10th Brazilian Conference on Natural Products
XXXVI RESEM
4-7 November 2025, Belo Horizonte, MG, Brazil
Section: 05

EUGENIA UNIFLORA ESSENTIAL OIL: ONTOGENETIC CHEMICAL VARIATIONS, RESPONSES TO ELICITORS, AND ACARICIDAL ACTIVITY AGAINST TETRANYCHUS URTICAE

Mirian Luzinete da Silva[1*], Daiane Maria Barbosa dos Santos[1], Rodolfo Rodrigues da Silva[1], Marcilio Martins de Moraes[1], Claudio Augusto Gomes da Camara[1].

myrianmelo765@gmail.com

1-DQ, Departamento de Química, Universidade Federal Rural de Pernambuco, Rua Dom Manuel de Medeiros, s/n - Dois Irmãos, Recife, Pernambuco, (81) 3320-6001, 52171-900. Brazil.

The genus *Eugenia* L. comprises approximately 600 species, of which 240 occur in the Brazilian Atlantic Forest, with 202 being endemic. Among them, *Eugenia uniflora* L. (pitangueira) stands out for its high production of essential oils (EOs), recognized for their insecticidal and acaricidal activities. However, most studies focus on adult plants, although chemical variations have already been associated with developmental stages and responses to biotic and abiotic stresses. In this context, the aim of this study was to analyze variations in chemical composition and acaricidal activity of *E. uniflora* EOs at different ontogenetic stages and under stress induced by elicitors, with emphasis on their effects against the mite *Tetranychus urticae*, a major agricultural pest of economic relevance, targeting the mite *Tetranychus urticae*, an agricultural pest of economic importance. The seeds of *E. uniflora* were cultivated in 5 L pots under greenhouse conditions, and leaves were collected at 2, 17, and 24 months of age, as well as from adult plants. Additionally, different pots containing 17-month-old plants were treated with methyl jasmonate (MJ), methyl salicylate (MS), and nerolidol (NE). Essential oils were obtained by hydrodistillation and analyzed by GC-MS. Acaricidal activity was evaluated through toxicity bioassays against *T. urticae*, using the lethal concentration (LC_{90}) of the commercial acaricide Azamax® as reference. The highest oil yield was observed in adult plants (0.66%). Ontogenetic analysis revealed significant differences in chemical composition ($p < 0.05$), with curzerene being the major compound predominant in all phases, especially in adult plants (40.63%), while the compound atractylone presented the highest percentage in seedlings (16.03%). In elicitor-treated groups, an increase in eudesma-5,11(13)-dien-8,12-olide was observed in NE (18.48%) and MJ (22.33%) treatments, whereas MS treatment enhanced germacrone production (15.34%). Differences in the chemical composition of EOs were confirmed by multivariate analyses (Heatmap and PCA). Bioassays demonstrated that the oils exhibited high toxicity against *T. urticae*, with the strongest effect in 2-month-old plants (89.0%), followed by 17-month-old plants (86.5%) and adults (76.11%). In conclusion, the chemical composition and acaricidal potential of *E. uniflora* essential oils vary according to developmental stage and elicitor-induced stress, highlighting the potential of this species as a source of bioactive molecules for agricultural applications.

Keywords: *Myrtaceae, Chemical variation, GC-MS analysis, Botanical acaricide, chemometrics, PCA.*