Field Cultivation and *in vitro* Cultures, Root-Forming Callus Cultures and Adventitious Root Cultures, of *Panax quinquefolium* as a Source of Ginsenosides

GraŨyna SzymaŒska*, Ewa Kochan, and Piotr Szymczyk

Department of Pharmaceutical Biotechnology, Medical University of ŁódŤ, MuszyŒskiego Street 1, 90–151 ŁódŤ, Poland. Fax: +48 42 6779187. E-mail: grazyna.szymanska@umed.lodz.pl

* Author for correspondence and reprint requests

Z. Naturforsch. **68 c**, 482–488 (2013); received August 29, 2012/Oktober 29, 2013

The content of six ginsenosides (Rb1, Rb2, Rc, Rd, Rg1, and Re) was studied in the roots of field-grown plants, as well as in root-forming callus cultures and adventitious root cultures of *Panax quinquefolium* using high-performance liquid chromatography (HPLC). The highest level of saponins was isolated from root hairs (128 mg/g dry weight). The examined *in vitro* culture synthesized all identified saponins, although in smaller amounts than those obtained from field cultivation. Metabolites Rb1 and Re dominated in the ginseng biomass from both field crops and *in vitro* culture.

Key words: American Ginseng, Ginsenosides, *in vitro* Culture, Adventitious Roots