

MOSQUITO REPELLENT- HUMAN & NEEM

Recent Research

[J Med Entomol.](#) 2004 Jul;41(4):726-30.

Laboratory evaluation of mosquito repellents against *Aedes albopictus*, *Culex nigripalpus*, and *Ochlerotatus triseriatus* (Diptera: Culicidae).

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http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=15311467&query_hl=26&itool=pubmed_docsum

Four synthetic mosquito repellents (Autan [10% KBR3023], IR3535 [7.5%], Off! [15% deet], Skinsations [7% deet]) and eight natural (primarily plant extracts and/or essential oils) product-based repellents (Bite Blocker [2% soybean oil], ByGone, GonE!, Natrapel [10% citronella], Neem Aura, Sunswat, MosquitoSafe [25% geraniol], and Repel [26% p-menthane-3,8-diol]) were tested in the laboratory against *Aedes albopictus* Skuse, *Culex nigripalpus* Theobald, and *Ochlerotatus triseriatus* (Say). When estimated mean protection time (eMPT) responses for each repellent were averaged for all three mosquito species, Autan, Bite Blocker, Off!, and Repel prevented biting for > or =7.2 h; IR3535, MosquitoSafe, and Skinsations for 3.2-4.8 h; and ByGone, Natrapel, GonE, NeemAura, and SunSwat for 0.9-2.3 h. Against *Ae. albopictus*, the eMPT for Off! and Repel exceeded 7.0 h and ranged from 5.0 to 5.7 h for Autan, Bite Blocker, and Skinsations. Bygone, GonE, NeemAura, and SunSwat provided 0.2 h protection against *Ae. albopictus* and *Oc. triseriatus*, whereas Autan, Bite Blocker, Off., and Repel prevented bites by *Oc. triseriatus* for > or =7.3 h. All 12 repellents provided an eMPT > or =2.8 h against *Cx. nigripalpus* (maximum: 8.5 h for Bite Blocker). When the average eMPT for each repellent (for all species) was divided by the eMPT for 7% deet (Skinsations), the order of repellent effectiveness and the corresponding repellency index (R_i) was Repel (1.7) > Bite Blocker (1.5) = Autan (1.5) = Off! (1.5) > Skinsations (1.0) > IR3535 (0.8) > MosquitoSafe (0.6) > Natrapel (0.5) > Neem Aura (0.3) = SunSwat (0.3) = Bygone (0.3) > GonE (0.2). PMID: 15311467 [PubMed - indexed for MEDLINE]

[Med Vet Entomol.](#) 2003 Dec;17(4):457-60.

Learning and memory in the mosquito *Aedes aegypti* shown by conditioning against oviposition deterrence.

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http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=14651662&query_hl=1&itool=pubmed_docsum

Oviposition site choice by female mosquitoes, *Aedes aegypti* (L) (Diptera: Culicidae), was

affected by rearing them in water treated with 0.016% of the repellent Mozaway trade mark containing citronella and neem. Given a choice between a bowl of repellent-treated and a bowl of untreated water, *Ae. aegypti* reared in untreated water strongly preferred to oviposit on the clean water (93-98%) instead of repellent-treated water. This demonstrates effective deterrence of oviposition by dilute Mozaway trade mark. Those reared in repellent-treated water were less deterred: 38-46% of their eggs were laid on the repellent-treated water and 54-62% on the clean water. Evidently the female mosquitoes reared in repellent-treated water were conditioned against oviposition site deterrence, as shown when choice tests were conducted 6 days post-emergence from the treated water. This demonstrates learning and memory in the mosquito *Ae. aegypti*, with implications for dengue vector surveillance and control.
PMID: 14651662 [PubMed - indexed for MEDLINE]

[Phytother Res.](#) 2003 Mar;17(3):202-5.

Field trials on the repellent activity of four plant products against mainly *Mansonia* population in western Ethiopia.

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http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=12672146&query_hl=1&itool=pubmed_docsum

The repellent activity of essential oils of lemon eucalyptus (*Eucalyptus maculata* citrodion), rue (*Ruta chalepensis*), oleoresin of pyrethrum (*Chrysanthemum cinerariaefolium*) and neem (*Azadiracta indica*) have been field tested as 40%, 50% and 75% solutions in coconut oil against populations of mosquitoes consisting mainly of *Mansonia* in Gambella, western Ethiopia. A latin square design was used to randomize the test subjects for possible individual differences for mosquito attraction. Repellency was evaluated as the percentage protection. Deet was included in the study for comparison. All the plant products manifested repellency. At 50% concentration at which the highest repellency was recorded the protection was 91.6%, 87.0%, 96.0%, 97.9% for rue, neem, pyrethrum and deet, respectively. The essential oil of lemon eucalyptus was not tried at this concentration. At a 40% concentration deet, lemon eucalyptus and pyrethrum were significantly ($p < 0.05$) more effective than rue and neem. At a 50% concentration, deet and pyrethrum were significantly better ($p < 0.05$) than rue and neem. At a 75% concentration concentration, deet and lemon eucalyptus performed significantly better ($p < 0.05$) than pyrethrum and neem. The difference between pyrethrum and neem was also significant ($p < 0.01$). Copyright 2003 John Wiley & Sons, Ltd.
PMID: 12672146 [PubMed - indexed for MEDLINE]

[J Am Mosq Control Assoc.](#) 2002 Jun;18(2):107-10.

Field evaluation of three plant-based insect repellents against malaria vectors in Vaca Diez Province, the Bolivian Amazon.

[Moore SJ](#), [Lenglet A](#), [Hill N](#).

London School of Hygiene and Tropical Medicine, United Kingdom.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=12083351&query_hl=1&itool=pubmed_docsum

The efficacy of repellents against *Anopheles darlingi*, the main malaria vector in Bolivia, was evaluated. This mosquito has a peak in biting activity early in the evening. Three natural repellents (1 eucalyptus based, 1 neem based, and 1 containing several repellent essential oils) were tested in comparison with 15% deet in human landing catches in Bolivia. The eucalyptus-based repellent containing 30% p-menthane-diol applied at a dose similar to those used in practice gave 96.89% protection for 4 h. Deet gave 84.81% protection. The other 2 products did not provide significant protection from mosquito bites.

Publication Types: [Evaluation Studies](#)

PMID: 12083351 [PubMed - indexed for MEDLINE]

[Indian J Malariol.](#) 2002 Mar-Jun;39(1-2):13-7.

Evaluation of repellent action of neem oil against the filarial vector, *Culex quinquefasciatus* (Diptera: Culicidae).

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http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=14686105&query_hl=26&itool=pubmed_docsum

Studies were carried out to evaluate the repellent action of neem oil against *Culex quinquefasciatus*. Application of 2 and 5 per cent neem oil @ 5 ml/person/night gave 50 and 40.9 per cent protection in indoor collections and 17.4 and 5.6 per cent in outdoor collections as compared with that of untreated control respectively. The protection time ranged from 0100 to 0300 hrs and 0100 to 0600 hrs in indoor and outdoor collections respectively. Results of repellent action of Autan, a synthetic mosquito repellent studied concurrently showed a relatively higher protection rate from the bites of *Cx. quinquefasciatus*.

Publication Types: [Clinical Trial](#)

PMID: 14686105 [PubMed - indexed for MEDLINE]

[J Commun Dis.](#) 1999 Dec;31(4):241-5.

Field evaluation of herbal mosquito repellents.

[Das NG](#), [Nath DR](#), [Baruah I](#), [Talukdar PK](#), [Das SC](#).

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=10937301&query_hl=1&itool=pubmed_docsum

Repellent properties of *Zanthoxylum armatum* DC. Syn. *Z. alatum* Roxb. (Timur), *Curcuma aromatica* (Jungli haldi) and *Azadirachta indica* (Neem) oils were evaluated against mosquitoes in mustard (*Brassica* sp.) and coconut (*Cocos* sp.) oil base and compared with synthetic repellent. Dimethyl phthalate (DMP) as standard. Timur and jungli haldi afforded better protection in the both the base at all the concentrations. Tepellents in mustard oil gave longer protection time than those in coconut oil. At 0.57 mg/cm² concentration timur oil gave

significantly higher protection both in mustard (445 min) as well as coconut oil (404 min) than the other repellents and DMP.

Publication Types: [Clinical Trial](#)

PMID: 10937301 [PubMed - indexed for MEDLINE]

[Indian J Malariol.](#) 1996 Sep;33(3):139-43.

Preliminary evaluation of safety aspects of neem oil in kerosene lamp.

[Valecha N](#), [Ansari MA](#), [Prabhu S](#), [Razdan RK](#).

Malaria Research Centre (ICMR), Delhi, India.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=9014397&query_hl=1&itool=pubmed_docsum

Kerosene lamps containing one per cent neem oil were used for mosquito repellent action in a village near Delhi. The safety aspects of this personal protection method developed by Malaria Research Centre were evaluated by animal studies and clinical examination of population before and after exposure. Single application of neem oil (1%) did not produce skin irritation in rabbits and adverse effect on guinea pigs after exposure to aerosol. Clinical examination of 156 adults and 110 children did not reveal any major adverse effects after one year of exposure to 1% neem oil.

PMID: 9014397 [PubMed - indexed for MEDLINE]

[Indian J Malariol.](#) 1996 Jun;33(2):99-102.

Use of neem cream as a mosquito repellent in tribal areas of central India.

[Singh N](#), [Mishra AK](#), [Saxena A](#).

Malaria Research Centre (Field Station), Jabalpur, India.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=8952174&query_hl=1&itool=pubmed_docsum

PMID: 8952174 [PubMed - indexed for MEDLINE]

[Indian J Malariol.](#) 1995 Sep;32(3):99-103.

Use of neem oil as a mosquito repellent in tribal villages of mandla district, madhya pradesh.

[Mishra AK](#), [Singh N](#), [Sharma VP](#).

Malaria Research Centre (Field Station), Medical College Building, Jabalpur, India.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=8936291&query_hl=1&itool=pubmed_docsum

A field study was carried out to evaluate the mosquito repellent action of neem (*Azadirachta indica*) oil in tribal forested villages of District Mandla. Various concentrations of neem oil mixed in coconut oil (1-4%) were applied to the exposed body parts of human volunteers. Results revealed 81-91% protection during 12 h period of observation from the bites of anopheline mosquitoes. Neem oil is an indigenous product and a practical solution to curtail

mosquito nuisance.

PMID: 8936291 [PubMed - indexed for MEDLINE]

[Indian J Malariol.](#) 1995 Jun;32(2):47-53.

Repellent action of neem cream against mosquitoes.

[Dua VK](#), [Nagpal BN](#), [Sharma VP](#).

Malaria Research Centre (Field Station), BHEL, Ranipur, India.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=7589727&query_hl=1&itool=pubmed_docsum

Neem cream was used as mosquito repellent to provide protection against *Aedes albopictus*, *Ae. aegypti*, *Culex quinquefasciatus*, *Anopheles culicifacies* and *An. subpictus* mosquitoes. The application of neem cream on exposed body parts @2.0 gm/person showed 78 (range 65-95), 89 (range 66-100) and 94.4 (range 66-100) per cent protection against *Aedes*, *Culex* and *Anopheles* mosquitoes respectively. Significant difference was observed between neem cream treated and untreated group of population for *Aedes* mosquitoes ($p < 0.001$). Application of neem cream was found to be a safe and suitable alternative to insecticide impregnated coils for personal protection against mosquitoes and one application was 68% effective for four hours. PMID: 7589727 [PubMed - indexed for MEDLINE]

[Southeast Asian J Trop Med Public Health.](#) 1995 Mar;26(1):180-2.

Field studies on the mosquito repellent action of neem oil.

[Sharma SK](#), [Dua VK](#), [Sharma VP](#).

Malaria Research Center (Field Station), BHEL Complex, Ranipur, Hardwar, India.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=8525409&query_hl=1&itool=pubmed_docsum

Repellent action of neem oil was evaluated against different mosquito species. 2% neem oil mixed in coconut oil provided 96-100% protection from anophelines, 85% from *Aedes*, 37.5% from *Armigeres* whereas it showed wide range of efficacy from 61-94% against *Culex* spp. Therefore, neem oil can be applied as a personal protection measure against mosquito bites.

Publication Types: [Clinical Trial](#) [Controlled Clinical Trial](#)

PMID: 8525409 [PubMed - indexed for MEDLINE]

[Indian J Malariol.](#) 1994 Sep;31(3):122-5.

Field evaluation of mosquito repellent action of neem oil.

[Kant R](#), [Bhatt RM](#).

Malaria Research Centre (Field Station), Civil Hospital, Nadiad, India

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=7713267&query_hl=1&itool=pubmed_docsum

PMID: 7713267 [PubMed - indexed for MEDLINE]

[J Med Entomol.](#) 1994 May;31(3):505-7.

Personal protection from mosquitoes (Diptera: Culicidae) by burning neem oil in kerosene.

[Sharma VP](#), [Ansari MA](#).

Malaria Research Centre (ICMR), Delhi, India.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=7914543&query_hl=1&itool=pubmed_docsum

The repellent action of neem oil (extracted from the seeds of *Azadirachta indica* A. Juss) was evaluated on mosquitoes at two villages near Delhi, India. Kerosene lamps containing neem oil were burned in the living rooms, and mosquitoes resting walls or attracted to human bait were collected inside rooms from 1800 to 0600 h. Neem oil (0.01-1%) mixed in kerosene reduced biting of human volunteers and catches of mosquitoes resting on walls in the rooms. Protection was more pronounced against *Anopheles* than against *Culex*. A 1% neem oil-kerosene mixture may provide economical personal protection from mosquito bites.

PMID: 7914543 [PubMed - indexed for MEDLINE]

[J Am Mosq Control Assoc.](#) 1993 Sep;9(3):359-60.

Mosquito repellent action of neem (*Azadirachta indica*) oil.

[Sharma VP](#), [Ansari MA](#), [Razdan RK](#).

Malaria Research Centre, Delhi, India.

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=8245950&query_hl=1&itool=pubmed_docsum

Two percent neem oil mixed in coconut oil, when applied to the exposed body parts of human volunteers, provided complete protection for 12 h from the bites of all anopheline species. Application of neem oil is safe and can be used for protection from malaria in endemic countries.

PMID: 8245950 [PubMed - indexed for MEDLINE]

Most of this research data was compiled from the National Library of Medicine at the National Institutes of Health website (www.pubmed.com) and is presented here as a service. Using Neem does not sell neem products.