Axial Dispersion in Beds of Packed Solids

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This paper deals with the experimental study of the axial dispersion phenomenon during displacement washing of fixed beds randomly packed with uniform sized, non-porous solids. The solids studied in this work included non-porous glass beads, hollow rods, and rings. Using the step input technique, an investigation of the movement of alkali lignin during the displacement washing of beds of packed solids was carried out. To characterize the displacement washing, the wash yield, axial dispersion coefficient, as well as time parameters such as the mean residence time of alkali lignin, and space time of wash liquid were evaluated.

The results obtained showed that, in packed beds of finite length, the axial dispersion coefficient is proportional to the first power of average velocity if longitudinal dispersion is large compared to molecular diffusion. Since no sorption of alkali lignin onto solid particles occurred, the mean residence time of lignin was approximately equal to the holding time of the wash liquid in the packed bed.