LC-MS/MS and GC-MS Analysis for the Identification of Bioactive Metabolites Responsible for the Antioxidant and Antibacterial Activities of Lygodium microphyllum (Cav.) R. Br

ABSTRACT

Natural products serve as a valuable source of antioxidants with potential health benefits for various conditions. Lygodium microphyllum (Cav.) R. Br., also known as Old World climbing fern, is an invasive climbing fern native to Southeast Asia, Africa, South America, Australia, and Melanesia. It has been reported to possess interesting pharmacological properties including hepatoprotective and anti-inflammatory mechanisms. This study analyzed the potential bioactive metabolites that contribute to the antioxidant and antimicrobial effects of L. microphyllum (LM) by profiling the crude extract using high-resolution LC-MS/MS and GC-MS systems. Several classes of compounds such as phenolics, flavonoids, terpenoids, steroids, macrolides, vitamins, lipids, and other hydrocarbons were found in the crude extract of LM through non-targeted analysis. A total of 74 compounds were detected in LC-MS/MS, whereas a total of nine compounds were identified in GC-MS. Out of the 74 compounds detected in LC-MS/MS, 34 compounds, primarily quercetin, kaempferol, trifolin, pyroglutamic acid, arachidonic acid, and rutin were reported with antioxidant, antimicrobial, antiinflammatory, and hepatoprotective activities. The presence of phenolic and flavonoid compounds with reported bioactivities in the crude extract of LM evidence its pharmacological properties.