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An environmentally friendly procedure to quantify and localize cedrelone in *Spodoptera frugiperda* after feeding with this limonoid

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Our group investigated the effectiveness and safety of plant extracts as potential natural pesticides for use as possible alternatives for synthetic pesticides that are intensively applied in many plantations in Brazil. In bioassays with ethanol extracts from more than 50 plants, *Toona ciliata* (Meliaceae) was the most toxic against *Spodoptera frugiperda* in the lab. Chemical analysis revealed the presence of the active ingredient cedrelone in the stems. It was isolated and assayed against *S. frugiperda* and evaluated the cumulative mortality via the incorporation of this compound into the artificial diet. The activities were comparable to that of the synthetic insecticides. However, its primary modes of action remained unclear. It has been hypothesized that it may inhibit acetylcholinesterase enzyme activity. Cedrelone was observed to cause strong inhibition of the acetylcholinesterase enzyme from *S. frugiperda*. The purpose of this work was also to apply the mass and nuclear magnetic resonance spectroscopy, a green analytical method which require small amount of solvent, for determination of cedrelone in hemolymph, midgut, head and faeces from *S. frugiperda*. Cedrelone was detected in the head, intestine and in the excreted faeces. MS spectra showed the presence of intact cedrelone and indicated change in its structure. Quantitative analysis via MS/MS indicated that more than 50% of cedrelone was metabolized. From this study, we concluded that the acetylcholinesterase inhibition is likely the primary mode of action for insecticidal activity by cedrelone.

Biography

M Fatima G F Silva is a Full Professor of Chemistry at the Federal University of São Carlos. She was a Post-doctoral Fellow at the University of Strathclyde, Glasgow, under the guidance of Professor Peter G Waterman. The central theme of her research is isolation and structure elucidation of plant secondary metabolites and the application of findings on numerous biological screening and in ecological and phylogenic studies. Her research has generally been centered on the Rainforest of Brazil with particular reference to Sapindales plant families.

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