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Clove oil nanoemulsion as an eco-friendly pesticide: effect of sonication time on droplet size

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Abstract:

It is very essential to introduce a new highly selective and biodegradable pesticide which is able to solve environmental issues such as long term toxicity of pesticide to mammal; that is an alternative solution for green (environmental friendly) formulations of pesticides. Clove oil possesses biological activities, such as antibacterial, antifungal, insecticidal and antioxidant properties. In this work, nanoemulsion of clove oil in water was formulated with different surfactants in continuous manner and dispersed phases through ultrasonic emulsification method. The effect of sonication time on droplet size was investigated while sonication time was varied in the range of 1 to 15 min. The clove oil droplet sizes were measured through dynamic light scattering (DLS) using a Zetasizer® Nano Series (Nano ZS model ZEN 3600, Malvern, UK). Experimental data demonstrated that increasing the sonication time up to 15 min caused the droplet size to decrease; the mean sizes of droplets were in the range of 32 to 145 nm.

Keywords: Nanoemulsion, Clove oil, Green nano pesticide