Diterpenoids from Alepidea amatymbica Eckl & Zeyh: Cytotoxicity, Antibiotic, and Lipoxygenase Inhibitory Activities

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Alepidea amatymbica, a herbaceous plant with a broad ethnomedicinal application among the native of Eastern and Southern Africa. The isolation of diterpenoids from A. amatymbica and evaluating their biological activities based on the ethnomedicinal information, was the primary focus of this investigation. Five bioassay guided isolated compounds: ent-13-hydroxy-16-kauren-19-oic acid (1), 16-hydroxy-kaur-6-en-19-oic acid (2), 14- acetoxy ent- kaur-16-en-19-oic acid (3), 14-oxokaur-16-en-19-oic acid (4), and 14-acetoxo-12-oxokaur-16-en-19-oic acid (5) were screened in vitro for their anti-inflammatory, cytotoxicity, and antimicrobial. The compounds were purify using open column chromatography, PTLC, and characterised with FTIR, NMR, and HRMS EI. The diterpenoids did not show cytotoxicity on the normal cell but showed a significant effect of cancer cell lines. 14-acetoxo-12-oxokaur-16-en-19-oic acid showed a high inhibitory effect on lipoxygenase with an EC50 of 19.10 ± 3.15 µg/ml compared to standard indomethacin with EC50 of 17.22 ± 5.48 µg/ml. Among the diterpenes tested, only 14-oxokaur-16-en-19-oic acid and 14-acetoxo-12-oxokaur-16-en-19-oic acid showed significant antibiotic activities against bacteria (MIC 125 µg/ml). Consequently, the antibiotic activity is structurally linked to the positions of acetate and oxo groups at C-14 and C-12 which enhances the activity of the diterpenoids. In vitro, biological activities result illustrated that the compounds can be a source of treatment and management for inflammation-related diseases with no cytotoxic effect. Therefore, justifying its traditional applications.

Keywords: A Amatymbica.; diterpenoids; bioautographic assay; cytotoxicity; lipoxygenase.

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