

P258

Effects of harvesting times on pasting properties of starch in colored rices

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Abstract

The study was conducted to investigate the effects of different harvesting time on pasting properties of starch in three colored rices. Seven major parameters of starch pasting properties, peak viscosity (PKV), hot pasting viscosity (HPV), cool pasting viscosity (CPV), setback (CPV minus PKV), breakdown (PKV minus HPV), peak time, and pasting time were determined by Rapid Visco Analyzer. The peak viscosity, hot viscosity, cool viscosity and peak time were influenced by different harvesting times. Pasting time was delayed slightly with prolonged harvesting time in all rice cultivars. Pasting temperature in each rice cultivar differed from each harvesting time, and pasting temperature of the two rice cultivars, Hongjinju and Joseongheugchal, showed the highest at the 40 days after heading and then it decreased at the final harvesting time. With the delay of the harvesting time, peak viscosity, hot viscosity, cool viscosity, setback value and pasting temperature did not exhibit a regular trend depending on their genetic characteristics. Branch chain length distribution of amylopectin was demonstrated a distinct difference among these colored rices. In changes of amylopectin branch chain-length distribution, the amylopectin structure of Hongjinju rice cultivar as affected by different harvesting time, the shortest chain length of amylopectin in rice starch harvested at 20 days after heading was characterized by the significant increase in A chains with $DP \geq 12$ and remarked decrease in long chains $37 \leq DP$ compared to that of 30, 40, and 50 days after heading. In particular, when harvesting time is delayed the distribution percentage of short chain (A chains with $DP \geq 12$) was increased except for the rice which harvested 20 days after heading. The similar results were also observed in Sintoheugmi rice cultivar like that of Hongjinju rice cultivar. Otherwise, distribution percentage of the shortest chain length of amylopectin in rice starch harvested at 20 days after heading was characterized by the significant decrease in A chains with $DP \geq 12$ and remarked increase in B chains $13 \leq DP \leq 24$ compared to that of 30, 40, and 50 days after heading.

Keywords: colored rice, rice flour, starch, amylopectin, RVA.

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