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# Comparison of Three Multi-Phase Dimensional Solid-Phase Extraction Methods with IL-based Silica Sorbent for Separation of Rutin, Quercetin, and Scoparone from *Herba Artemisiae Scopariae*

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## Abstract

Five types of ionic liquid-based silica (SilprBlmCl, SilprImNH<sub>2</sub>, SilprPy, SilmPS, and SilmBr) with different radical groups were synthesized and applied to the separation of three bioactive compounds (rutin, quercetin, and scoparone) from *Herba Artemisiae Scopariae* by three multi-dimensional solid-phase extraction (MDSPE) methods combined with high-performance liquid chromatography. After comparing the comprehensive adsorption capacity test of the five types of ionic liquid-based silica materials, SilprPy and SilmPS, with the highest adsorption capacity were selected and applied in the packing of three different types of MDSPE process (layered MDSPE, blended MDSPE, and stacked MDSPE). With 2.0 mL of ethanol as the washing solution and 2.0 mL of methanol as the elution solution, blended MDSPE achieved the highest recoveries of all three target compounds (91.2% for rutin, 84.3% for scoparone, and 89.7% for quercetin).

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