

MICROSTRUCTURAL CHARACTERIZATION OF POLYSACCHARIDES – PROTEINS DRY MIXTURES BY ATOMIC FORCE MICROSCOPY

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ABSTRACT

The microstructure of amylose - β -lactoglobulin (AM- β lg) mixtures and amylopectin - patatin (AP-PA) mixtures formed during drying of solutions from different concentrations and different polysaccharide and protein ratios have been studied using atomic force microscopy (AFM), and the results were confirmed by transmission electron microscopy (TEM). The pure components displayed even structures, although between the polysaccharides, AM had a rougher structure, and between the proteins PA did. The native proteins displayed different structures than the heat-treated proteins which showed uneven structures formed by the aggregation of the protein. The polysaccharide – protein system displayed non-phase-segregated structures at polysaccharide:protein ratios equal to 1:1 for AM: β lg and higher than 1:1 for AP:PA, and phase-segregated structures at polysaccharide:protein ratios lower than 1:1 for AM: β lg and equal or higher than 1:1 for AP:PA. The phase-segregated samples showed regions rich in polysaccharide and regions rich in protein. After heat treatment the non-phase-segregated samples showed some degree of phase segregation, the degree of phase segregation depended on the protein concentration.

Keywords: Phase Separation, Phase Segregation, Dry Films; Atomic Force Microscopy; Amylose; β -Lactoglobulin, Amylopectin, Patatin.