

Publication

Antiprotozoal activity of diterpenoids isolated from *Zhumeria majdae* - absolute configuration by circular dichroism

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Zhumeria majdae, a unique species of the *Zhumeria* genus, is an endemic Iranian plant in the Lamiaceae family. Phytochemical investigation and biological activity of this plant are rarely reported. The current study aimed to find new antiprotozoal compounds from the roots of *Z. majdae* and to determine the absolute configuration of isolated compounds by circular dichroism. The extraction process from roots and aerial parts of *Z. majdae* was carried out by hexane, ethyl acetate and methanol followed by testing their antiprotozoal effects against *Leishmania donovani*, *Trypanosoma brucei rhodesiense*, *T. cruzi*, and *Plasmodium falciparum*, respectively. Structure elucidation was done using 1D and 2D NMR spectroscopy and HREIMS spectrometry. In addition, experimental and theoretical circular dichroism spectroscopy was used to establish absolute configuration. In comparison with aerial parts, the hexane extract from roots showed superior activity against *T. b. rhodesiense*, *L. donovani* and *P. falciparum* with IC₅₀ values of 5.4, 1.6 and 2.1 $\mu\text{g/ml}$, respectively. From eight abietane-type diterpenoids identified in roots, six were reported for the first time in the genus *Zhumeria*. 11,14-dihydroxy-8,11,13-abietatrien-7-one (6) exhibited a promising biological activity against *P. falciparum* (IC₅₀ 8.65 μM), with a selectivity index (SI) of 4.6, and lanugon Q (8) showed an IC₅₀ value of 0.13 μM and SI of 15.4 against *T. b. rhodesiense*. Altogether, according to the results, of 8 isolated compounds, dihydroxy-8,11,13-abietatrien-7-one (6) and lanugon Q (8) exhibited a promising activity against *T. b. rhodesiense* and *P. falciparum*. In conclusion, these compounds could be potential candidates for further analysis and may serve as lead compounds for the synthesis of antiprotozoal agents.

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