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Pickering emulsifiers based on hydrophobically modified small granular starches –

Part I: Manufacturing and physico-chemical characterization

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Highlights

- Small granular starches from rice, quinoa and amaranth were hydrophobized by OSA.
- Starch granules from small granule botanical sources have emulsification capacity.
- Quinoa and rice starch granules have emulsifying capacity in native and modified form.
- Emulsifying properties depend on modification level, size and concentration of starch.
- Quinoa starch granules had the best emulsifying capacity followed by amaranth and rice.

Abstract

Small granular starches from rice, quinoa and amaranth were hydrophobized by esterification with octenyl succinic anhydride (OSA) in an aqueous alkaline slurry to obtain series of modified starches at defined intervals (i.e. 0.6, 1.2, 1.8, 2.4, 3.0%). The physical and the physico-chemical properties of the starch particles were characterized by proximate analysis including protein level, amylose level and dry matter. The shape and size of the starch granules were characterized by scanning electron microscopy and light scattering. The gelatinization properties were characterized by differential scanning calorimetry. The degree of modification was determined by titration with NaOH. With regard to the emulsion formulation and in order to assess the emulsifying capacity of the small granular starches, the effect of starch type, degree of modification and starch concentration on the resulting emulsion droplet size were evaluated by light scattering and optical microscopy.

Emulsifying properties were found to depend on the degree of substitution, size of the granules and the starch to oil ratio of the formulation. Quinoa starch granules, in general, had the best emulsifying

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