

## Synthesis and Characterization of Natural Acetylenic and Olefinic Fatty Acids as Potential Bioactive Compounds

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Naturally occurring unsaturated fatty acids have been recognized by their potential biological activities. These types of acids have shown antitumor<sup>1</sup> and antifungal properties<sup>2</sup>, antimicrobial activity towards gram (+) bacteria<sup>3</sup>, and antiprotozoal activity towards *Leishmania donovani* promastigotes<sup>4</sup>. On the other hand,  $\Delta 6$  fatty acids have shown low toxicity towards mammalian cell lines which make them potential drug candidates<sup>2</sup>. Leishmaniasis and cancer have raised awareness to the World Health Organization in the past few years due to their high death rates<sup>5,6</sup>. As the mortality rate of these diseases rises, finding novel active compounds to treat them is a priority in the research field. Topoisomerases IB enzymes have become targets for the design of new active compounds to treat leishmaniasis and cancer because of their involvement in the relaxation of DNA in biological processes, such as replication. Previous research done in our laboratory has shown that very long-chain cis-diunsaturated fatty acids generally inhibit the human topoisomerase IB enzyme<sup>7</sup>, while short-chain  $\Delta 6$  acetylenic fatty acids effectively inhibit the *Leishmania donovani* Topoisomerase IB<sup>4</sup>. Our research goal is to complete the synthesis of  $\Delta 6$  acetylenic, olefinic fatty acids, and their analogs. Each intermediate will be characterized using spectroscopic techniques <sup>1</sup>H-NMR, <sup>13</sup>C-NMR, IR and mass spectrometry. Once synthesized a series of biological assays will be performed in order to elucidate their biological properties.

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