Sociedade Brasileira de Química (SBQ) Phytochemical study and standardization of Copaifera Oil

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introduction

The oleoresin obtained by tapping the trunk of trees of the Copaifera (Leguminosae Caesalpinoideae) genus is widely used in Brazilian popular medicine, under the name "óleo de copaíba", mainly as a healing, antiseptic and antiinflammatory agent.^{1,2,3} It is composed mainly of and diterpenoics acids. sesquiterpenes The bactericidal, anti-helminthic, analgesic, antiinflammatory, gastro-protective, antitumor and trypanocidal activities have been recorded.^{3,4} A variety of substances have been identified, nevertheless little is known of the structure-activity relationship of the components.

The objectives of the Project are the chemical composition and standardization analysis of oils, fractions and isolated compounds of *Copaifera* of different species, associated to biological, pharmacological and toxicological properties

Results and Discussion

In the present communication the chemical composition of the oleoresins from *Copaifera spp* and *C. multijuga from* different regions were qualitatively and quantitatively characterized by GC-MS and GC-MS/HS-SPME. In addition, was evaluated some standardization and/or adulteration technique and separation method of the acid fraction.

The chromatographic profiles (TLC and GC-MS) of the sesquiterpenes hydrocarbon fraction, and preliminary analysis by FTIR/HATR associated to PCA method (Principal Components Analysis) were useful to detect adulteration and to separate oils in groups. Among the samples studied it was not found any adulterations with vegetable oils, diesel or ethanol, the most common contaminants in commercial oils.

Recently,⁵ we showed significant activity of *several* copaiba oil samples against *B. subtilis* and *S. aureus*. Some of them with biological activity superior to cloranphenicol. The study of the chemical composition at the present time showed that the oils are rich in diterpenoics acids (particularly, diterpenes-copalic and kaurenic acid). Preliminary analysis on separation processes of sesquiterpenes and diterpenes acids showed that hydrodestillation (**Fig. 1**) is the more appropriate 29^a Reunião Anual da Sociedade Brasileira de Química

method since economic, simplifies many of the sample handling problems, with few or no structural modification and can increase the biological action of the sesquiterpenic or diterpenoic fraction.

The GC-MS analysis showed that oleoresin presented as main sesquiterpenes transcaryophylene, α -copaene and bisabolene, while among diterpenes were found: copalic acid, kaurenoic acid, agatic acid, 3α -acethoxycopalic and hardiwickic acid. There was significant differences in chemical composition between inter and intra species and also among commercial samples. This fact indicates that relationship of the chemical composition with the biological activity of authentic samples of Copaifera oleoresins is essential to permit its validation as a safe and effective phytomedicine with adequate quality control, as suggested by other authors.3,4



Fig. 1. Main components detected in the sesquiterpenoid fraction of oil sample (Copaifera spp, Vale do Anari - Ro), obtained by hydrodestillation (6 hours): $1 = \alpha$ -copaene, $2 = \beta$ -caryophylene, $3 = \beta$ -bisabolene and $5 = \delta$ -cadinene.

Conclusions

Although the proportions are significantly different the **GC-MS/HS-SPME** analysis indicated that main sesquiterpenes are α -copaene, β -caryophylene, bergamotene, β -bisabolene and δ -cadinene in the sesquiterpenic fraction. TLC and GC-MS/HS-SPME comparative analysis revealed surprisingly similar result to twelve samples of *Copaifera spp* oil.

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