HPLC-UV DIODE ARRAY & LC-MS QUADRUPOLE TIME-OF-FLIGHT (Q-TOF) ANALYSIS OF FLAVONOIDS FROM *GUNNERA MANICATA*

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Extraction, liquid chromatographic (LC) and mass spectrometric methods were developed for quantification of flavonoids in *Gunnera manicata*, an angiosperm that forms a symbiotic relationship with cyanobacteria. Of particular interest, *G. manicata* develops a stem gland with an intense red color when the plant is grown in a nitrogen-poor medium. The hypothesis of this research was that flavonoid compounds play an important role in gland development. Several extraction and chromatographic methods were developed to identify and quantify flavonoids in the gland. Solid phase extraction using a C_{18} cartridge and elution with acidic methanol produced a red-colored extract. LC analysis of this extract using an ammonium formate buffer (15 mM) (A) and methanol (B) with a linear gradient from 5-95% B over 11 minutes was found to be ideal for the analysis of flavonoid standards and plant extracts. A multi-way Alternating Least Squares (ALS) algorithm was used to compare UV spectra in the plant matrix with standard flavonoid UV spectra. Unimodality and nonnegativity constraints were implemented to provide chemically feasible results. The flavonoids kaempferol and quercetin were identified in the stem gland and evidence for the presence of glycone derivatives was found. To the knowledge of the authors, this is the first reported chemical profile of *Gunnera* gland tissue.