Comparative Study of Extraction Techniques with Ammonia or Methanol/Water for the Isolation of Ginsenosides Using HPLC/MS

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Roots of ginseng plants have been extracted with liquid ammonia or methanol/water (60:40 v/v). The extracts were characterized by means of a gradient HPLC/MS method and the results were compared with each other. The ginsenosides Rb\textsubscript{1}, Rb\textsubscript{2}, Rc, Rd, Re, Rf, Rg\textsubscript{1} and Ro including the malonyl ginsenosides m-Rb\textsubscript{1}, m-Rb\textsubscript{2}, m-Rc and m-Rd could be identified. Contrary to previous reports suggesting that during the extraction with liquid ammonia malonyl ginsenosides are totally converted to neutral ginsenosides, it could now be demonstrated by use of mass spectrometry that even after an extraction time of 4 h malonyl ginsenosides can be detected. However, the amount of malonyl ginsenosides was reduced by about one order of magnitude. The neutral ginsenosides were not changed by liquid ammonia.

The mass spectrometric detection has been performed by use of the quasi-molecule ion [M+Na]\textsuperscript{+} and some specific fragment ions.

Key words: Ginsenosides, Extraction, Liquid Ammonia Extraction, Methanol/Water, HPLC/MS