

SURFACE-HYDROPHOBIZED SMALL GRANULAR STARCHES AS EMULSION STABILIZERS FOR FOOD, COSMETICS, AND PHARMACEUTICALS

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Small granular starches from quinoa, amaranth, and rice were surface hydrophobized (esterified) with cis/trans 2-Octen-1-ylsuccinic anhydride (OSA) to different degrees of modifications (i.e. 0.6, 1.2, 1.8, 2.4, 3.0% of OSA) in aqueous alkaline slurry at pH = 8.2-8.4 at 32°C. The dry matter content of the suspensions was 17.7% and the reactions were carried out within 120-200 min. The degree of substitution (DS) was determined by alkaline hydrolysis of the ester and also by a quantitative FTIR-method by evaluation of the $-\text{COO}^{(-)}$ - absorption band at 1569 cm^{-1} . Physico-chemical properties of these “Pickering emulsifiers” were characterized by light scattering, scanning electron microscopy (SEM), and their pore size distribution (BET). Emulsifying properties were determined in relation to the degree of modification and different starch/oil ratios (i.e. 50, 100, 200, 400, 800 mg starch/ml oil) by laser light scattering experiments.

Particularly, surface hydrophobized starches from quinoa and amaranth have a great potential for applications in the food, cosmetic and pharmaceutical industry. Unfortunately these starches are not commercially available. Currently, the high raw material price of quinoa and amaranth prevents applications of such emulsifiers in the food industry.