Development of biological control formulations incorporating components of plant origin.

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Semiochemicals – informative molecules used in insect-insect or plant-insect interactions – have been considered within various integrated pest management IPM strategies. Herein, two sesquiterpenoids: *E*-*β*-farnesene and *E*-*β*-caryophyllene have been formulated for their potential properties as aphid enemies attractants. Indeed, *E*-*β*-farnesene, the alarm pheromone of many aphid species [1], has also been identified as a kairomone by attracting and inducing oviposition of aphid predators (*Episyrphus balteatus* De Geer (Diptera: Syrphidae)) [2-5] and by attracting aphid parasitoids (*Aphidius ervi* Haliday (Hymenoptera: Braconidae)) [6, 7]. *E*-*β*-caryophyllene was identified as a potential component of the aggregation pheromone of the Asian ladybird, *Harmonia axyridis* Pallas [8, 9]. The two products have been purified from essential oils of *Matricaria chamomilla* L. (*Asteraceae*) and *Nepeta cataria* L. (*Lamiaceae*) [10, 11]. Natural and biodegradable slow-release devices have been investigated in order to deliver these molecules. Moreover, due to their sensitivity to oxidation, the sesquiterpenes needed to be protected. For this purpose, alginate (hydrophilic matrix with low oxygen permeability) was used as polymer for the formulations: the main objective was to hold and deliver semiochemical substances in a controlled way. Consequently, a careful selection of alginates was realised for encapsulation. Formulated beads showed different structural and encapsulation properties depending on factors such as polymer concentration, ionic strength, type and concentration of cross-linker ion,... The gel structure influenced diffusion properties. Alginate formulations were characterized by texturometry and by confocal microscopy in order to observe the distribution of semiochemicals in alginate network. The last step consisted in studying release rate of semiochemicals in laboratory-controlled conditions by adapted trapping and Fast-GC procedures [10,11].

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