J Nat Prod. 2018 Oct 26;81(10):2169-2176. doi: 10.1021/acs.jnatprod.8b00079. Epub 2018 Oct 18.

Bioactive Pentacyclic Triterpenes from the Root Bark Extract of Myrianthus arboreus, a Species Used Traditionally to Treat Type-2 Diabetes.

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Abstract

Four new Δ^{12} ursene-type pentacyclic triterpenes containing the trans-feruloyl moiety (1-4), along with ursolic acid (5), were isolated from a Myrianthus arboreus root bark ethanol extract, after bioassay-guided subfractionation of its hexane fraction. The structures of 1-4 were established on the basis of the results of standard spectroscopic analytical methods (IR, HRESIMS, GC-MS, 1D and 2D NMR). The compounds 3β- O- trans-feruloyl-2α,19α-dihydroxyurs-12-en-28-oic acid (1), 2α-acetoxy-3β- O- trans-feruloyl-19α-hydroxyurs-12-en-28-oic acid (3), and 5 were determined to decrease the activity of hepatocellular glucose-6-phosphatase (G6Pase) and to activate glycogen synthase (GS). Their action on G6Pase activity implicated both Akt and AMPK activation. In addition, these compounds were determined to stimulate GS via the phosphorylation of glycogen synthase kinase-3. Compound 3 showed the most potent effect in modulating glucose homeostasis in liver cells. This is the first comprehensive report on novel phytochemical components of the root bark extract of M. arboreus based on the isolation of the principles responsible for its antidiabetic effects.