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Tropical Biodiversity Sights Through Mass Spectrometric Glasses

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Results from studies of floral emissions of more than 40 different tropical flowers will be presented. These emanations were monitored according to the time of day and part of the flower (petals, pistils, etc.), detecting more than 200 different volatile compounds, mainly, attractants of pollinating insects or those insects that are natural enemies of predators. Flowers attract pollinators through their exotic forms and multiple and vivid colours. The study of colours of tropical flowers is related to extraction with solvents (methanol, ethanol, water) or by matrix solid-phase dispersion (MSPD), of anthocyanins, flavonoids or other phenolic compounds. Liquid chromatography coupled to mass spectrometry (LC-MS) was used to analyse these complex mixtures. Examples of more than 20 tropical flowers of distinct colours, whose hydro-alcoholic extracts were analysed by LC-MS with electrospray interface, using different high-resolution mass analysers (HR-TOF, Orbitrap), will be presented.

Alkaloids also play a key role in the development and defence of plants; their diversity and abundance in tropical plants is very high. Plants of the genus *Crotalaria* spp. synthesize pyrrolizidine alkaloids (PA) and their N-oxides, compounds very toxic to humans and animals, which are produced in plants to reduce the attack of herbivores. However, some predators such as the caterpillar *Utetheisa ornatrix* (**Figure 1**), which consumes these leaves, absorbs PA for its own benefit; to synthesize pheromones and prevent the attack of its own predators, for example, birds, to which the pyrrolizidine alkaloids are poisonous. In the presentation, a study of the distribution of alkaloids in different organs (root, stem, leaves, flowers, seed) of six *Crotalaria* species using solvent extraction and MSPD methods and the LC-ESI (+)-Orbitrap-MS technique as a tool for identification will be presented. It was interesting to observe the accumulation of alkaloids in the caterpillar and their biotransformation into different nitrogenous compounds, useful for the caterpillar survival and as the raw material for the synthesis of pheromones (**Figure 1**).

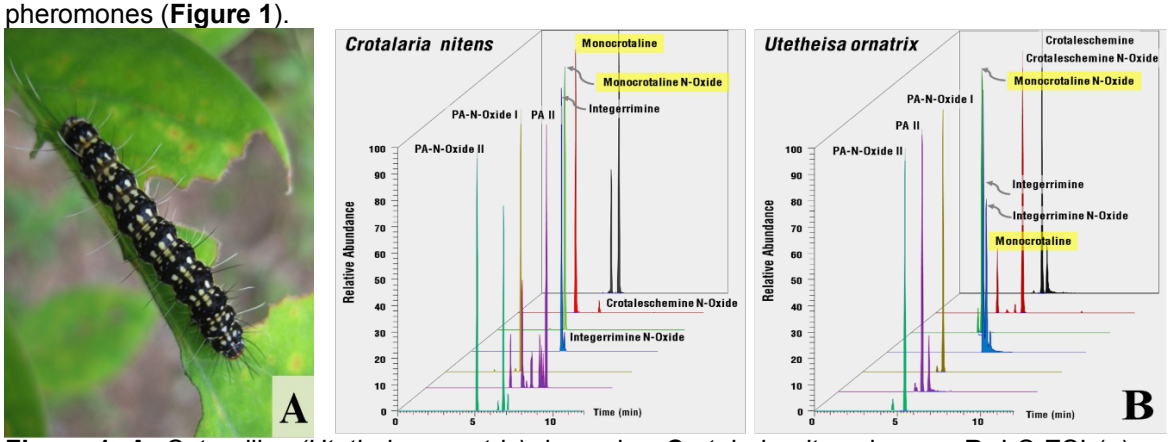

Figure 1. **A.** Caterpillar *(Utetheisa ornatrix)* devouring *Crotalaria nitens* leaves. **B.** LC-ESI (+)-Orbitrap-MS chromatographic profiles (EIC, MH^+) of pyrrolizidine alkaloids and their N-oxides isolated by MSPD from *C. nitens* leaves and from caterpillar who has consumed *C. nitens*.

The study of tropane alkaloids found in leaves and flowers of tropical plants and *harmala* alkaloids, present in *Banisteriopsis caapi* (Ayahuasca) used by the indigenous tribes of Amazonia and Orinoquia in magic-religious ceremonies, was carried out by LC-ESI (+) -MS (HR-TOF-MS or Orbitrap), with the determination of ion exact masses and fragmentation patterns, as a function of capillary or fragmentor voltages or of the energy in the collisionally-activated dissociation chamber.