

## Biological control formulations incorporating essential oils' components

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E- $\beta$ -Farnesene, the alarm pheromone of many aphid species [1] and  $\beta$ -caryophyllene, recently identified as one of the possible component of the aggregation pheromones of the Asian ladybeetles *Harmonia axyridis* Pallas [2], are considered as two sesquiterpenes attractive for aphids' predators and parasitoids, *Episyrphus balteatus* De Geer [3,4] and *Aphidius ervi* Haliday [5], respectively.

In the present research, alginate gel beads formulations were optimised as semiochemical slow-release devices acting in biological control. The sesquiterpenes used in the formulations were purified by flash chromatography fractionation of essential oils of *Matricaria chamomilla* L. and *Nepeta cataria* L., for obtaining E- $\beta$ -farnesene and  $\beta$ -caryophyllene respectively. The purities of the fractions were determined by means of a fast gas chromatograph with a method optimised for a good resolution of terpenes [6] in less than five minutes.

The formulations were evaluated in terms of volatile release capacity, protection efficiency of sesquiterpenes against oxidation, and biological activity towards *Episyrphus balteatus* and *Aphidius ervi*.

The experiments lead to the conclusion that the semiochemical formulations are efficient as biological control devices considering the results obtained with biological tests led on predators and parasitoids. Moreover, the sesquiterpenes are more protected when formulated in alginate beads. The devices allow also a slow-release of semiochemicals during at least 40 days depending on physico-chemical parameters (temperature, relative humidity).

### References

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