



Constituents in evening primrose oil with radical scavenging, cyclooxygenase, and neutrophil elastase inhibitory activities.

Hamburger M, Riese U, Graf H, Melzig MF, Ciesielski S, Baumann D, Dittmann K, Wegner C.

Institute of Pharmacy, Friedrich-Schiller-University Jena, Semmelweisstrasse 10, Germany. b7hama@rz.uni-jena.de

Cold-pressed, non-refined evening primrose oil was found to contain lipophilic radical scavengers. A highly enriched fraction of these compounds could be obtained from the oil by extraction with aqueous ethanol and subsequent liquid-liquid partitioning with petroleum. LC-DAD-MS analysis revealed that the fraction contained three aromatic compounds with identical UV and ESI-MS spectra. The compounds were isolated by RP-HPLC and their structures established by chemical and spectroscopic means as 3-O-trans-caffeoyl derivatives of betulinic, morolic, and oleanolic acid. The morolic acid derivative was a new compound. The three esters exhibited pronounced radical scavenging activity against the stable 2,2-diphenyl-1-picrylhydrazyl radical and were potent inhibitors of neutrophil elastase and cyclooxygenase-1 and -2 *in vitro*. Commercial samples of evening primrose oils contained only traces of these lipophilic antioxidants.