250 Scale up and mass balance of affinity purification of native β-lactoglobulin. Harit K. Vyas*, J. M. Izco, and R. Jimenez-Flores, *Dairy Products Technology Center, Cal Poly.*

The process of affinity purification of β-lactoglobulin in its native form using all-trans-retinal immobilized on Celite R-648^{TM} was scaled up and applied to fractionate industrial sweet whey. Three different ways of mixing the Celite R-648^{TM} and whey for the interaction between all-trans-retinal and β-lactoglobulin were tried at pilot scale. The three methods used were (1) a continuous operation using a column packed with Celite R-648^{TM}, (2) a batch operation in a stirred tank and (3) a continuous operation using a fluidized Celite R-648^{TM} column. Adsorption and desorption of β-lactoglobulin were carried out at pH 5.1 and 7.0, using 0.01 and 0.1M phosphate buffers, respectively. The phosphate buffer containing desorped β-lactoglobulin was concentrated 20 times using ultrafiltration and then freeze-dried. The packed column, stirred tank and fluidized column produced β-lactoglobulin with purity of 80, >95 and >95%, and recovery of 0.65, 2.88 and 2.88g per kg of Celite R-648^{TM}, respectively. The comparative poor purity and recovery of β-lactoglobulin in the case of the packed column was attributed to insufficient contact between the passing fluids and the Celite R-648^{TM} during adsorption, desorption and intermittent washing. The fluidized column method being a continuous operation with a gentle mixing action, was considered the best suited for further scale up to the industrial level.

Key Words: Process scale up, affinity purification, β-lactoglobulin