

Isoelectric precipitation of sunflower protein in an MSMPR precipitator: Modelling of PSD with aggregation

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Abstract

Isoelectric precipitation of sunflower protein was carried out in a 273 ml MSMPR precipitator. Experimental results showed a bimodal particle-size distribution (PSD) of protein particles when the solids concentration or the mean residence time was low. Increasing the solids concentration and the mean residence time transformed the bimodal PSD to a unimodal PSD. Protein particle growth by turbulent collision mechanism and breakage by shear mechanism were modelled using an approach similar to Glatz *et al. A.I.Ch.E. J.* **32**, 1196–1204 (1986). The model results showed that the breakage of large aggregates results in the birth of two daughter fragments. Also at high solids concentrations the particle growth rate was linear with respect to particle size. At low solids concentrations the growth rate constant was larger than the breakage rate constant and *vice versa* at high solids concentrations.

Keywords

Protein precipitation;
MSMPRP;
aggregation;
population balance