

Área: ORG

CHEMICAL DIVERSITY AND PROPERTIES OF ESSENTIAL OILS EXTRACTED FROM LEAVES OF DIFFERENT SPECIES OF *Eucalyptus*

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Highlights

Oil from the same *Eucalyptus* species can have completely different chemical compositions. The yield of *Eucalyptus* leaf oil can vary from 0.78% to 3.58%, a crucial factor for the industry.

Abstract

Essential oils are complex mixtures of volatile secondary metabolites, widely used in the pharmaceutical, food, and cosmetics industries. Some aromatic plants can extract their essential oils from different parts (leaves, flowers, roots, and seeds), but *Eucalyptus* species produce their oils primarily in their leaves, where they are stored in secretory glands. The usefulness and commercial value of these Essential oils are related to their chemical composition and extraction yield, which can vary significantly, particularly among different *Eucalyptus* species. Studies show that the Essential oil extraction yield was 0.78% for *Eucalyptus robusta* leaves and up to 3.58% for a clone of *Eucalyptus camaldulensis*. Genetics can also be a crucial factor, as clearly observed in the hybrid *Eucalyptus urograndis* (*Eucalyptus urophylla* x *Eucalyptus grandis*), whose clones showed Essential oil yields ranging from 0.81% to 2.43%. Other studies using the same hybrid report yields of 0.74% and 1.12%. Although they are of the same species, the clones are not genetically identical; that is, clone 07 and clone 58 are not genetically identical, and this can be observed in the essential oil extraction yield results. These variations may indicate that the species may have different industrial applications. The chemical composition, a factor that determines the oil's application, is also influenced by the environmental conditions in which the plant is grown. In addition to these factors, another factor, already proven to influence the yield and chemical composition of essential oils, is the plant's stage of development (young, adult, or senescent—planting age). Studies on *Eucalyptus urograndis* leaves revealed very heterogeneous data. Depending on the study, the major compound identified in the chemical composition of its leaf oil was 1,8-cineole (eucalyptol) (86.93%), ortho-cymene (41.4%), citronellal (81.13%), or α -pinene (22.72%). These data corroborate the fact that location, harvest time, genetics, and other factors directly influence the chemical profile of Essential oils. This chemical diversity of Essential oils obtained from different *Eucalyptus* species indicates that the preferred use of each can be directed to a specific industry, given their biological activities, including fungicidal and antimicrobial action, differ. Thus, there is a need for more specific studies of Essential oils and their properties specific to *Eucalyptus*, especially for hybrid species, considering the different species.

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