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ESSENTIAL OILS CONSTITUENTS AND ANTIMICROBIAL ACTIVITY FROM HIGH ALTITUDE BRAZILIAN SPECIES: Baccharis parvidentata, Hyptis monticola AND Lippia origanoides


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Introduction
Essential oils have been used in aromatherapy, pharmacy, perfumery, cosmetics, as well as food preservatives among other industrial uses (Lubbe & Verpoorte, 2011). Brazil is reputed by its floristic diversity, hence its flora should be considered as an important reservoir of active molecules with potential industrial applications (Valli et al., 2012). Herein, three wild species have been investigated: Baccharis parvidentata Malag (Asteraceae). Hyptis monticola Mart. ex Benth (Lamiaceae) and Lippia origanoides Kunth. (Verbenaceae).

Method
B. parvidentata (W: 43º 01.681’; S: 22º 27.594’; altitude: 2100m) was collected around Pedra dos Sinos, Teresópolis. H. monticola (W: 44º 41.166’; S: 22º 02.196’; 1229m) and L. origanoides (W: 43º 17.443’; S: 22º 25.341’; 1.239m) were harvested on the climb of Morro do Cuca, Vale das Videiras, Petrópolis. All species were collected in Rio de Janeiro, Brazil in October 2013.

200 g of fresh aerial parts of B. parvidentata and L. origanoides, and fresh leaves of H. monticola were submitted to hydrodistillation in a Clevenger-type apparatus for 3h (n=3). The oils were analyzed in an Agilent GC-FID and GC-MS gas chromatograph equipped with a HP5-MS (5%–phenylmethylsilicone, 30 m x 0.25 mm x 0.25 μm) fused silica capillary column (n=3). The GC settings were as follows: the initial oven temperature was 60°C, the raised to 240°C at 3°C/min and hold for 10 min. Hydrogen was used as carrier gas at a flow rate of 1 mL/min. The injector was maintained at 250°C and detector (FID) was kept at 280°C. Quantification was performed by the normalization method from the electronic integration of the FID peak areas. Constituents were identified by comparison of both mass spectra and GC retention indices with those from NIST and Wiley libraries, as well as literature data (Adams, 2009). Antibacterial and antifungal activities for B. parvidentata and L. origanoides were assayed by broth micro dilution method according to procedures of the Clinical Laboratory Standard Institute against Escherichia coli ATCC 11229, Staphylococcus aureus (MRSA BMB 9393), Candida albicans Serotype B ATCC 10231, Cryptococcus neoformans Serotype A, Aspergillus niger ATCC 16404, Fonsecaea pedrosoi SVPL, Trychophyton rubrum T544. Results were obtained in triplicate and expressed as minimum inhibitory concentration (MIC).

Results / Discussion / Conclusion
Essential oil yields were 0.50 % for B. parvidentata, 0.05% for H. monticola and 0.56 % for L. origanoides. The most noteworthy compounds from B. parvidentata were sabi nose (15.2%), himachalol (10.3%), β-pinene (9.2%) and δ-3-carene (5.7%). H. monticola was characterized predominantly by trans-caryophyllene (11.3%), trans-methyl-cinnamate (7.8%), germacrene-D (6.9%), limonene (6.6%), α-murolene (6.4%) and β-pinene (5.6%) whereas the most prevalent components for L. origanoides were trans-methyl cinnamate (40.0%), hedycaryol (8.0%), α-eudesmol (8.0%) and β-
eudesmol (7.0%). To the best of our knowledge, this is the first report about chemical composition of B. parvidentata and H. montila. C. neoformans yeast was the most sensitive strain against essential oil from L. origanoides with MIC of 78μg/mL whereas T. rubrum were the most sensitive filamentous fungus against essential oil from B. parvidentata with MIC of 156μg/mL.

Bibliographic References