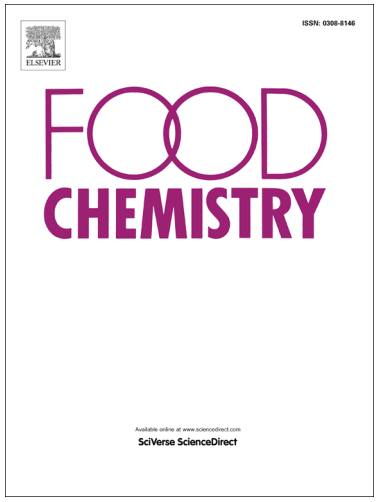

Co-melting behaviour of sucrose, glucose & fructose

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Co-melting behaviour of sucrose, glucose & fructose

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Abstract

The co-melting behaviour of sugar mixtures, comprising sucrose, glucose and fructose at various binary (3:1, 1:1, 1:3, 1:7, 1:15) and ternary (4:1:1, 2:1:1, 1:1:1, 2:5:5, 2:11:11, 1:4:1, 1:10:1) ratios, was studied using DSC. The melting temperature of sucrose was found to decrease in the presence of either fructose or glucose. In the sugar mixtures, the melting enthalpy of sucrose decreased compared with the proportional calculated values, using the percentage equation, whilst the melting enthalpy of fructose or glucose increased at the same time, implying the melting or dissolution of sucrose together with fructose or glucose. The tested enthalpy is usually higher than the calculated enthalpy for fructose, but lower than the calculated enthalpy for sucrose. Microscopic pictures showed that sucrose crystals could melt and dissolve gradually in the fructose melt liquid. This study provides useful information for both fundamental understanding of sugars co-melting and food industry applications.

Keywords: sugar melting; DSC; sucrose; glucose; fructose

Highlights: