Study of volatile secondary metabolites from Colombian aromatic plants and flowers

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Colombia´s large biodiversity is accompanied by the immense chemical variety of plant metabolites, which can be revealed by chromatographic analysis of essential oils and flower scents. CENIVAM carries out a bioprospection study of aromatic plants found in Colombia, aimed at characterizing their volatile secondary metabolites and exploring their potential sustainable uses. The selection of promising aromatic plants, among more than 800 accessions obtained from botanical collection trips to various places in Colombia, has resulted in pilot experimental plantations that are already providing essential oils used as ingredients of cosmetic products. Volatile organic compound mixtures were isolated from plant aerial parts by hydrodistillation, microwave-assisted hydrodistillation, steam distillation, and simultaneous distillation-extraction. Flower fragrance was sampled *in vivo* and *in vitro* by solid-phase microextraction at various times of day. Analyses performed by chromatographic and mass spectrometric techniques permitted the identification and quantification of typically, over 90% of the constituents of essential oils and flower fragrances. Several chemotypes, characterized by very different essential oil compositions, were found for some species. Plant material of *Lippia alba* and *L. origanoides* from different Colombian regions were found to correspond to three and four different chemotypes, respectively. A few essential oils were notorious because their composition was dominated by a single metabolite with relative abundance above 40%. Estragole (99%) is accompanied by traces of a few other metabolites in the *Tagetes lucida* essential oil. The *L. origanoides* (thymol chemotype) oil had the highest amount of thymol (>50%) among the oils studied. The most abundant components of Colombian *Turnera diffusa* oil were dehydrofuquinone (52.3%) and drima-7,9-diene (4.4%). More than 300 compounds were identified in flower volatile fractions. Although the studied flower fragrances contained several common compounds (linalool, terpineol, ocimene isomers, benzyl benzoate, benzyl alcohol, benzaldehyde, farnesene, indole), the volatile fractions from each species had their own distinctive pattern, which in some cases changed during the day, before or after pollination. Isothiocyanates were distinctive substances in *Moringa oleifera* flowers, bovolide was present in coca flowers only in the morning; methyl salicylate appeared in passion fruit flowers only after their pollination. Knowing the chemical composition is a requisite to understanding the processes that take place during blossoming.

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