OBB-15

ZETA POTENTIAL AND RHEOLOGY OF OIL IN WATER EMULSIONS STABILISED WITH MESQUITE GUM

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Mesquite gum (MG) is a complex polysaccharide produced by the desert tree of the genus *Prosopis* belonging to the same family as the *Acacia* species which exudates gum arabic (GA), an firmly established industrial hydrocolloid gum. MG is traditionally chewed as candy in the rural zones of northwestern Mexico, and has been granted authorization for use in food and drinks by the Ministry of Health of Mexico(1). In the international trade, however, MG is a non permitted food additive and so far no petitions have been made in Europe nor USA to affirm its safety. Due to political factors associated with production and trade of GA, being Sudan the major world producer, MG can become an important alternative. One of the well known properties of MG is the capability to stabilize oil/water emulsions. Therefore, one of the aims of this work was to understand better the mechanisms by which MG stays adhered to the oil particles and to determine the role of the oil on the emulsification process. We have conducted Zeta potential measurements in MG emulsions of different pH and salt concentrations. Emulsions were prepared as follows: 9 % w/w MG solutions were dissolved at room temperature and then allowed to hydrate overnight before use. The solution were refrigerated when not in use. The oil used was orange oil and we added 0.5 ml of this oil to 1.5 ml of MG solution.

Zeta potential for MG emulsions shows a negative charge of the oil particles surrounded by protein-polysaccharide molecules, similar to the behavior found for GA (2). The second

(a) (b)

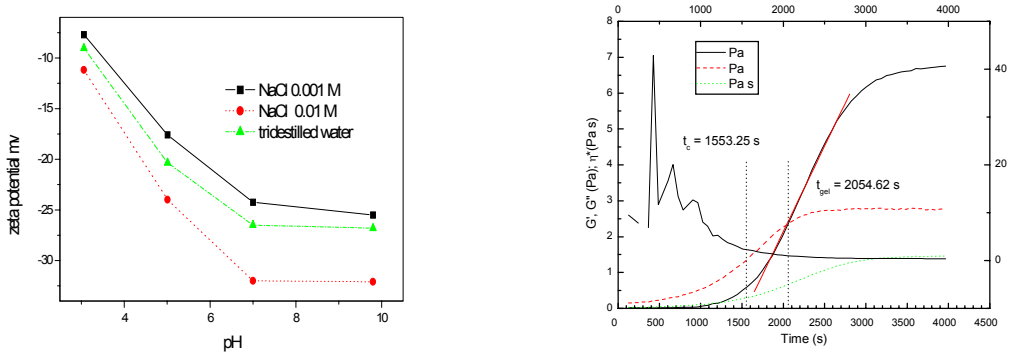

Fig. 1. (a) Zeta potential of MG for different pH and salt concentration at 25°C. (b) Variation of loss tangent ($\tan\delta$), elastic modulus G', viscous modulus G'', complex viscosity η^* as a function of time for a o/w emulsion of mesquite gum and citrus essential oil (15 % w/w MG solution) at 25°C.

aim of the work was to analyze the gelation process of MG emulsions by using small-deformation rheological measurements. Emulsions for gelation studies were prepared with 15 % w/w native MG solutions and after homogenisation immediately loaded into the rheometer. Fig. 1b shows the temporal behavior of the elastic (G'), loss modulus (G''), loss tangent ($\tan\delta$) and complex viscosity (η^*). According to the Near Linear Growth Model of Pope and Mackenzie (NLGM) (3), the $\ln(\eta^*)$ plotted against $\ln(\alpha/(1-\alpha))$, where $\alpha = t/t_{gel}$, gives a linear zone, that in our case is in the region from $\alpha = 0.22$ to $\alpha = 0.82$, which confirms a gelation process based on the model describing the evolution of molecular weight with time (4).

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