

Phytochemical Profiling and Biological Evaluation of *Hedychium coronarium* Essential Oil from the Konkan Province

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Abstract: *Hedychium coronarium*, a unique species from the Zingiberaceae family, is native to the Western Ghats of India. Although the essential oil of this plant has been studied in northern and southern India, extensive research has yet to explore its isolation and bioefficacy from the Konkan region. This study fills that gap by isolating the rhizome essential oil using steam distillation (SDREO) and analyzing its composition with GC/FID and GC/HRMS techniques. The results revealed that monoterpenoids dominate the oil, making up 41.07% of its chemical profile. The SDREO exhibited strong antibacterial activity against *E. coli* and *P. aeruginosa*, along with moderate antifungal effects against *Candida albicans*. Furthermore, the oil displayed impressive antioxidant activity in the DPPH assay, with gallic acid as a standard, and showed significant anti-inflammatory effects through the membrane stabilization method. These findings highlight the role of geographical factors and isolation methods employed in shaping the essential oil's composition, with notable differences observed compared to other reports from different regions.

Keywords: Essential oil, *Hedychium coronarium* species., Steam distilled Rhizome Essential Oil (SDREO), Konkan region

