INTEGRATING GC/MS METABOLITE PROFILING OF LATEX FROM THE NICKEL-HYPERACCUMULATING TREE *SEBERTIA ACUMINATA* WITH LC/MS TO TARGET THE IDENTIFICATION OF NEW NI^{2+}-COMPLEXES.

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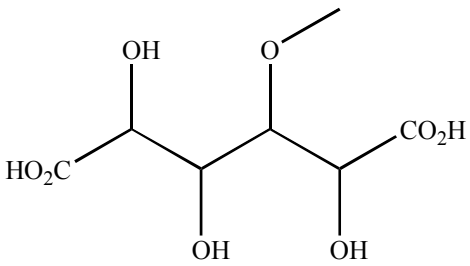
Sebertia acuminata Pierre ex Baill. (Sapotaceae) is a rare rainforest tree endemic to New Caledonia. It belongs to a diverse group of plants known as hyperaccumulators which store metal ions in their above-ground tissues at levels which are toxic to other species. Nickel concentrations in the latex of *S. acuminata* have been found up to 26% dry weight, the highest levels found in any organism [1]. The ligands which bind metal ions in hyperaccumulators have not been well characterised. Previous studies of the *S. acuminata* latex have reported that between 37-99.4% of the Ni is complexed by citric acid [2, 3].

The present work is a detailed phytochemical study of the latex of *S. acuminata* using LC-MS (Ion trap and FT-MS) and metabolite profiling based on GC-MS. A new Ni^{2+}-complex $[Ni^{2+}.L_2]^+$ (L=3-methylether-2,4,5-hydroxyhexane-1,6-dioic acid, below) was identified in the latex, the first time that this organic acid has been isolated directly from biological material. More than 120 compounds were detected in the latex by GC-MS. The gas chromatography revealed that while citric acid is present in the highest concentration a number of other organic acids, subsequently found bound to Ni^{2+}, were also present in high relative concentrations. A list of metabolites identified in the GC-MS of the latex was used to identify the following Ni^{2+}-complexes in the LC-MS profile: Ni^{2+}-citric acid $[Ni(C_6H_8O_7)(C_6H_7O_7)]^+$, Ni^{2+}-malic acid $[Ni(C_4H_6O_5)_2(C_4H_5O_5)]^+$, Ni^{2+}-itaconic acid $[Ni(C_5H_5O_4)(CH_3CN)_2]^+$, Ni^{2+}-erythronic acid $[Ni(C_4H_8O_5)_2(C_4H_7O_5)]^+$, Ni^{2+}-galacturonic acid $[Ni(C_6H_{10}O_7)_2(C_6H_9O_7)]^+$, Ni^{2+}-tartaric acid $[Ni(C_4H_5O_6)]^+$, Ni^{2+}-aconitic acid $[Ni(C_6H_6O_6)_2(C_6H_5O_6)]^+$ and Ni^{2+}-saccharic acid $[Ni(C_6H_{10}O_8)(C_6H_9O_8)]^+$. The results are consistent with a number of organic acids having a potential role in the storage of Ni^{2+} ions within *S. acuminata*.



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