10th Brazilian Conference on Natural Products
XXXVI RESEM
4-7 November 2025, Belo Horizonte, MG, Brazil
Section: 03

MARINOLIDE A, A NEW GERMACRANOLIDE FROM Mikania nummularia, DISPLAYS in vivo ANTISCHISTOSOMAL ACTIVITY

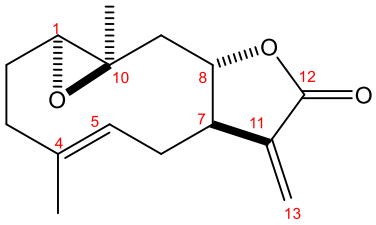
Marina de M. Gonçalves[1*], Leonardo M. Carneiro[1], Roberto Baptista P. Almeida[2], Thainá R. Teixeira[3], Monique C. Amaro[3], Josué de Moraes[3], João Henrique G. Lago[1]

marina.monroe@ufabc.edu.br

1-Center for Human and Natural Sciences, Federal University of ABC, Santo André, SP, Brazil. 2-Department of Botany, University of São Paulo, São Paulo, SP, Brazil. 3-Research Center for Neglected Diseases, University of Guarulhos, Guarulhos, SP, Brazil.

In the search for new drug prototypes against schistosomiasis, the hexane extract from the aerial parts of *Mikania nummularia* DC (Asteraceae) showed 100% mortality of *Schistosoma mansoni* at 200 µg/mL. Chromatographic fractionation afforded one pure compound whose structure was elucidated using NMR, ESI-HRMS and ECD analysis. The ^{1}H NMR spectrum revealed signals of exocyclic methylene hydrogens at δ 6.23 (d, J = 2.8 Hz, H-13a) and 5.63 (d, J = 2.8 Hz, H-13b), carbinol hydrogens at δ 4.40 (m, H-8) and 2.76 (dd, J = 10.6 and 2.6 Hz, H-1) and vinyl hydrogen at δ 5.32 (t, J = 7.7 Hz, H-5). The ^{13}C NMR spectrum showed 15 signals including an α,β-unsaturated carbonyl system at δ 169.2 (C-12), 138.7 (C-11) and 122.7 (C-13), an endocyclic double bond at δ 137.1 (C-4) and 122.5 (C-5), as well as carbinol carbons at δ 79.3 (C-8), 61.6 (C-1) and 57.0 (C-10). The ESI-HRMS spectrum showed the $[M + Na]^+$ ion at *m/z* 271.1318 (error = 2.9 ppm) and the $[2M + Na]^+$ ion at *m/z* 519.2726 (error = 0.8 ppm), confirming the molecular formula as $C_{15}H_{20}O_3$, with six unsaturation. Based on these data and in the correlations observed in the HMBC spectrum, the structure of this compound was proposed as 1,10-epoxy-germacra-4,11(13)-dien-12,8-olide, named marinolide A. Finally, analysis of NOESY correlations and ECD data, the absolute configuration 1*S*,7*R*,8*S*,10*R* was proposed to this non-previously reported sesquiterpene lactone. For *in vivo* evaluation, *S. mansoni*-infected mice were treated with a single oral dose of 400 mg/kg of marinolide A on 49th day post-infection. On day 63th, the analysis revealed a 47% reduction in total worm burden compared to untreated controls, with no significant difference between male and female worms, and with reduced toxicity. These findings suggest that marinolide A, may serve as a promising scaffold for future structural optimization and development of new schistosomicidal agents.

Figure 1: Marinolide A, a new germacranolide isolated from *M. nummularia*



Keywords: *Schistosoma mansoni, germacranolide, Mikania nummularia*