation of stored grains and other products by insects. Smoke produced by burning of neem leaves is used for the

protection against mosquitoes. Neem oil has also been used in various insecticidal and medicinal preparations, but its mosquito repellent activity is not known. Therefore, systematic studies were undertaken at NIMR to see the mosquito repellency of neem oil.

Topical Applications

Repellent action of neem oil was evaluated against different vector species of malaria—*An. culicifacies*, *An. stephensi*, *An. minimus*, *An. fluviatilis* and *An. sondaicus* in the villages of Mandla district (Madhya Pradesh), Ghaziabad district (Uttar Pradesh) and Hardwar district (Uttarakhand), Kheda

Table 4. Repellent activity of various herbal products against mosquitoes and sandflies

Plant species	Plant product	Species tested	% Protection	References
<i>Azadirachta indica</i>	5–40% Neem oil-mixed with coconut/ mustard oil as topical application	<i>An. culicifacies</i>	80–100	Sharma <i>et al</i> 1993a
		<i>Cx. quinquefasciatus</i>	61–100	Mishra <i>et al</i> 1995
		<i>Ae. aegypti</i>	85	Sharma <i>et al</i> 1995
				Rajnikant and Bhatt 1994
	5% Neem oil in a cream-base topical application	<i>Phlebotomus papatasi</i>	97.6	Dhiman and Sharma 1994
		<i>Phlebotomus argentipes</i>	100	Sharma and Dhiman 1993
		<i>Ae. aegypti</i>	84	Dua <i>et al</i> 1995
		<i>Ae. albopictus</i>	78	Singh <i>et al</i> 1996
		<i>Anopheles</i> spp	93–100	
		<i>Culex</i> spp	89–94	Nagpal <i>et al</i> 2001
5-10% Neem oil- impregnated on mats (Vapours)	<i>Anopheles</i> spp	98	Sharma <i>et al</i> 1993	
	<i>Cx. quinquefasciatus</i>	63		
1% Neem oil in Kerosene oil (Smoke)	<i>An. culicifacies</i>	99–100	Sharma and Ansari 1994	
	<i>Culex</i> spp	79–81	Valecha <i>et al</i> 1996	
<i>Cymbopogon</i> spp	Oil as topical application	<i>An. culicifacies</i> <i>Cx. quinquefasciatus</i>	99–100 for 10 h 95–97 for 6 h	Ansari and Razdan 1995
<i>Lantana camara</i>	Methanol + Coconut oil extract	<i>Ae. albopictus</i> <i>Ae. aegypti</i>	94 for 2 h 50 for 4 h	Dua <i>et al</i> 1996
<i>Mentha piperita</i> essential oil	Steam distilled	<i>An. annularis</i>	100	Ansari <i>et al</i> 1999
		<i>An. culicifacies</i>	92	
		<i>Cx. quinquefasciatus</i>	85	