Extractions of Ginsenosides from Ginseng Roots with Liquid Ammonia, Methanol-Water or Water

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Extractions of ginsenosides from ginseng roots with liquid ammonia, methanol/water (60:40; v/v) or water were carried out. The extracts have been analyzed qualitatively and quantitatively to valuate yield and selectivity of extractions of ginsenosides. Water supplied the lowest yield. The yields of extracts with liquid ammonia were higher than those with methanol-water (60%). Yields of the ginsenosides Rb₁, Rb₂, Rc and Rd by extracting with liquid ammonia are about twice as much as those of the extraction with methanol-water (60%). It was proved by HPLC that malonyl-ginsenosides m-Rb₁, m-Rb₂, m-Rc and m-Rd were converted to the corresponding neutral ginsenosides by extraction with liquid ammonia. Because of high yields of extracts and simultaneous increase of the contents of Rb₁, Rb₂, Rc and Rd the extraction with liquid ammonia is obviously superior to the other extraction methods.

Furthermore, ginsenosides from ginseng roots were extracted by alkaline methanol-water (60%) solutions. Alternatively, the extracts of the methanol-water (60%) extraction were treated with sodium hydroxide solution. Both methods convert also the malonyl-ginsenosides to neutral ginsenosides.