

Anti-Leishmanial Compounds from the Seaweed *Padina pavonica*

Authors : Nahal Najafi, Afsaneh Yegdaneh, Sedigheh Saberi

Abstract : Introduction: Leishmaniasis poses a substantial global risk, affecting millions and resulting in thousands of cases each year in endemic regions. Challenges in current leishmaniasis treatments include drug resistance, high toxicity, and pancreatitis. Marine compounds, particularly brown algae, serve as a valuable source of inspiration for discovering treatments against Leishmania. Material and method: *Padina pavonica* was collected from the Persian Gulf. The seaweeds were dried and extracted with methanol: ethylacetate (1:1). The extract was partitioned to hexane (Hex), dichloromethane (DCM), butanol, and water by Kupchan partitioning method. Hex partition was fractionated by silica gel column chromatography to 10 fractions (Fr. 1-10). Fr. 6 was further separated by the normal phase HPLC method to yield compounds 1-3. The structures of isolated compounds were elucidated by NMR, Mass, and other spectroscopic methods. Hex and DCM partitions, Fr. 6 and compounds 1-3, were tested for anti-leishmanicidal activity. RAW cell lines were cultured in enriched RPMI (10% FBS, 1% pen-strep) in a 37°C CO₂ 5% incubator, while promastigote cells were initially cultured in NNN culture and subsequently transferred to the aforementioned medium. Cytotoxicity was assessed using MTT tests, anti-promastigote activity was evaluated through Hemocytometer chamber promastigote counting, and the impact of amastigote damage was determined by counting amastigotes within 100 macrophages. Results: NMR and Mass identified isolated compounds as fucosterol and two sulfoquinovosyldiacylglycerols (SQDG). Among the samples tested, Fr.6 exhibited the highest cytotoxicity (CC₅₀=60.24), while compound 2 showed the lowest cytotoxicity (CC₅₀=21984). Compound 1 and dichloromethane fraction demonstrated the highest and lowest anti-promastigote activity (IC₅₀=115.7, IC₅₀=16.42, respectively), and compound 1 and hexane fraction exhibited the highest and lowest anti-amastigote activity (IC₅₀=7.874, IC₅₀=40.18, respectively). Conclusion: All six samples, including Hex and DCM partitions, Fr.6, and compounds 1-3, demonstrate a noteworthy correlation between rising concentration and time, with a statistically significant P-value of ≤ 0.05 . Considering the higher selectivity index of compound 2 compared to others, it can be inferred that the presence of sulfur groups and unsaturated chains potentially contributes to these effects by impeding the DNA polymerase, which, of course, needs more research.

Keywords : *Padina*, leishmania, sulfoquinovosyldiacylglycerol, cytotoxicity

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