Abstract

Vector-borne diseases such as malaria, yellow fever and dengue are the major public health problems and obstacles to socio-economic development of developing countries particularly in tropics. Due to drug and insecticide resistance against these diseases, control of mosquito vector has become a major approach. Application of insect repellents to the skin is a common personal protection practice. Even though synthetic repellents such as DEET may be effective, toxic effects after application have been documented. Although repellents from plant origin are safe alternatives, mosquito repellent formulations available from the market today such as Kinga ® and Ballet ® are not effective. The purpose of this study was to investigate mosquito repellent activities of plant extracts from Sweet basil (Ocimum basilicum), Neem (Azadirachta indica), Lemon Eucalyptus (Eucalyptus citriodora) and Pyrethrum (Chrysanthemum cinerariefolium) and their synergistic effects. Ocimum basilicum, Azadirachta indica, Eucalyptus citriodora and Chrysanthemum cinerariefolium extracts were evaluated for mosquito repellency on rabbit skin as the host of Aedes aegypti. Starved females were used for the bioassays. Data collection was done by observational parameters based on frequency of mosquito landing and blood engorgement. Different concentrations of each of the test extracts and their combinations were tested. Synergised pyrethrum (Chrysanthemum cinerariefolium) was tested and found to possess a high repellent activity, followed by Eucalyptus citriodora oil, Ocimum basilicum oil and Azadirachta indica oil respectively. Chrysanthemum cinerariefolium, Ocimum basilicum and Eucalyptus citriodora were tested to provide complete protection at 1mg/ml. 3% and 2% respectively. However, Azadirachta indica did not provide complete protection in all tested concentrations with a maximum of 10% (p<0.05). Two mosquito repellent formulations, Kinga Mosquito Repelling Wax of Tibro Limited and Ballet Mosquito Repellent of Biop Company, made from plant essential oils were included in the study as positive test controls and Vaseline Pure Petroleum Jelly as a negative test control. The test of the two commercial formulations does not offer complete protection. The mean percentage repellency was 80.53 and 66.84 for Kinga and Ballet respectively. 0.01 mg/ml Chrysanthemum cinerariefolium, 2% Ocimum basilicum, 0.1 % Eucalyptus citriodora and 5% Azadirachta indica showed percentage repellency at 85.09, 91.45, 89.47 and 84.21 respectively. These values are higher than those of the two commercial formulations. There was a high statistical difference between all the test extracts and Vaseline Pure Petroleum Jelly (p<0.001). A formulation was developed by a combination of: Eucalyptus