

## Moment Analysis of Lysozyme in Cation Exchange Chromatography

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Parameters of lysozyme separation in CE-HPLC (WCX-300 HENENCHEM) were calculated by moment analysis from experiment data. 30 mM sodium phosphate buffer (pH 9) was used for equilibrium. The buffer containing NaCl (0.5, 0.75, 1.0 M) eluted lysozyme. Concentrations of lysozyme were in the range of 3, 5, and 7 mg/ml. The column is with the size of 4.6\*250 mm. Flow velocity was varied from 0.5 to 1.5 mL/min. Moment analysis was conducted using GR (general rate) model. Equilibrium constants (K) read to be 13.8, 12.8, and 11.9 for 0.5, 0.75 and 1.0 M salt. After the molecular diffusivity was obtained by using Wilke-Chang equation, the axial dispersion coefficient was calculated as  $4.22$  to  $10.29 \times 10^{-5}$  [cm]<sup>2</sup>/s. The external mass transfer coefficients were obtained as 0.131, 0.128, and 0.125 by using Wilson-Geankoplis equation. The intra-particle diffusivity was calculated by comparing theoretical plate number and van Deemter equation. The values were from 1.74 to  $8.56 \times 10^{-8}$  [cm]<sup>2</sup>/s. Influence on overall H<sub>total</sub> by each mass transfer phenomenon was also determined by calculating H<sub>ax</sub>, H<sub>f</sub>, and H<sub>d</sub>.