

Effects of storage conditions on the retrogradation properties of Xiaozhan rice

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The retrogradation of rice during storage will seriously affect the taste and flavor of rice. In order to further improve the storage conditions of rice and reduce the quality decay caused by retrogradation properties, the changes of starch structure and physicochemical properties of Xiaozhan rice at different storage temperatures (0?, 4?, 10?, 15?, 25?) and storage times (15d, 30d, 45d, 60d, 75d) were studied in this paper. Starch, amylose and amylopectin were extracted from Xiaozhan rice at different storage times and temperatures, and the color reaction was observed, and the retrogradation rate, chain length distribution, molecular weight, infrared spectroscopy (IR) and X-ray diffraction pattern were measured and analyzed. The correlation between storage conditions and those physicochemical properties was investigated. The results shown that there was a positive correlation between temperature and starch retrogradation rate after 75 days of storage ($R^2=0.64$, $r=0.806$), the starch retrogradation rate was the lowest at 0?, and the fluctuation was the least during the whole storage period. Combined with IR and X-ray diffraction, it was found that low temperature was beneficial to maintain water molecular content and relative crystallinity of Xiaozhan rice starch, which could maintain good edible taste and nutritional quality of rice. The results of this study shown that there was a correlation between storage conditions and physicochemical properties of rice, which would provide data and theoretical basis for the optimal selection of Xiaozhan rice storage environmental parameters.