



EFFECT OF AUTOCLAVING-COOLING ON THE PHYSICAL PROPERTIES, MICROSTRUCTURE AND STARCH HYDROLYSIS OF MILLED RICE

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ABSTRACT

The research aimed to determine the effect of autoclaving and cooling on physical properties, particularly texture and color of cooked rice grains, the microscopic images and starch hydrolysis. Autoclaving and cooling were applied on rice grains to slow down rice starch hydrolysis. Three rice varieties were selected based on amylose level (high, medium and low amylose content of rice varieties). Autoclaving-cooling was conducted by autoclaving rice grains in excess water at 120°C for 15 minutes, followed by cooling the rice grains at temperature of 4°C for 24 hours. The process of autoclaving and cooling were repeated for the treatments of two and three autoclaving-cooling cycles. Results showed that rice variety (based on amylose content) and number of autoclaving-cooling cycles had significant effect on the rate of starch hydrolysis, on the other hand, they had no significant effect on the texture and color of cooked rice. Microstructure images showed that the autoclaved-cooled rice grains displayed more condensed structure and a continuous network with irregular shape formed. The higher amylose rice variety and more autoclaving-cooling cycles applied on rice grains resulted in a lower rate of constant (k) of total dissolved solids content during starch hydrolysis. The condensed microstructure in a rice grain and a lower rate of starch hydrolysis might indicate the content of resistant starch in rice grains increased; therefore it would result in a slower glucose release during digestion.

Keywords:

Rice;

Autoclaving;

Cooling;

Physical;

Starch hydrolysis.