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in vitro AND in silico ANTI-INFLAMMATORY POTENTIAL OF A COUMAROYL OLEANOLIC ACID DERIVATIVE FROM Miconia albicans: VIA NF-KB PATHWAY MODULATION

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Miconia albicans ("canela-de-velho") is widely used in traditional medicine to alleviate inflammation and joint pain, particularly in osteoarthritis, a chronic inflammatory condition in which mediators such as IL-1β induce mitochondrial dysfunction and nitric oxide (NO) production, promoting cartilage degradation and disease progression. The study describes the isolation of an acylated triterpene from *M. albicans* and the evaluation of its anti-inflammatory activity to better understand its ethnopharmacological relevance. The hydroalcoholic crude extract underwent successive fractionation by flash open-column chromatography, followed by semipreparative HPLC purification, which led to the isolation of a coumaroyl triterpene ester (1). Its structure was elucidated using 1D and 2D NMR spectroscopy in combination with tandem mass spectrometry (MS/MS). The **1** was evaluated *in vitro* for cytotoxicity in J774 macrophages, and its anti-inflammatory potential was assessed via inhibition of NO production in LPS/IFN-γ-stimulated J774 macrophages. Subsequently, the structure was evaluated for its interaction with the NF-κB pathway through molecular docking. The isolated compound was analyzed by MS/MS in positive mode showed a molecular ion peak [M+H]+ at *m/z* 619.38, with fragment ion at *m/z* 455.05 corresponding to the loss of coumaric acid. The structural elucidation using 1D and 2D NMR, combined with comparison to literature data, allowed the identification of 23-hydroxy-27-p-coumaroyloxy-olean-12-en-28-oic acid (**1**). The **1** significantly inhibited NO production at non-cytotoxic concentrations. A concentration-dependent reduction was observed at 100 and 200 µg/mL ($p < 0.0001$), with the 200 µg/mL dose exceeding the inhibitory effect of dexamethasone (40 µM; $p < 0.0001$), emphasizing the potential of compound **1** as a modulator of the inflammatory response.

Keywords: *Miconia albicans, coumaroyl triterpene ester, anti-inflammatory activity, osteoarthritis.*