

# Pharmacology and Ethnopharmacology

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## Dirchromones and dircoxepines, a new group of cytotoxic organic sulfur compounds from *Dirca palustris* (Thymelaeaceae)

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*Dirca palustris* L. is a shrub that is endemic in the eastern part of North America, where it is commonly known as eastern leatherwood. It thrives under the canopy of the Canadian maple forests, and is the only native member of the Thymelaeaceae of the country. Its crushed bark was reportedly employed by the Iroquois to treat cancer. The plant also induces vomiting and vesication, and is a potent laxative. The highly cytotoxic dichloromethane extract from the ligneous parts of the plant was thus fractionated using a bioassay-guided strategy. Among other results, one of the active subfractions yielded several minority sulfur-containing compounds. They were characterized by NMR, HRMS, FTIR and UV spectroscopy, and named dirchromones and dircoxepines. Not only were they the first mention of organic sulfur compounds in the Thymelaeaceae, they also featured an original structure, unrelated to other known sulfur-bearing molecules in plants such as glucosinolates and cysteine-derived sulfoxides. The substitution pattern of dirchromones and the occurrence of dircoxepines can be explained by a common tentative metabolic relationship, although the origin of the parent compound remains unclear. Additionally, isolated dirchromones show a significant polarity-dependent cytotoxicity, with increasing activity and selectivity towards DLD-1 colorectal adenocarcinoma cells as the calculated logP increases.

### Biography

Alexis St-Gelais is a current PhD candidate at the Université du Québec à Chicoutimi, and has received numerous scholarships to pursue his studies. He is also the co-founder and scientific Director of Laboratoire PhytoChemia, a respected essential oil quality control laboratory. His research interests include bioactive natural products, the study of volatile compounds, and chemotype determination.

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