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| **Adsorption kinetic and film rheology of whey proteins and hydroxypropylmethylcellulose mixtures at the air-water interface** | | |
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| *1: Departamento de Industrias, Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires, Ciudad Universitaria (1428), Buenos Aires, Argentina. Fax: 54-11-45763366.*  *2 : Departamento de Ingeniería Química, Facultad de Química, Universidad de Sevilla, Prof. García González s/núm, 41012, Sevilla, Spain* | | |
| 1  2  3  4  5  6  7  8  9  10  11  12  13  14  15  16  17  18  19  20  21  22  23  24  25  26  27  28  29  30  31  32  33  34  35 | Whey proteins have many technological applications. The main proteins present are -lactoglobulin, -lactalbumin and bovine sero-albumin and are responsible for the hydration capacity, gelling, foaming and emulsifying properties of whey protein concentrates (WPC).  Hidroxypropylmethylcellulose (HPMC), which has methyl and hydroxypropyl groups added at the anhydroglucose backbone, includes a family of cellulose ethers that mainly differ in the molecular weight, viscosity, degree and molar substitution. HPMC is used in the food industry, printing technology, and pharmaceutical applications , in particular for controlled drug-release. The usefulness of HPMC is essentially based upon four key attributes: efficient thickening, surface activity, film forming ability, and the capacity to form thermal gels that melt upon cooling.  The interactions between proteins and polysaccharides at the air-water interface are of great importance for the formation and stability of food colloid systems. Along-side the use of HPMC as thickener to retard destabilization of foams and emulsions, because of its surface activity it would compete with proteins for the interfaces, affecting film properties and stability.  In this work we studied the dynamic behavior of WPC + HPMC mixtures at the air-water interface. Three different HPMC, so-called E4M, E50LV and F4M that exhibited different interfacial properties were used. Time-dependent surface pressure and surface dilatational properties of single and mixed systems at different bulk concentrations were determined in an automatic drop tensiometer IT Concept at 20±0.2 ºC.  The results show that the surface-active HPMCs show a competitive behaviour with WPC, that is modulated by the relative bulk concentration and time of adsorption.  At WPC concentrations where the protein can saturate the interface (i.e. 1 %wt) WPC dominates the surface pressure and dilatational properties of films at long adsorption times. Nevertheless, HPMC dominates the surface at short adsorption time.  At lower WPC concentrations (0.01 % wt) the degree of competition depends on the amount of HPMC in the mixture. At low WPC and HPMC concentrations, where none of the macromolecules is able to saturate the interface, an additive or synergistic surface pressure evolution is observed. However the surface dilatational modulus of mixed films is greatly decreased in comparison to films from single components, indicating that HPMC hinders the protein interfacial aggregation.  \* corresponding author: [*apilosof@di.fcen.uba.ar*](mailto:apilosof@di.fcen.uba.ar) | 1  2  3  4  5  6  7  8  9  10  11  12  13  14  15  16  17  18  19  20  21  22  23  24  25  26  27  28  29  30  31  32  33  34  35 |