

Volatile constituents of *Pinus roxburghii* from Nepal

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ABSTRACT

Background *Pinus roxburghii* Sarg. Is one of 3 species of pine found in Nepal, the oil of which is traditionally used to treat cuts, wounds, boils, and blisters. **Objective** To obtain, analyze, and examine the anti-microbial and cytotoxic activities of the essential oils of *P. roxburghii*. **Materials and Methods** Three plant parts (cone, needle, and bark) of *Pinus roxburghii* were collected in Biratnagar, Nepal. The essential oils were obtained by hydrodistillation, and the chemical compositions were determined by GC-MS. The needle and cone essential oils were screened for anti-microbial activity against *Bacillus cereus*, *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Escherichia coli*, and *Aspergillus niger*; brine shrimp (*Artemia salina*) lethality; and in-vitro cytotoxicity against MCF-7 cells. **Results** GC-MS analysis for the cone oil revealed 81 compounds with 78 components being identified (95.5% of the oil) while 98.3% of needle oil was identified to contain 68 components and 98.6% of the bark oil (38 components) was identified. The 3 essential oils were dominated by sesquiterpenes, particularly (E)-caryophyllene (26.8%-34.5%) and α -humulene (5.0%-7.3%) as well as monoterpene alcohols terpinen-4-ol (4.1%-30.1%) and α -terpineol (2.8%-5.0%). The monoterpene γ -3-carene was present only in needle and cone essential oils (2.3% and 6.8%, respectively). Bio-activity assays of the cone essential oil of *P. roxburghii* showed remarkable cytotoxic activity (100% killing of MCF-7 cells at 100 μ g/ mL) along with notable brine shrimp lethality (LC₅₀=11.8 μ g/mL). The cone essential oil did not show anti-bacterial activity, but it did exhibit anti-fungal activity against *Aspergillus niger* (MIC=39 μ g/mL). **Conclusion** The bioactivity of *P. roxburghii* essential oil is consistent with its traditional medicinal use.

KEYWORDS

Anti-fungal . brine shrimp lethality, cytotoxicity . essential oil composition . α -humulene

REFERENCES