

Effect of Temperature at Grain Filling Stage on Activities of Key Enzymes Related to Starch Synthesis and Grain Quality of Rice [PDF]

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摘要: Three japonica rice varieties with different cooking and eating quality were grown at high temperature in the greenhouse and natural field. Effects of temperature at the grain filling stage on these varieties were investigated in terms of the activities of key enzymes related to starch synthesis and cooking and eating quality of rice grain. The high temperature at the grain filling stage increased protein content, and decreased amylose content and taste meter value of rice; inferior grain quality varieties showed a greater magnitude of the increase or decrease than the superior ones. Reaction of rapid visco analyser profiles to the temperature varied with rice varieties. The activities of adenosine diphosphoglucose pyrophosphorylase (AGPP), soluble starch synthase (SSS) and starch branching enzyme (SBE) gradually increased to a peak value, and thereafter declined as grain filling progressed. Enzyme activities in different varieties differed in a same filling stage, and also in the time when the enzyme activity reached a maximum. AGPP and SSS were insensitive to the environmental temperature, but SBE was comparatively sensitive to the temperature, and its activity declined when temperature was too high or too low.

关键词: japonica rice; grain filling stage; temperature; starch synthesis enzymes; cooking quality; eating q

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