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Anti-chaperone Activity and Cytotoxicity of Chemical Components in Copaiba Oil

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Anti-chaperone activity and cytotoxicity of chemical components in Copaiba oil

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Abstract

Copaiba oil derived from the oleoresin of the Copaiba tree has been widely used as an antiseptic and expectorant for the respiratory tract, and as anti-inflammatory agent in various skin diseases. Studies have indicated that Copaiba oil exhibited anti-carcinogenic properties in various preclinical studies. However, the anti-cancer mechanisms of copaiba oil still remain unclear. There are various diterpenoid compounds within Copaiba oil, which also make the mechanism investigation very difficult. Hardwickiic acid (HAA), a clerodane diterpenoid isolated from Copaiba oil shows anti-chaperone activity from a recent study. In the current study, cytotoxicity and anti-chaperone assay guided isolation led to 9 fractions from Copaiba oil. Three of the fractions showed cytotoxicity in prostate cancer cells. And other three fractions exhibited potent anti-chaperone activity. There are multiple chemical components in the fractions that showed cytotoxicity, which has been confirmed with mass spectrum. The three fractions showed anti-chaperone activity were further purified for structure elucidation. NMR combined with MS reveal that the three fractions are Copaibic acid, Hardwickiic acid and 7-Acetyl-copaibic acid. All three compounds can be used as lead compounds for the development of more potent small molecule chaperone inhibitors.