REFERENCES

Acosta E. Bioavailability of nanoparticles in nutrient and nutraceutical delivery. Curr Opin Colloid Interface Sci 2009;14:3-15.

Adeniran OI, Fabiyi E. A cream formulation of an effective mosquito repellent: a topical product from lemongrass oil (*Cymbopogon citratus*) Stapf. J Nat Prod Plant Resour 2012;2:322-7.

Afify A, Horlacher B, Roller J, Galizia CG. Different repellents for *Aedes aegypti* against blood-feeding and oviposition. PLoS One 2014;9:e103765.

Amer A, Mehlhorn H. Repellency effect of forty-one essential oils against *Aedes*, *Anopheles*, and *Culex* mosquitoes. Parasitol Res 2006;99:478-90.

Amerasan D, Murugan K, Kovendan K, Mahesh KP, Panneerselvam C, Subramaniam J, et al. Adulticidal and repellent properties of *Cassia tora* Linn. (Family: Caesalpinaceae) against *Culex quinquefasciatus*, *Aedes aegypti*, and *Anopheles stephensi*. Parasitol Res 2012;111:1953-64.

Amichai B, Lazarov A, Halevy S. Contact dermatitis from diethyltoluamide. Contact Dermatitis 1994;30:188.

Anjali C, Sharma Y, Mukherjee A, Chandrasekaran N. Neem oil (*Azadirachta indica*) nanoemulsion-a potent larvicidal agent against *Culex quinquefasciatus*. Pest Manag Sci 2012;68:158-63.

Ansari MA, Razdan RK, Tandon M, Vasudevan P. Larvicidal and repellent actions of *Dalbergia sissoo* Roxb. (*F. leguminosae*) oil against mosquitoes. Bioresour Technol 2000;73:207-11.

Barnard DR. Repellents and Toxicants for Personal Protection. WHO/CDS/WHOPES/GCDPP/2000.5, global collaboration for development of pesticides for public health. Geneva: WHO; 2000.

Basketter DA, Chamberlain M, Griffiths HA, Rowson M, Whittle E, York M. The classification of skin irritants by human patch test. Food Chem Toxicol 1997;35: 845-52.

Beaty BJ, Marquardt WC. The Biology of Disease Vectors. Colorado: Am J Trop Med 1996;56:482.

Beck JJ, Chou SC. The structural diversity of phthalides from the Apiaceae. J Nat Prod 2007;70:891-900.

Becker N, Petríc D, Zgomba M, Dahl C, Boase C, Lane J, et al. Mosquitoes and their Control. New York: Kluwer Academic/Plenum Publishers; 2003.

Berenbaum M. Allelochemical interactions in plants. Rec Adv Phytochem 1985;19:139-69.

Bhatti WH, Gaich CL, Menke GL. Natural hormone replacement therapy, U.S.: 2004 [serial online] 2008 May [cited 2016 Sep 8]. Available from: URL: http://uspharmacist.com/index.asp?page=ce/3176/default.htm

Blackwell A, Stuart AE, Estambale BA. The repellant and antifeedant activity of oil of *Myrica gale* against *Aedes aegypti* mosquitoes and its enhancement by the addition of salicyluric acid. J R Coll Physicians Edinb 2003;33:209-14.

Changbunjong T, Weluwanarak T, Taowan N, Suksai P, Chamsai T, Sedwisai P. Seasonal abundance and potential of Japanese encephalitis virus infection in mosquitoes at the nesting colony of ardeid birds, Thailand. Asian Pac J Trop Biomed 2013;3:207-10.

Chen SW, Min L, Li WJ, Kong WX, Li JF, Zhang YJ. The effects of angelica essential oil in three murine tests of anxiety. Pharmacol Biochem Behav 2004;79:377-82.

Choi AJ, Kim CJ, Cho YJ, Hwang JK, Kim CT. Characterization of capsaicin-loaded nanoemulsions stabilized with alginate and chitosan by self-assembly. Food Bioprocess Technol 2011;4:1119-26.

Choi YY, Kim MH, Hong J, Kim K, Yang WM. Effect of dangguibohyul-tang, a mixed extract of *Astragalus membranaceus* and *Angelica sinensis*, on allergic and inflammatory skin reaction compared with single extracts of *Astragalus membranaceus* or *Angelica sinensis*. Evid Based Complement Alternat Med 2016;2016:5936354.

Choochote W, Chaithong U, Kamsuk K, Jitpakdi A, Tippawangkosol P, Tuetun B, et al. Repellent activity of selected essential oils against *Aedes aegypti*. Fitoterapia 2007;78:359-64.

Choochote W, Kanjanapothi D, Panthong A, Taesotikul T, Jitpakdi A, Chaithong U, et al. Larvicidal, adulticidal and repellent effects of *Kaempferia galanga*. Southeast Asian J Trop Med Public Health 1999;30:470-6.

Clem JR, Havemann DF, Raebel MA. Insect repellent (*N,N*-diethyl-*m*-toluamide)-cardiovascular toxicity in an adult. Ann Pharmacother 1993;27:289-93.

Clements AN. The physiology of mosquitoes. Oxford: Perganon Press; 1992. p.395.

Conti B, Benelli G, Leonardi M, Afifi FU, Cervelli C, Profeti R, et al. Repellent effect of *Salvia dorisiana, S. longifolia,* and *S. sclarea* (Lamiaceae) essential oils against the mosquito *Aedes albopictus* Skuse (Diptera: Culicidae). Parasitol Res 2012a;111:291-9.

Conti B, Leonardi M, Pistelli L, Profeti R, Ouerghemmi I, Benelli G. Larvicidal and repellent activity of essential oils from wild and cultivated *Ruta chalepensis* L. (Rutaceae) against *Aedes albopictus* Skuse (Diptera: Culicidae), an arbovirus vector. Parasitol Res 2012b;112:991-9.

Dakshinamoorthy G, Samykutty AK, Munirathinam G, Reddy MV, Kalyanasundaram R. Multivalent fusion protein vaccine for lymphatic filariasis. Vaccine 2013;31:1616-22.

Das D, Chandra. Mosquito larvicidal activity of *Rauvolfia serpentina* L. seeds against *Culex quinquefasciatus* Say. Asian Pac J Trop Med 2012;5:42-5.

Das NG, Nath DR, Baruah I, Talukdar PK, Das SC. Field evaluation of herbal mosquito repellents. J Commun Dis 1999;31:241-5.

DeRosa R, Cupp MJ. Dong quai. In: Cupp MJ, ed. Toxicology and Clinical Pharmacology of Herbal Products. Totowa, NJ: Humanna Press; 2000. p.289-94.

Duarte JL, Amado JRR, Oliveira AEMFM, Cruz RAS, Ferreira AM, Souto RNP, et al. Evaluation of larvicidal activity of a nanoemulsion of *Rosmarinus officinalis* essential oil. Rev Bras Farmacogn 2015;25:189-92.

Dugassa S, Medhin G, Balkew M, Seyoum A, Michael GT. Field investigation on the repellent activity of some aromatic plants by traditional means against *Anopheles arabiensis* and *An. pharoensis* (Diptera: Culicidae) around Koka, central Ethiopia. Acta Trop 2009;112:38-42.

Erler F, Ulug I, Yalcinkaya B. Repellent activity of five essential oils against *Culex pipiens*. Fitoterapia 2006;77:491-4.

Evergetis E, Michaelakis A, Haroutounian SA. Essential oils of Umbelliferae (Apiaceae) family taxa as emerging potent agents for mosquito control. In: Soloneski S (ed) Integrated pest management and pest control-current and future tactics, InTech, China 2012:613-38.

FAO. Basic principles of steam distillation [serial online] 1995 [cited 2014 Dec 26] Available from: URL: http://www.fao.org/docrep/V5350e/V5350e13.htm.

Farag M, Ahmed MH, Yousef H, Abdel-Rahman AA. Repellent and insecticidal activities of *Melia azedarach* L. against cotton leafworm *Spodoptera littoralis* (Boisd.). Z Naturforsch C 2011;66:129-35.

Forattini OP, Kakitani I, Massad E, Marucci D. Studies on mosquitoes (Diptera: Culicidae) and anthropic environment 2. Immature stages research at a rice irrigation system location in south-eastern Brazil. Rev Saude Publica 1993;27:227-36.

Foster BC, Arnason JT, Briggs CJ. Natural health products and drug disposition. Annu Rev Pharmacol Toxicol 2005;45:203-26.

Fradin MS. Mosquitoes and mosquito repellents: a clinician's guide. Ann Intern Med 1998;128:931-40.

Fradin MS, Day JF. Comparative efficacy of insect repellents against mosquito bites. N Engl J Med 2002;347:13-8.

Fraser AD, MacNeil A, Theriault M, Morzycki W. Analysis of diethyltoluamide (DEET) following intentional oral ingestion of Muskol®. J Anal Toxicol 1995;19:197-9.

Garcia LS. Malaria. Clin Lab Med 2010;30:93-129.

Gerberg EJ, Barnard DR, Ward RA. Manual for Mosquito Rearing and Experimental Techniques. American Mosquito Control Association Bulletin No.5 1994:61-2.

Giatropoulos A, Papachristos DP, Kimbaris A, Koliopoulos G, Polissiou MG, Emmanouel N, et al. Evaluation of bioefficacy of three *Citrus* essential oils against the dengue vector *Aedes albopictus* (Diptera: Culicidae) in correlation to their components enantiomeric distribution. Parasitol Res 2012;111:2253-63.

Gillij YG, Gleiser RM, Zygadlo JA. Mosquito repellent activity of essential oils of aromatic plants growing in Argentina. Bioresour Technol 2008;99:2507-15.

Goodyer LI, Croft AM, Frances SP, Hill N, Moore SJ, Onyango SP, et al. Expert review of the evidence base for arthropod bite avoidance. J Travel Med 2010;17:1708-8305.

Govindarajan M. Larvicidal and repellent activities of *Sida acuta* Burm. F. (Family: Malvaceae) against three important vector mosquitoes. Asian Pac J Trop Med 2010;3:691-5.

Govindarajan M, Sivakumar R. Mosquito adulticidal and repellent activities of botanical extracts against malarial vector, *Anopheles stephensi* Liston (Diptera: Culicidae). Asian Pac J Trop Med 2011;4:941-7.

Govindarajan M, Sivakumar R. Repellent properties of *Cardiospermum halicacabum* Linn. (Family: Sapindaceae) plant leaf extracts against three important vector mosquitoes. Asian Pac J Trop Biomed 2012;2:602-7.

Govindarajan M, Rajeswary M, Sivakumar R. Mosquito larvicidal and ovicidal activity of *Delonix elata* (L.) Gamble against *Culex quinquefasciatus* Say (Diptera: Culicidae). Asian Pac J Trop Med 2012;2:s571-3.

Grossman AM. Herbal supplements create new niche in specialty bath products: Drug Store News. Newsletter from PROMT 1999;21:24.

Gryboski J, Weinstein D, Ordway NK. Toxic encephalopathy apparently related to the use of an insect repellent. N Engl J Med 1961;264:289-91.

Gupta A, Eral HB, Hatton TA, Doyle PS. Nanoemulsions: formation, properties and applications. RSC 2016;12:1-16.

Hammon WM, Rudnick A, Sather GE. Virus associated with epidemic hemorrhagic fevers of the Philippines and Thailand. Science 1960;131:1102-3.

Han Y, Li LC, Hao WB, Tang M, Wan SQ. Larvicidal activity of lansiumamide B from the seeds of *Clausena lansium* against *Aedes albopictus* (Diptera: Culicidae). Parasitol Res 2013;112:511-6.

Harbach R. Mosquito Taxonomic Inventory (MTI) [serial online] 2013 Aug [cited 2013 Sep 1]. Available from: URL: www.mosquito-taxonomic-inventory.info/

Harborne JB. Phytochemical methods: A guide to modern technique of plant analysis. London: Chapmam and Hall; 1984.

Hazarika S, Dhiman S, Rabha B, Bhola RK, Singh L. Repellent activity of some essential oils against *Simulium* species in India. J Insect Sci 2012;12:1-9.

Heba Y, EL-Lakwah SF, EL-Sayed YA. Insecticidal activity of linoleic acid against *Spodoptera littoralis* (Boisd.). Egypt J Agric Res 2013;91:573-80.

Heick HM, Shipman RT, Norman MG, James W. Reye-like syndrome associated with use of insect repellent in a presumed heterozygote for ornithine carbamoyl transferase deficiency. J Pediatr 1980;97:471-3.

Hendarto SK, Hadinegoro SR. Dengue encephalopathy. Acta Paediatr Jpn 1992;34:350-7.

Hsiao CY, Hung CY, Tsai TH, Chak KF. A study of the wound healing mechanism of a traditional Chinese medicine, *Angelica sinensis*, using a proteomic approach. Evid Based Complement Alternat Med 2012;2012:467531.

Huang KC. The pharmacology of Chinese herbs. Boca Raton: CRC Press; 1993.

Huang KF, Hsu YC, Lin CN, Tzeng JI, Chen YW, Wang JJ. Shiunko promotes epithelization of wounded skin. Am J Chin Med 2004;32:389-96.

Huang YM. Medical entomology studies. VII. The subgenus *Stegomyia* of *Aedes* in Southeast Asia. II. The *edwardsi* group of species. III. The *w-albus* group of species. (Diptera: Culicidae). Contrib Amer Ent Inst 1977;14:1-132.

Hummelbrunner LA, Isman MB. Acute, sublethal, antifeedant, and synergistic effects of monoterpenoid essential oil compounds on the tobacco cutworm, *Spodoptera litura* (Lep. Noctuidae). J Agric Food Chem 2001;49:715-20.

Julvez J, Ragavoodoo C, Gopaul AR, Mouchet J. Human diseases transmitted by Culicidae in southwest Indian Ocean islands. Bull Soc Pathol Exot 1998;91:99-103.

Kamalakannan S, Murugan K, Barnard DR. Toxicity of *Acalypha indica* (Euphorbiaceae) and *Achyranthes aspera* (Amaranthaceae) leaf extracts to *Aedes aegypti* (Diptera: Culicidae). J Asia-Pac Entomol 2011;14:41-5.

Kamaraj C, Rahuman AA, Bagavan A, Elango G, Zahir AA, Santhoshkumar T. Larvicidal and repellent activity of medicinal plant extracts from Eastern Ghats of South India against malaria and filariasis vectors. Asian Pac J Trop Med 2011;4:698-705.

Keys JD. Chinese herbs (their botany, chemistry, and pharmacodynamics). Tokyo: Charles E. Tuttle Company, Inc.; 1976.

Keziah EA, Nukenine EN, Danga SPY, Younoussa L, Esimone CO. Creams formulated with *Ocimum gratissimum* L. and *Lantana camara* L. crude extracts and fractions as mosquito repellents against *Aedes aegypti* L. (Diptera: Culicidae). J Insect Sci 2015;15:1-5.

Khan AA, Maibach HI, Skidmore DL. Addition of vanillin to mosquito repellents to increase protection time. Mosq News 1975;35:223-35.

Knight KL, Stone A. A catalog of the mosquitoes of the world (Diptera: Culicidae), 2nd ed. Entomol Soc Am, 1977.

Komalamisra N, Trongtokit Y, Rongsriyam Y, Apiwathnasorn C. Screening for larvicidal activity in some Thai plants against four mosquito vector species. Southeast Asian J Trop Med Public Health 2005;36:1412-22.

Kongkaew C, Sakunrag I, Chaiyakunapruk N, Tawatsin A. Effectiveness of citronella preparations in preventing mosquito bites: systematic review of controlled laboratory experimental studies. Trop Med Int Health 2011;16:802-10.

Labunska I, Santillo D. Environmental and human health concerns relating to diethyl phthalate (DEP), a common ingredient in cosmetics and other personal care products [serial online] 2004 [cited 2014 Dec 20]. Available from: URL: http://www.greenpeace.to/publications/dep_2004.pdf

Lalrotluanga, Ngente L, Nachimuthu SK, Guruswami G. Insecticidal and repellent activity of *Hiptage benghalensis* L. Kruz (Malpighiaceae) against mosquito vectors. Parasitol Res 2012;111:1007-17.

Lamberg SI, Mulrennan JA. Ballous reaction to diethyltoluamide (DEET). Arch Dermatol 1969;100:582-6.

Leikin JB, Paloucek FP. Poisoning and Toxicology Compendium. Cleveland, OH: Lexi-Comp, Inc.; 1998. p.677-8.

Limsuwan S, Rongsriyam Y, Kerdpibule V, Apiwathnasorn C, Chiang GL, Cheong WH. Rearing techniques for mosquitoes. In:Sucharit S, Supavej S Eds. Practical Entomology. Malaria and filariasis, 1st ed. Museum and Reference Center, Faculty of Tropical Medicine, Mahidol University, Thailand, 1987.

Lipscomb JW, Kramer JE, Leikin JB. Seizure following brief exposure to the insect repellent *N,N*-diethyl-*m*-toluamide. Ann Emerg Med 1992;21:315-7.

Lust JB. The Herb Book. California: Benedict Lust Publications; 1974.

Maia MF, Moore SJ. Plant-based insect repellents: a review of their efficacy, development and testing. Malar J 2011;10:S11.

Mandal S. Repellent activity of *Eucalyptus* and *Azadirachta indica* seed oil against the filarial mosquito *Culex quinquefasciatus* Say (Diptera: Culicidae) in India. Asian Pac J Trop Biomed 2011:S109-12.

Meepagala KM, Sturtz G, Wedge DE, Schrader KK, Duke SO. Phytotoxic and antifungal compounds from two Apiaceae species, *Lomatium californicum* and *Ligusticum hultenii*, rich sources of Z-ligustilide and apiol, respectively. J Chem Ecol 2005;31:1567-78.

Mehmood F, Manzoor F, Khan ZUD. Evaluation of toxicity and repellency of essential oils of family Rutaceae against black ants (*Lasius niger*) in Pakistan. Asian J Chem 2012;24:3087-90.

Mehta RM. Pharmaceutics-I. Delhi: Vallabh Prakashan; 2002.

Miguel MG. Antioxidant and anti-inflammatory activities of essential oils: a short review. Molecules 2010;15:9252-87.

Miller JD. Anaphylaxis associated with insect repellent. N Engl J Med 1982;307:1341-2.

MirÓ Specos, García JJ, Tornesello J, Marino P, Vecchia MD, Tesoriero MVD, et al. Microencapsulated citronella oil for mosquito repellent finishing of cotton textiles. Trans R Soc Trop Med Hyg 2010;104:653-8.

Mittal PK, Sreehari U, Razdan RK, Dash AP, Ansari MA. Efficacy of advanced odomos repellent cream (*N*,*N*-diethyl-benzamide) against mosquito vectors. Indian J Med Res 2011;133:426-30.

Miyazawa M, Tsukamoto T, Anzai J, Ishikawa Y. Insecticidal effect of phthalides and furanocoumarins from *Angelica acutiloba* against *Drosophila melanogaster*. J Agric Food Chem 2004;52:4401-5.

Murugan K, Mahesh Kumar P, Kovendan K, Amerasan D, Subrmaniam J, Hwang JS. Larvicidal, pupicidal, repellent and adulticidal activity of *Citrus sinensis* orange peel extract against *Anopheles stephensi*, *Aedes aegypti* and *Culex quinquefasciatus* (Diptera: Culicidae). Parasitol Res 2012;111:1757-69.

Nerio LS, Olivero-Verbel J, Stashenko E. Repellent activity of essential oils: a review. Bioresour Technol 2010;101:372-8.

Newman A. How to make essential oils [serial online] 2013 Jul [cited 2014 Dec 26]. Available from: http://www.herbs-info.com/how-to-make-essential-oils.html.

Nilsson E, Bengtsson G. Endogenous free fatty acids repel and attract Collembola. J Chem Ecol 2004;30:1431-43.

Nitatpattana N, Dubot-Pérès A, Gouilh MA, Souris M, Barbazan P, Yoksan S, et al. Change in Japanese encephalitis virus distribution, Thailand. Emerg Infect Dis 2008;14:1762-5.

Nuchuchua O, Sakulku U, Uawongyart N, Puttipipatkhachorn S, Soottitantawat A, Ruktanonchai U. *In vitro* characterization and mosquito (*Aedes aegypti*) repellent activity of essential-oils-loaded nanoemulsions. AAPS PharmSciTech 2009;10:1234-42.

Oliveira AEMFM, Duarte JL, Amado JRR, Cruz RAS, Rocha CF, Souto RNP, et al. Development of a larvicidal nanoemulsion with *Pterodon emarginatus* Vogel oil. PLoS One 2016;11:e0145835.doi:10.1371/journal.pone.0145835.

Omolo MO, Okinyo D, Ndiege IO, Lwande W, Hassanali A. Repellency of essential oils of some Kenyan plants against *Anopheles gambiae*. Phytochemistry 2004;65:2797-802.

Oransky S, Roseman B, Fish D, Gentile T, Melius J, Cartter ML, et al. Seizures temporally associated with use of DEET insect repellent-New York and Connecticut. MMWR Morb Mortal Wkly Rep 1989;38:678-80.

Oyedele AO, Gbolade AA, Sosan MB, Adewoyin FB, Soyelu OL, Orafidiya OO. Formulation of an effective mosquito-repellent topical product from lemongrass oil. Phytomedicine 2002;9:259-62.

Pandian RS, Chandrashekaran MK. Rhythms in the biting behaviour of a mosquito *Armigeres subalbatus*. Oecologia 1980;47:89-95.

Panneerselvam C, Murugan K. Adulticidal, repellent, and ovicidal properties of indigenous plant extracts against the malarial vector, *Anopheles stephensi* (Diptera: Culicidae). Parasitol Res 2013;112:679-92.

Phasomkusolsil S, Soonwera M. Insect repellent activity of medicinal plant oils against *Aedes aegypti* (Linn.), *Anopheles minimus* (Theobald) and *Culex quinquefasciatus* Say based on protection time and bitting rate. Southeast Asian J Trop Med Public Health 2010;41:831-40.

Phasomkusolsil S, Soonwera M. Comparative mosquito repellency of essential oils against *Aedes aegypti* (Linn.), *Anopheles dirus* (Peyton and Harrison) and *Culex quinquefasciatus* (Say). Asian Pac J Trop Med 2011;1:s113-8.

Pongboonrod S. Thai medicinal plants. Bangkok: Kasambanakit Press; 1976.

Prajapati V, Tripathi AK, Aggarwal KK, Khanuja SPS. Insecticidal, repellent and oviposition-deterrent activity of selected essential oils against *Anopheles stephensi*, *Aedes aegypti* and *Culex quinquefasciatus*. Bioresour Technol 2005;96:1749-57.

Promsiri S, Naksathit A, Kruatrachue M, Thavara U. Evaluations of larvicidal activity of medicinal plant extracts to *Aedes aegypti* (Diptera: Culicidae) and other effects on a non target fish. Insect Sci 2006;13:179-88.

Rajavel AR. Larval habitat of *Armigeres subalbatus* (COQ) and its characteristics in Pondicherry. Southeast Asian J Trop Med Public Health 1992;23:470-3.

Rattanarithikul R, Panthusiri P. Illustrated keys to the medically important mosquitoes of Thailand. Southeast Asian J Trop Med Public Health 1994;25:1-66.

Rehman JU, Ali A, Khan IA. Plant based products: use and development as repellents against mosquitoes: A review. Fitoterapia 2014;95:65-74.

Reutemann P, Ehrlich A. Neem oil: an herbal therapy for alopecia causes dermatitis. Dermatitis 2008;19:E12-5.

Reuveni H, Yagupsky P. Diethyltoluamide-containing insect repellent. Arch Dermatol 1982;118:582-3.

Rodrigues ECR, Ferreira AM, Vilhena JCE, Almeida FB, Cruza RAS, Florentino AC, et al. Development of a larvicidal nanoemulsion with Copaiba (*Copaifera duckei*) oleoresin. Rev Bras Farmacogn 2014;24:699-705.

Rowland M, Freeman T, Downey G, Hadi A, Saeed M. DEET mosquito repellent sold through social marketing provides personal protection against malaria in an area of all-night mosquito biting and partial coverage of insecticide-treated nets: a case-control study of effectiveness. Trop Med Int Health 2004;9:343-50.

Rozendaal JA. Vector control: Methods for use by individuals and communities. Geneva: WHO; 1997.

Rutledge LC, Gupia RK, Mehr ZA, Buescher MD, Reifenrath WG. Evaluation of controlled-release mosquito repellent formulation. J Am Mosq Control Assoc 1996;12:39-44.

Sakulku U, Nuchuchua O, Uawongyart N, Puttipipatkhachorn S, Soottitantawat A, Ruktanonchai U. Characterization and mosquito repellent activity of citronella oil nanoemulsion. Int J Pharm 2009;372:105-11.

Sanghong R, Junkum A, Choochote W, Chaithong U, Jitpakdi A, Riyong D, et al. Repellency screening of herbal products against the dengue fever vector, *Aedes aegypti* (Diptera: Culicidae). Chiang Mai Med J 2014;53:53-62.

Sanghong R, Junkum A, Chaithong U, Jitpakdi A, Riyong D, Tuetun B, et al. Remarkable repellency of *Ligusticum sinense* (Umbelliferae), a herbal alternative against laboratory populations of *Anopheles minimus* and *Aedes aegypti* (Diptera: Culicidae). Malar J 2015;14:1-9.

Sathantriphop S, Ketavan C, Prabaripai A, Visetson S, Bangs MJ, Akratanakul P, et al. Susceptibility and avoidance behavior by *Culex quinquefasciatus* Say to three classes of residual insecticides. J Vector Ecol 2006;31:266-74.

Scanlon JE. Bangkok haemorrhagic fever investigations: The 1962-63 mosquito collections. Bull WHO 1966;35:82-3.

Sharma VP, Ansari MA. Personal protection from mosquitoes (Diptera: Culicidae) by burning neem oil in kerosene. J Med Entomol 1994;31:95-102.

Sharma N, Bansal M, Visht S, Sharma PK, Kulkarni GT. Nanoemulsion: A new concept of delivery system. Chron Young Sci 2010;1:2-6.

Singh SP, Mittal PK. Mosquito repellent and oviposition deterrent activities of *Solanum nigrum* seed extract against malaria vector *Anopheles stephensi*. OIIRJ 2013;3:326-33.

Siriyasatien P, Tangthongchaiwiriya K, Jariyapan N, Kaewsaitiam S, Poovorawan Y, Thavara U. Analysis of salivary gland proteins of the mosquito *Armigeres subalbatus.* Southeast Asian J Trop Med Public Health 2005;36:64-7.

Smitinand T. Thai plant names (botanical names-vernacular names). Bangkok: Royal Forest Department; 1980.

Snow KR. Mosquitoes. Slough: Richmond Publishing; 1990.

Snyder JW, Poe RO, Stubbins JF, Garrettson LK. Acute manic psychosis following the dermal application of *N,N*-diethyl-*m*-toluamide (DEET) in an adult. Clin Toxicol 1986;24:429-39.

Sokolov YV. Nanoemulsion formation by low-energy methods: A review. News of pharmacy 2014;3:16-9.

Songkro S, Jenboonlap M, Boonprasertpon M, Maneenuan D, Bouking K, Kaewnopparat N. Effects of glucam P-20, vanillin, and fixolide on mosquito repellency of citronella oil lotions. J Med Entomol 2012;49:672-7.

Strickman D, Frances SP, Debboun M. Chapter 8: put on something natural. Prevention of bugs, bites, stings and disease. New York: Oxford University Press; 2009.

Sturm W, Peters K. Perfumes Ullmann's Encyclopedia of Industrial Chemistry. Weinheim: Wiley-VCH Verlag GmbH & Co; 2005.

Sukanya G, Mantry S, Anjum S. Review on nanoemulsions. IJIPSR 2013;1:192-205.

Sutthanont N, Choochote W, Tuetun B, Junkum A, Jitpakdi A, Chaithong U, et al. Chemical composition and larvicidal activity of edible plant-derived essential oils against the pyrethroid-susceptible and -resistant strains of *Aedes aegypti* (Diptera: Culicidae). J Vector Ecol 2010;35:106-15.

Suwansirisilp K, Visetson S, Prabaripai A, Tanasinchayakul S, Grieco JP, Bangs MJ, et al. Behavioral responses of *Aedes aegypti* and *Culex quinquefasciatus* (Diptera: Culicidae) to four essential oils in Thailand. J Pest Sci 2012;86:309-20.

Tanaka K, Mizusawa K, Saugstad ES. A revision of the adult and larval mosquitoes of Japan (including the Ryukyu Archipelago and the Ogasawara Islands) and Korea (Diptera: Culicidae). Contrib Amer Ent Inst 1979;16:1-987.

Tang Y, Zhu M, Yu S, Hua Y, Duan JA, Su S, et al. Identification and comparative quantification of bio-active phthalides in essential oils from si-wu-tang, fo-shou-san, radix angelica and rhizoma chuanxiong. Molecules 2010;15:341-51.

Tawatsin A, Wrattenn SD, Scott RR, Thavara U, Techadamrongsin Y. Repellency of volatile oils from plants against three mosquito vectors. J Vector Ecol 2001;26:76-82.

Tenenbein M. Severe toxic reactions and death following the ingestion of diethyltoluamide- containing insect repellents. JAMA 1987;258:1509-11.

Tennyson S, Ravindran KJ, Arivoli S. Screening of twenty five plant extracts for larvicidal activity against *Culex quinquefasciatus* Say (Diptera: Culicidae). Asian Pac J Trop Med 2012;2:s1130-4.

Terenius O, Marinotti O, Sieglaff D, James AA. Molecular genetic manipulation of vector mosquitoes. Cell Host Microbe 2008;4:417-23.

Thakur N, Garg G, Sharma PK, Kumar N. Nanoemulsions: A review on various pharmaceutical application. Global J Pharm 2012;6:222-5.

Thorsell W, Mikiver A, Malander I, Tunon H. Efficacy of plant extracts and oils as mosquito repellents. Phytomedicine 1998;4:311-23.

Tripathi AK, Upadhyay S, Bhuiyan M, Bhattacharya PR. A review on prospects of essential oils as biopesticides in insect-pest management. J Pharmacog Phytother 2009;1:52-63.

Trumble JT. Caveat emptor: safety considerations for natural products used in arthropod control. Am Entomol 2002;48:7-13.

Tsukamoto T, Ishikawa Y, Miyazawa M. Larvicidal and adulticidal activity of alkylphthalide derivatives from rhizome of *Cnidium officinale* against *Drosophila melanogaster*. J Agric Food Chem 2005;53:5549-53.

Tuetun B, Choochote W, Kanjanopothi D, Rattanachanpichai E, Chaithong U, Chaiwong P, et al. Repellent properties of celery, *Apium graveolens* L., compared with commercial repellents, against mosquitoes under laboratory and field conditions. Trop Med Int Health 2005;10:1190-8.

Tuetun B, Choochote W, Pongpaibul Y, Junkum A, Kanjanapothi D, Chaithong U, et al. Field evaluation of G10, a celery (*Apium graveolens*)-based topical repellent, against mosquitoes (Diptera: Culicidae) in Chiang Mai province, northern Thailand. Parasitol Res 2009;104:515-21.

Tuetun B, Choochote W, Rattanachanpichai E, Chaithong U, Jitpakdi A, Tippawangkosol P, et al. Mosquito repellency of the seeds of celery (*Apium graveolens* L.). Ann Trop Med Parasitol 2004;98:407-17.

Turek C, Stintzing FC. Stability of essential oils: A review. Article first published online [serial online] 2012 Jan [cited 2014 July 1]. Available from: URL: http://onlinelibrary.wiley.com/doi/10.1111/1541-4337.12006/pdf

Turek C, Stintzing FC. Stability of essential oils: a review. Compr Rev Food Sci F 2013;12:40-53.

Tyagi BK, Shahi AK, Kaul BL. Evaluation of repellent activities of *Cymbopogon* essential oils against mosquito vectors of malaria, filariasis and dengue fever in India. Phytomedicine 1998;5:324-9.

United States Environmental Protection Agency (USEPA). Dimethyl phthalate [serial online] 2000 [cited 2014 Dec 26]. Available from: URL: http://www.epa.gov/ttnatw01/hlthef/dimet-ph.html.

United States Environmental Protection Agency (USEPA). *N,N*-diethyl-m-toluamide. Office of Pesticides and Toxic Substances, 1980.

Venkatachalam MR, Jebanesan A. Repellent activity of *Ferronia elephantum* Corr. (Rutaceae) leaf extract against *Aedes aegypti* (L.). Bioresour Technol 2001;76:287-8.

von Mayenburg J, Rakoski J. Contact urticaria to diethyltoluamide. Contact Dermatitis 1983;9:171.

Wandscheer CB, Duque JE, da Silva MAN, Fukuyama Y, Wohlke JL, Adelmann J, et al. Larvicidal action of ethanolic extract from fruit endocarps of *Melia azedarach* and

Azdirachta indica against the dengue mosquito *Aedes aegypti*. Toxicon 2004;44:829-35.

Warikoo R, Ray A, Sandhu JK, Samal R, Wahab N, Kumar S. Larvicidal and irritant activities of hexane leaf extracts of *Citrus sinensis* against dengue vector *Aedes aegypti* L. Asian Pac J Trop Biomed 2012;2:152-5.

Webb C. Aussies vs mozzies: a user's guide to repellents [serial online] 2013 [cited 2014 Dec 26]. Available from: URL: http://theconversation.com/aussies-vs-mozzies-a-users-guide-to-repellents-10964

Wedge DE, Klun JA, Tabanca N, Demirci B, Ozek T, Baser KH, et al. Bioactivity-guided fractionation and GC/MS fingerprinting of *Angelica sinensis* and *Angelica archangelica* root components for antifungal and mosquito deterrent activity. J Agric Food Chem 2009;57:464-70.

Weinstein P, Laird M, Browne G. Exotic and endemic mosquitoes in New Zealand as potential arbovirus vectors. Wellington: Ministry of Health; 1997.

World Health Organization. Report of the WHO informal consultation on the evaluation and testing of insecticides. CTD/WHOPES/IC/96.1, Control of Tropical Diseases Division. Geneva: WHO; 1996.

World Health Organization. Expert committee on malaria. Technical report series 892. Geneva: WHO; 2000.

World Health Organization. Diethyl phthalate, Concise International Chemical Assessment Document 52 [serial online] 2003 [cited 2014 Dec 20]. Available from: URL: http://www.who.int/ipcs/publications/cicad/en/cicad52.pdf

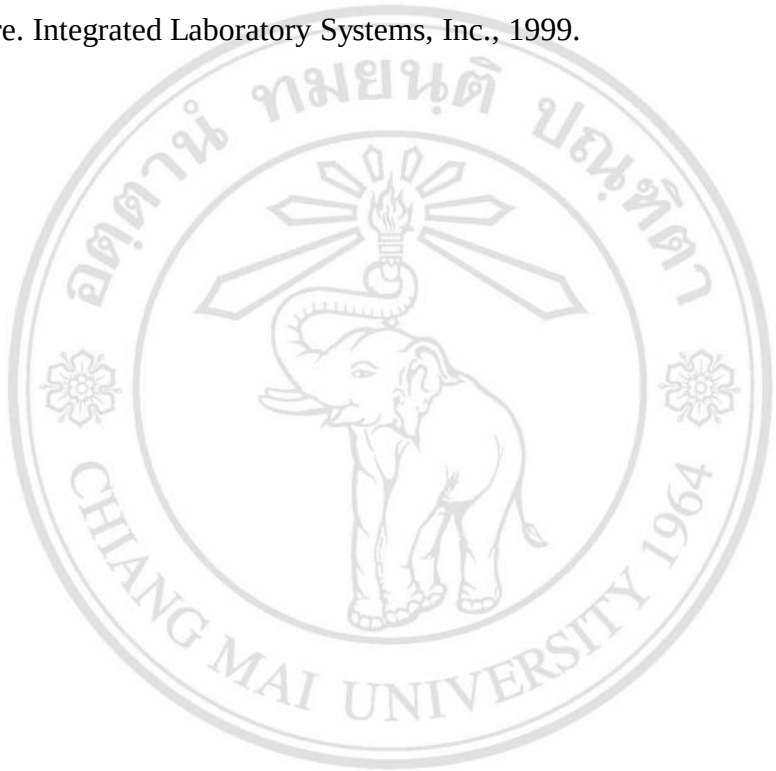
World Health Organization. Lymphatic filariasis. Fact sheet No.102. Geneva: WHO; 2012.

Wu JD, He SC, Huang XS, Shen WZ. Effects of *N*-methyl-*N*-*cis*-styryl-cinnamamide on Penicilin-induced epileptiform discharges in rats. J Sun Yat-Sen (Med Sci) 2010;31:213-20.

Wu YC, Hsieh CL. Pharmacological effects of Radix *Angelica sinensis* (Danggui) on cerebral infarction. Chin Med 2011;6:1-5.

Yap HH, Jahangir K, Chong AS, Adanan CR, Chong NL, Malik YA. Field efficacy of a new repellent, KBR 3023, against *Aedes albopictus* (Skuse) and *Culex quinquefasciatus* (Say) in a tropical environment. J Vector Ecol 1998;23:62-8.

Zeiger E. *N,N*-Diethyl-m-toluamide (DEET) [134-62-3] Review of Toxicological Literature. Integrated Laboratory Systems, Inc., 1999.



LIST OF PUBLICATIONS

1) **Champakaew D**, Junkum A, Chaithong U, Jitpakdi A, Riyong D, Sanghong R, Intirach J, Muangmoon R, Chansang A, Tuetun B, Pitasawat B. *Angelica sinensis* (Umbelliferae) with proven repellent properties against *Aedes aegypti*, the primary dengue fever vector in Thailand. Parasitol Res 2015;114(6):2187-98.

2) **Champakaew D**, Junkum A, Chaithong U, Jitpakdi A, Riyong D, Wannasan A, Intirach J, Muangmoon R, Chansang A, Tuetun B, Pitasawat B. Assessment of *Angelica sinensis* (Oliv.) Diels as a repellent for personal protection against mosquitoes under laboratory and field conditions in northern Thailand. Parasit *Vectors* 2016;373(9):1-14.