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## Determination of Acidic Saponins in Crude Drugs by High-Performance Liquid Chromatography on Octadecylsilyl Porous Glass

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We prepared an octadecylsilyl porous glass (MPG-ODS) and reported that it was a useful packing material for reversed phase high-performance liquid chromatography (HPLC). Saponins of ginseng, the root of *Panax ginseng* and other crude drugs were determined by HPLC on MPG-ODS.

Neutral dammarane saponins (ginsenosides-Rb<sub>1</sub>, Rb<sub>2</sub>, Rc, Rd) and an acidic saponin (ginsenoside-Ro, a glucuronide saponin of oleanolic acid) isolated from ginseng have been extensively studied from the chemical, pharmacognostic and pharmacological view points. Prof. Kitagawa, Osaka University, and his coworkers reported that white ginseng contains a considerable amount of acidic malonate of the dammarane saponins, malonyl-ginsenosides Rb<sub>1</sub>, Rb<sub>2</sub>, Rc and Rd. These malonyl-ginsenosides are rather unstable and readily demalonylated by heating. Recently, acidic malonate of saikosaponins, malonyl-saikosaponin a and d were also isolated from bupleurum root. Other well known acidic saponins are those contained in senega. Senega is the roots of *Polygala senega* and has been used as an expectorant. Acidic saponins of Senega, senegins II, II', III and IV, are the glycosides of pentacyclic triterpens and the sugar moieties contain glucose, fucose, rhamnose, xylose, galactose and so on.

In traditional oriental medicine, several crude drugs are generally prescribed in a single formula. Ginseng is one of the most important crude drugs in the medicine. Bupleurum root is often prescribed with ginseng.

HPLC analysis on octadecylsilyl porous glass was investigated for acidic saponins in ginseng, bupleurum root and senega. The acidic saponins, malonyl-ginsenosides, malonyl-saikosaponins and senegins, as well as neutral saponins in the crude drugs were separated rapidly by HPLC on this column with aqueous acetonitrile containing KH<sub>2</sub>PO<sub>4</sub> as the mobile phase. Simultaneous determinations of the acidic and neutral saponins were successful at room temperature.

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