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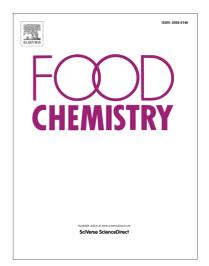
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CCEPTED MANUSCRIPT

Co-melting behaviour of sucrose, glucose & fructose

Yong WANG^{a,b,c}, Tuyen TRUONG^b, He LI^a, Bhesh BHANDARI^{b,*}

^a Beijing Advanced Innovation Center for Food Nutrition and Human Health, Beijing Technology

and Business University (BTBU), Beijing 100048, China

^b School of Agriculture and Food Sciences, University of Queensland, St Lucia, QLD 4072,

Australia

^c Beijing Key Laboratory of Nutrition & Health and Food Safety, COFCO Nutrition & Health

Research Institute, COFCO, Beijing 100020, China

*Contact author: Bhesh Bhandari, b.bhandari@uq.edu.au, +61 7 334 69192, School of Agriculture

and Food Sciences, University of Queensland, St Lucia, QLD 4072, Australia

Authors' email address:

Yong WANG: benjaminwy@gmail.com; wang-yong@cofco.com

Tuyen TRUONG: tuyen.truong@uq.edu.au

He LI: lihe@btbu.edu.cn

Bhesh Bhandari: b.bhandari@uq.edu.au

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:

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