

# **Comparison of the performance of conventional microparticulates and monolithic reversed-phase columns for liquid chromatography separation of eleven pollutant phenols**

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## **Abstract-**

The performance of isocratic separations of 11 pollutant phenols (PP) using monolithic (Chromolith RP-18e) and conventional reversed-phase 5 $\mu$ m (Luna and Purospher C18) and 4 $\mu$ m (Synergi C12) particulate size columns, selected from high purity silica materials, has been compared. The separations have been optimized based on a previously optimized separation in which a reversed-phase C18 Luna column and acetonitrile as organic modifier were used, allowing the separation of all phenols tested in 23 min. The optimization process was carried out for each column by studying the effect of the mobile phase (acetonitrile as organic modifier, pH, flow-rate) on phenols separation. Under the optimized separation conditions, all phenols were separated in less than 23 min for all columns tested. Asymmetry factors were further evaluated and used to estimate column efficiency using the Dorsey-Foley equation. The efficiency and asymmetry factors were lower for Chromolith than for Purospher and Luna columns respectively. The Chromolith column was finally selected, due to its lower flow resistance, analysis time and good efficiency and asymmetry factors. The PPs separation was achieved in 3 min. The asymmetry factors were in the range 0.9-1.5 using 50mM acetate buffer (pH = 5.25)-ACN (64:36, v/v) as mobile phase, T=45 °C and 4.0 ml min<sup>-1</sup> flow-rate.

**Index Terms-** Reversed-phase columns; Monolithic column; Phenols

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