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Journal of Supercritical Fluids
Volume 95, November 2014, Pages 499-505

Reduction of gelatinization temperatures of starch blend suspensions with supercritical CO₂ treatment (Article)

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Abstract

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Modification of starch blend properties by contact with supercritical carbon dioxide (scCO₂) was studied. Potato starch (PS), sweet potato starch (SPS), and cassava starch (CS) were blended with wheat starch (WS) at 15, 25, 50, 75 and 85% (w/w) ratios. For WS, the maximum decrease in gelatinization temperature (T_p) was 13 °C. The WS-PS and WS-CS blends exhibited a decrease in T_p of 13 to 17 °C. Reduction in T_p by treatment was 10 to 18 °C for all blend ratios. Conditions for lowering the starch blend T_p were determined to be a minimum contact time of 1 h with scCO₂ at 60 °C and 20 MPa. Swelling of starch granules that leads to the lowering of T_p involves both kinetic and physicochemical factors. Gelatinization of wheat starch blends with scCO₂ pressure treatment provides a versatile and non-thermal method for modifying the properties of ingredients used in food processing applications. © 2014 Elsevier B.V. All rights reserved.

Author keywords

Carbohydrate Differential scanning calorimetry Food processing Gelatinization temperature Starch modification

Indexed keywords

Engineering controlled terms: Carbohydrates Carbon dioxide Differential scanning calorimetry Food processing Gelation Processed foods Supercritical fluid extraction Thermal processing (foods) Carbon

Gelatinization temperature

Physico-chemical factors

Pressure treatments

Processing applications

Starch modification

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Engineering main heading: Starch

Zaidul, I.S.M. , Absar, N. , Kim, S.-J.
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Funding details

Funding number	Funding sponsor	Acronym
	Japan Society for the Promotion of Science	JSPS

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