



Study of the repellent activity and encapsulation of *Lippia origanoides* HBK essential oil and fractions

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Lippia origanoides (Verbenaceae) is an aromatic shrub 1 to 3.5 m tall, endemic to Central and South America. It is popularly known as mountain oregano. Its essential oils (EO) are rich in three main components: thymol, carvacrol and γ -terpinene (1). The repellent activity of *L. origanoides* essential oil (obtained by steam distillation) and two fractions (LF and FF) obtained by fractional distillation at reduced pressure (BR-Instruments Equipment 800) was evaluated against *T. castaneum*, one of the main pests in grain storage. Since the effectiveness of essential oils as repellents decreases due to the high volatility of its components, they were encapsulated. In the encapsulation process used, individual particles or droplets of active material were loaded into a polymer melt (PEG-6000) and ground to produce capsules with sizes in the range of nanometers to millimeters. The area preference method was used to evaluate repellent activity (2). The kinetic release of the compounds in the microcapsules was studied (20 mL vial, with ca. 0.2 g of the encapsulated material at 70 °C), using a headspace autosampler Agilent Technologies 7694E, coupled to GC/FID, Hewlett Packard 5890 Series II, column DB-WAX polyethyleneglycol of 60 m X 0.25 mm, i.d X 0.25 μ m, df. The EO, light (LF) and bottom fractions (FF) of *L. origanoides* showed a repellency percentage higher than the control compound (IR3535) at 2 and 4 h of exposure. The highest repellency values were observed for fractions with intermediate contents (5-15 %) of γ -terpinene, thymol and caryophyllene. Concentrations above 0.002 mL/cm² of carvacrol decreased the percentage of repellency against *T. castaneum*, at 2 and 4 h of exposure. Encapsulation of *L. origanoides* EO in PEG-6000 presented a slower release of volatiles compared with light fractions (LF) and found fractions (FF). Percent encapsulation of *L. origanoides* essential oil in PEG-6000 was 60 %, with liberation of the components for up to 20 days at 40 °C.

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2. Tapondjou et al. J. Stored Prod. Res., 2005, **41**, 91-102.

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