

Flora of the Guianas (FOG) Meeting and Seminars - “The importance of the Herbarium in Plant Sciences”

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How can plant defenses lead to valuable products? Inspiration from plant complexity in phytochemistry

Plants have been known for centuries to be a valuable source of molecules, yet complexity remains, and can open up numerous perspectives. Plants have indeed evolved a wide range of secondary metabolites as defense, competition or attraction compounds (1). Moreover, the exceptional biodiversity encountered in the tropics, along with the presence of various pathogens and a strong herbivory especially linked to a rich entomofauna, leads to a promising chemodiversity, due to the constant and dynamic interactions between plants and

their environment (2). Taking into account the role and “raison d’être” (3) of natural products, and the fact that all these molecules work together, as complex mixtures, can therefore lead to a new point of view. In particular, we will discuss the role of volatile organic compounds (VOCs) emitted by trees from French Guiana (4,5) and illustrate that, inspired by their ecological functions, and taking into account synergistic interactions, some therapeutic applications can be found for these versatile mixtures of compounds (7,8). Likewise, if shifting from the “magic bullet” classical approach to “herbal shotgun” studies is widely discussed in phytomedicine, applying this concept in the field of vector control could lead to valuable solutions in the context of resistance development (9). To conclude, we will show through the example of *Sextonia rubra* (Mez) Van der Werff (Lauraceae) that bioinspiration can lead to chemically surprising valuable molecules (10,11) but also to new questions on tree growth and development.

(1) *Current Opinion in Plant Biology* **2002**, 5, 237. (2) *Evolution* **1964**, 18, 586. (3) *Science* **1959**, 129, 1466. (4) *Journal of Chemical Ecology* **2009**, 35, 1349. (5) *Phytochemistry* **2012**, 82, 81. (6) *Journal of Applied Microbiology* **2014**, 116, 288. (7) *Memórias do Instituto Oswaldo Cruz* **2015**, 110, 1063. (8) *Phytomedicine* **2013**, 21, 1. (9) *PLOS ONE* **2013**, 8, e82103. (10) *Journal of Natural Products* **2010**, 73, 1706. (11) *Pest Management Science* **2011**, 67, 1420.

