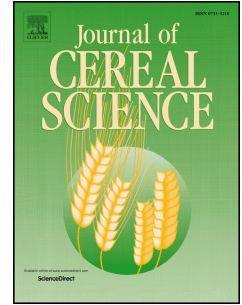


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Effect of starch modification in the whole white rice grains on physicochemical properties of two contrasting rice varieties

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Abstract

The effect of acetylation of milled rice of selected rice varieties viz. TDK8 and DG on their physicochemical properties was investigated at different acetic anhydride concentrations (1 – 7 g per 100 g of milled rice samples in 225 mL of water). Results showed that the intact starch of milled grains of both selected varieties could be acetylated (Acetyl % for TDK8 = 2.81 and for DG = 0.89) even with 1 g of acetic anhydride. X-ray diffraction patterns showed that acetylation resulted in reduced crystallinity. Acetylation resulted in reduced peak and final viscosities and gel strength, particularly in glutinous (TDK 8) and non-glutinous (DG) rice. Thermal study showed acetylation resulted in reduced thermal transition temperatures and enthalpy of both varieties. Although the increase in retrogradation thermal temperatures was observed, the amount of retrograded starch was decreased in both varieties. Furthermore, the texture of cooked acetylated grains was less hard and more adhesive. *In vitro* digestion showed significant decrease in GI possibly due to structural changes in the native starch during acetylation. These findings suggest a good potential of applying acetic anhydride pre-treatments in rice processing, especially glutinous varieties to control the hardness and maintain the stickiness properties of rice.

Keywords

Acetylation; Pasting properties; Thermal properties; Texture profile analysis

List of abbreviations

AA₀ 0 g of acetic anhydride per 100 g of milled rice grains in 225 mL of water

AA₁ 1 g of acetic anhydride per 100 g of milled rice grains in 225 mL of water

AA₃ 3 g of acetic anhydride per 100 g of milled rice grains in 225 mL of water

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