



Comparative toxicities of a wild Plant essential oil and blends of its major constituents on mortality and fecundity of spider mites (Acari: Tetranychidae)

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The phytophagous two-spotted spider mite *Tetranychus urticae* Koch is a ubiquitous species, present worldwide on a large variety of plant families [1]. Since *T. urticae* resistance to acaricides spread rapidly, biological control tactics are crucial to manage spider mite populations [2]. In this respect, plant-derived essential oil products are a good alternative as they are, in general, considered as minimum-risk pesticides [3]. In that context, laboratory experiments were conducted to assess the toxicity of essential oil of *Pteranthus dichotomus* a wild-growing plant of Tunisia on females and eggs of the two spotted spider mite *T. urticae* (Koch).

Essential oil was distilled from Fresh leaves from *P. dichotomus* and was sprayed on groups of adult females. The susceptibility of these females to *P. dichotomus* essential oil was tested. A series of dilutions were used to bracket the dose-response range. Tests proved that female mortality increased with essential oil concentration with DL₅₀ value of 75µl/l. The percentage of egg-laying inhibition is prominent with doses of 5, 10 and 20µl/l compared to control, while at the same concentrations no mortality was observed.

The analysis of *P. dichotomus* essential using GC-MS revealed presence of 10 major constituents: alpha-thujene, alpha-pinene, sabinene, Myrcene, 3-carene, ocimene, terpinene-4-ol, pulegone, eugenol and β-eudesmol. For a comprehensive evaluation of the potential of *P. dichotomus* essential oil as acaricidal, individual and blends activity of these constituents were tested against *T. urticae* female. Toxicity of blends of different components indicated significant differences among the active and inactive components, with the presence of all constituents necessary to have toxicity near to that of whole *P. dichotomus* oil. The results showed that natural oil of *P. dichotomus* and some of its constituents have potential for development as botanical acaricide, at least against *T. urticae*.

References

- [1] Van de Vrie, M.; McMurtry, J.A.; Huffaker, C.B., *Biology, ecology, and pest status, and host-plant relations of tetranychids*, 1972, 41, 343-432.
- [2] Gerson, U.; Weintraub, P.G., *Pest Management Science*, 2007, 63, 658-676.
- [3] Miresmailli, S.; Isman, M.B., *Journal of economic entomology*, 2006, 99, 2015-2023.