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ONLINE ISSN : 1881-3984

PRINT ISSN : 1344-6606

Food Science and Technology Research

Vol. 14 (2008) , No. 5 pp.457

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Application of Whey Protein Isolate Glycated with Rare Sugars to Ice Cream

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(Received: February 12, 2008)

(Accepted: May 16, 2008)

Glycated whey protein isolate (WPI) was prepared by incubation of WPI with the rare sugars, d-allose (All) and d-psicose (Psi) under controlled conditions. Its emulsion and foaming properties, and its antioxidant activity were determined and compared to those of the native WPI and of WPI glycated with the alimentary sugars d-glucose (Glc) and d-fructose (Fru). WPI glycated with ketohexose showed a greater ability to form emulsions than control WPI or WPI glycated with aldohexoses. The foam overrun of all glycated WPIs was almost the same as that of the WPI control. However, the foam stability of WPI glycated with ketohexose was higher than that of the WPI control and of WPI glycated with aldohexose, following whipping for 30 min. Moreover, WPI glycated with the rare sugars All and Psi had the highest antioxidant activity as determined with the ABTS^{•+} radical, even at low concentration. WPI glycated with rare sugars was then applied to ice cream manufacture and the resulting ice cream properties were evaluated and compared with ice cream made from skim milk powder (SMP). The ice cream made with added glycated WPI showed ice cream overrun and hardness that was intermediate between that of SMP and native WPI ice cream. On the other hand, the modified ice creams containing WPI glycated with the rare sugars All and Psi had significantly higher antioxidant activity than the other ice cream samples as determined with the ABTS^{•+} radical. Thus, glycation of WPI with Psi improves emulsion and foaming properties and, after application in ice cream manufacture maintains high antioxidant activity. Fortification of ice cream with glycated WPI can therefore produce ice cream with excellent antioxidant activity and good ice

cream qualities.

Keywords: [rare sugars](#), [WPI](#), [glycation](#), [ice cream](#)

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FSTR. Vol. **14**, 457. (2008) .

doi:10.3136/fstr.14.457

JOI JST.JSTAGE/fstr/14.457

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