

## Chemical and Biological Characterization of *Theobroma bicolor* leaves Extracts with Antimicrobial Potential

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### Abstract

*Theobroma bicolor*, also known as cacao blanco, is a perennial crop with native distribution in South American countries such as Peru, Colombia, and Ecuador. *T. bicolor* has agricultural and medicinal interest as the fruit is consumed and its leaves are used to prepare infusions. In the past, there was a limited number of reports exploring the biological activity of *T. bicolor* leaves. The lack of detailed research on the properties of its metabolites has been a challenging path. The present study aims to unveil the chemical profile of *T. bicolor* leaves. In this sense, leaf samples will be collected in four locations of the province of Tena-Ecuador. Then, the leaves will be grouped into fresh and dry plant material. Each plant material will be grounded, and metabolite will be extracted with methanol and water. The extracts will be untargeted analyzed by mass spectrometry based techniques (LC-MS and GC-MS). Mass spectrometry data will be analyzed and compared against mass spectrometry libraries to identify metabolites present in the leaf extracts. We hypothesize a wide variety of metabolites present in the leaves, with a higher concentration in fresh plant material. Furthermore, we will conduct microbial growth inhibition assays against pathogenic microorganism resistant to antibiotics with the leaf extracts, which help to understand the possible antimicrobial potential of *T. bicolor*. On the other hand, being a non-targeted metabolomic analysis, it will reveal possible metabolites not previously identified, likewise, these metabolites might have biological activity against pathogenic microorganisms resistant to antibiotics, which will be conducted in parallel to the untargeted metabolomics analysis. Thus, it is hypothesized the possible presence of metabolites is higher in fresh leaves than in dry leaves and they have a high antimicrobial potential against microorganisms resistant to ampicillin.

### Key words:

*Theobroma bicolor*, UPLC-MS/MS, metabolomics, antibiotic resistance, GNPS