

Study of synthesis and surface activity of inulin lauric esters

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Abstract

Fatty esters of carbohydrates constitute an interesting group of non-ionic surfactants. These compounds present a good biodegradability and a low toxicity, which confer to them a particular interest in pharmaceutical, cosmetic and food industry.

In most cases, sugar esters are prepared by condensation of a fatty acid with a mono- or disaccharide, but aliphatic carboxylate esters of polysaccharides tend more and more to be developed. In this work, lauric esters of inulin were chemically synthesised. Inulin is a mixture of polysaccharides composed of a chain of fructose units (linked by an β -(2 \rightarrow 1) *D*-fructosyl-fructose bonds) with generally a terminal glucose unit (linked by an *α*-*D*-glucopyranosyl bond).

By varying synthesis and purification conditions, compounds with different degree of substitution (esterification) were obtained. The dynamic surface tension of 0.1% esters solutions was measured using a Drop Volume Tensiometer (Lauda TVT 1).

The most surface active esters corresponded to a low degree of substitution (< 0.010). At the tested concentration, they were able to reduce surface tension below 40 mN/m. In comparison, the highest obtained degree of substitution led to an equilibrium surface tension of ~ 60 mN/m.