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CHEMICAL COMPOSITION AND BIOACTIVITY OF PSIDIUM RUFUM ESSENTIAL OIL: CYTOTOXIC AND LEISHMANICIDAL EVALUATION

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The essential oil (EO) from the leaves of Psidium rufum (Myrtaceae) was obtained by hydrodistillation using a Clevenger apparatus, with a modest yield of 0.5% (w/w). GC-MS and GC-FID analyses allowed the identification of 41 compounds, representing 98.6% of the total composition. The chemical profile was dominated by oxygenated sesquiterpenes (46.8%) and sesquiterpene hydrocarbons (29.5%), followed by oxygenated monoterpenes (12.5%) and monoterpene hydrocarbons (5.6%). The major constituents were 1,8-cineole (12.5%), spathulenol (10.3%), α-longipinene (9.8%), β-caryophyllene (7.5%), globulol (6.1%), and γ terpinene (4.2%). This prevalence of oxygenated terpenes is consistent with reported antimicrobial and cytotoxic properties in other Myrtaceae species. Cytotoxicity was assessed against human tumor cell lines (HeLa, MCF-7, and U-251MG) and non-tumor fibroblasts (GM07492A). The EO displayed IC_{50} values of 21.9 ± 0.3 µg/mL for HeLa, 25.7 ± 0.4 µg/mL for MCF-7, and >100 µg/mL for U-251MG. For non-tumor fibroblasts, the IC_{50} was also >100 µg/mL, resulting in selectivity indices of 3.86 (HeLa) and 3.04 (MCF-7), confirming selective cytotoxicity toward tumor cells while maintaining relative safety to normal cells. Leishmanicidal activity was evaluated against promastigotes of Leishmania amazonensis. At 24 h, the EO promoted moderate inhibition, with a maximum value of 50.18% ± 1.49 at 50 µg/mL and an IC_{50} of 38.05 µg/mL. However, at 48 h the activity decreased, reaching 28.71% ± 1.87 at the same concentration, with IC_{50} values above 50 µg/mL. This reduction suggests a time-dependent decline, possibly associated with compound instability or parasite adaptation under prolonged exposure. In conclusion, this is one of the first reports on the biological activities of P. rufum essential oil, which combines a chemically rich composition dominated by oxygenated sesquiterpenes with selective cytotoxicity and moderate leishmanicidal effects. These findings highlight P. rufum EO as a promising natural source of bioactive molecules.

Keywords: *Psidium rufum, essential oil, chemical composition, cytotoxicity, leishmanicidal activity*