

# Possible Fungistatic Implications of Betulin Presence in Betulaceae Plants and their Hymenochaetaceae Parasitic Fungi

Izabela Jasicka-Misiak\*, Jacek Lipok, Izabela A. Świder, and Paweł Kafarski

Faculty of Chemistry, Opole University, Oleska 48, 45-052 Opole, Poland.

Fax: +4 87 74 52 71 15. E-mail: izajm@uni.opole.pl

\* Author for correspondence and reprint requests

Z. Naturforsch. **65c**, 201–206 (2010); received September 23/October 26, 2009

Betulin and its derivatives (especially betulinic acid) are known to possess very interesting prospects for their application in medicine, cosmetics and as bioactive agents in pharmaceutical industry. Usually betulin is obtained by extraction from the outer layer of a birch bark. In this work we describe a simple method of betulin isolation from bark of various species of Betulaceae trees and parasitic Hymenochaetaceae fungi associated with these trees. The composition of the extracts was studied by GC-MS, whereas the structures of the isolated compounds were confirmed by FTIR and  $^1\text{H}$  NMR. Additionally, the significant fungistatic activity of betulin towards some filamentous fungi was determined. This activity was found to be strongly dependent on the formulation of this triterpene. A betulin-trimyrustin emulsion, in which nutmeg fat acts as emulsifier and lipophilic carrier, inhibited the fungal growth even in micromolar concentrations – its  $\text{EC}_{50}$  values were established in the range of 15 up to  $50\ \mu\text{M}$  depending on the sensitivity of the fungal strain. Considering the lack of fungistatic effect of betulin applied alone, the application of ultrasonic emulsification with the natural plant fat trimyrustin appeared to be a new method of antifungal bioassay of water-insoluble substances, such as betulin.

*Key words:* Betulin, Triterpene, Trimyrustin, Fungistatic Effect