Development of larvicidal nanoemulsions containing *Baccharis arctostaphyloides* Baker essential oil.

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Keywords: *Baccharis arctostaphyloides*, nanoemulsion, essential oil, larvicidal activity.

Natural products have been extensively used for different purposes, including development of pharmaceuticals, cosmetics, nutraceuticals and insecticides. Nanotechnology emerged as a promising area for development of innovative phytoproducts, including nanoemulsions. Essential oils are volatile oily natural products that can constitute internal phase of nanoemulsions with several advantages, including improved bioavailability, enhanced stability and availability of bioactive substances in water (1). The aim of the present study was to develop a nanoemulsion with this essential oil and evaluate its larvicidal activity against *Aedes aegypti.* Plant material was collected at Restinga de Jurubatiba National Park (Carapebus, RJ, Brazil) and identified by the botanist Dr. Marcelo Guerra Santos. Essential oil from the leaves was extracted by hydrodistillation using a Clevenger apparatus and analyzed by GC-MS and GC-FID. Hydrophilic-lipophilic balance (HLB) of the essential oil was determined by blending polysorbate 80 and sorbitan monooleate at different ratios. Low energy non-heating emulsification method was employed by adding water through organic phase (surfactants mixed with essential oil) under constant magnetic stirring. Nanoemulsions was stored under room temperature (20 ± 2 ºC) and evaluated after 1, 7 and 21 days of preparation. Droplet size and polydispersity of the nanoemulsions was determined by photon correlation spectroscopy. Results were expressed as the mean diameter. Larvicidal activity was evaluated according to WHO protocol (2). Twenty-one compounds were identified, being limonene, β-myrcene, bicyclogermacrene, β-caryophyllene and β-eudesmol considered the major constituents. Manoyl oxide, 13-*epi*-manoyl oxide and kaurene were first identified in the essential oil of the genus *Baccharis*. Nanoemulsions at HLB 15 presented the smallest mean droplet size and low polydispersity index. Most stable formulation occurs when HLB of the surfactant (s) coincides with HLB of the oil. Thus, required HLB of *B. arctostaphyloides* may be considered 15. Low variation at mean droplet size was observed for nanoemulsion at HLB 15 (Day 0 – 88.96 ± 0.210 nm; Day 21 – 83.90 ± 2.401 nm) suggesting stability of this system. DL50 (48 h) against *A. aegypti* was 118.94 ppm expressed as essential oil content. The present study allowed determination of HLB and development of a potential natural product-based nanoemulsion with larvicidal activity.

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Acknowledgements: FAPEAP, CNPq, CAPES.