

Using the Rapid Visco™ Analyser (RVA™) to Determine Pasting Property Changes in 12 Australian Rice Cultivars

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INTRODUCTION

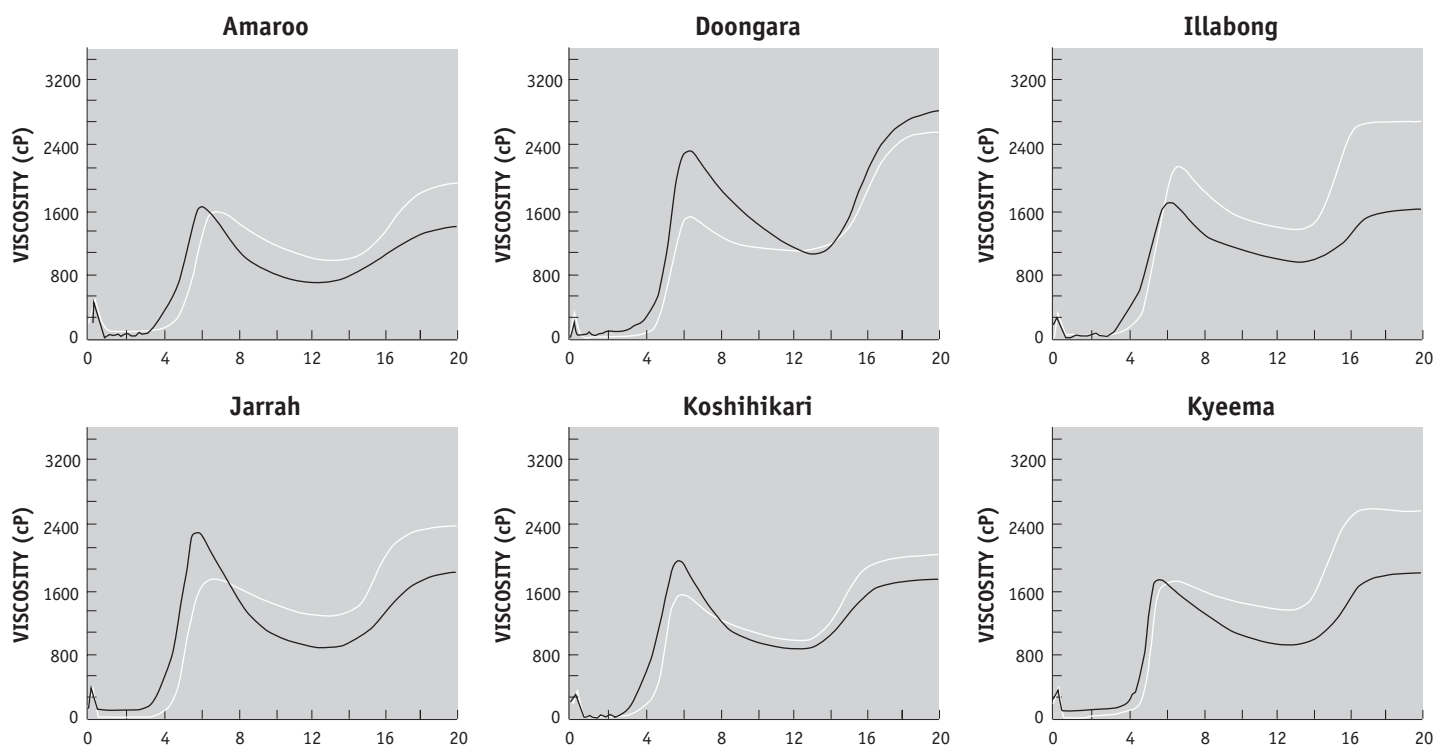
Rice is stored to maintain adequate supply beyond the harvest season. Higher temperature storage causes quality changes even though the total protein and starch content remain almost unchanged (Chrastil, 1990; Zhou et al., 2002). This paper compares the changes in pasting properties in 12 commercially grown Australian rice cultivars following 9 months' storage.

METHODS AND MATERIALS

Twelve brown rice cultivars (*Oryza sativa* L.) including Amaroo, Doongara, Illabong, Jarrah, Koshihikari, Kyeema, Langi, Millin, Opus, Paragon, Quest and Reiziq were stored in airtight jars at 37°C and 4°C. Rice flour samples were then analysed using the RVA after 1, 3, 6 and 9 month storage time intervals. Duplicate samples were withdrawn for each analysis. 3g of sample were added to 25mL of distilled water for each RVA analysis.

RESULTS

Note: 4°C storage shows relatively minimal changes, therefore only 37°C storage results are presented.



Pre-germination
in barley
Recent references
Newport
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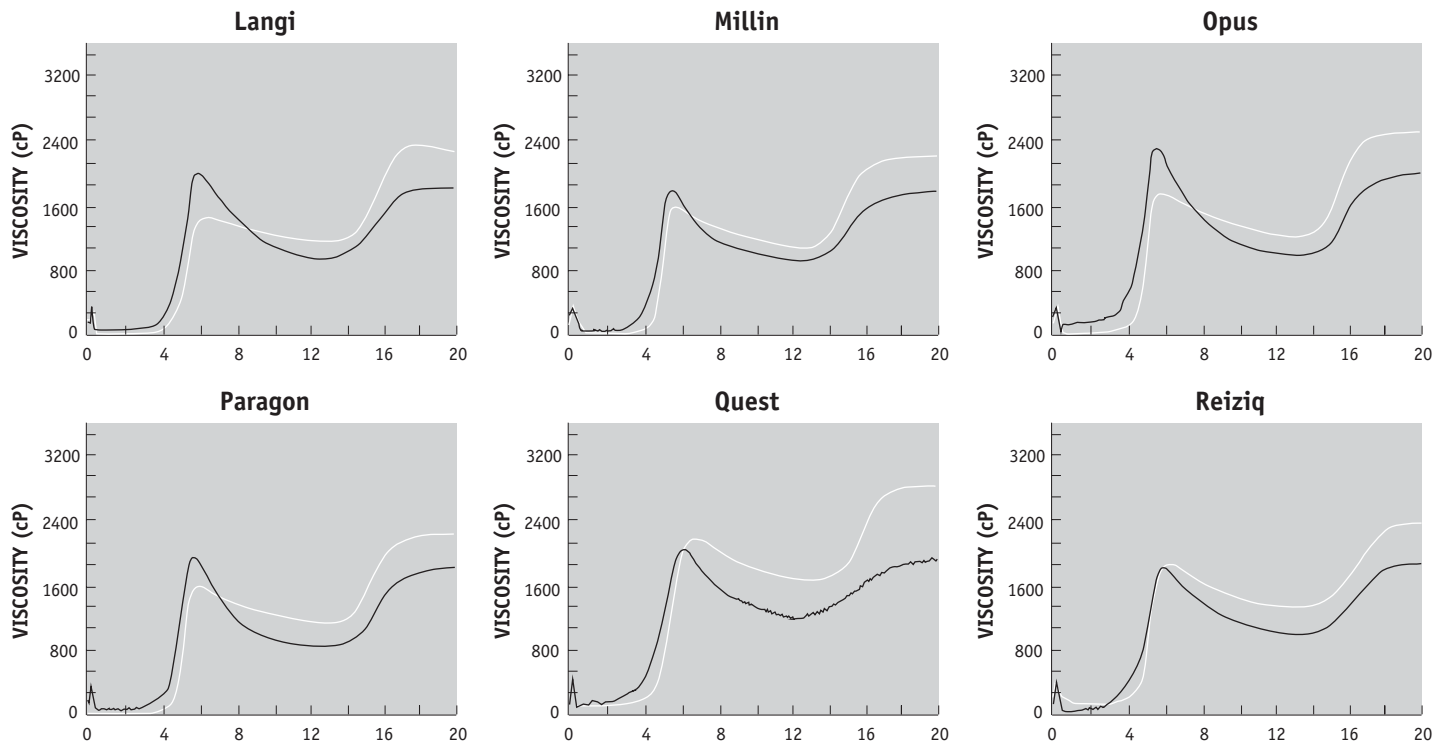


Figure 1 (this page and previous) RVA curves show changes in pasting properties of 12 cultivars after 9 months' storage.

Key
 — 1 month storage
 — 9 months' storage

Generally all cultivars follow similar changing trends but they appear to change at different rates following storage, suggesting physicochemical changes during storage. However, all rice cultivars retain obvious peaks in the RVA curve showing physicochemical quality retention as in fresh rice even after 9 months' storage.

Doongara and Illabong show the greatest changes. Doongara has the largest amylose content suggesting amylose content plays an important role in determination of rice storage properties. In addition, Illabong shows the greatest differences in Breakdown and Setback suggesting that it has the lowest stability during high temperature storage.

CONCLUSION

There appears to be a genetic basis contributing to differences in pasting properties as each cultivar changes at a different rate following storage. This suggests the potential for rice breeding according to storage characteristics. It will be valuable to further study amylose content and its relationship to rice storage characteristics.

ACKNOWLEDGEMENTS

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Canadian Grain Commission Develops Method for Detecting and Measuring Degree of Pre-germination in Barley using RVA-StarchMaster™

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The Canadian Grain Commission (CGC) has developed a method for the malting barley industry to use to predict the long-term storage capability of individual lots of malting barley.

The method uses the RVA-StarchMaster to detect and measure the degree of pre-germination in barley. It also recommends safe storage times at various temperatures and percentages of relative humidity for barley samples with various degrees of pre-germination.

Although a visual inspection of barley conducted during the selection processes can identify severely sprouted grain, it cannot detect early stages of germination.

'The CGC saw a clear need for a rapid and objective test,' said Peter Burnett, director of the CGC's Grain Research Laboratory (GRL). 'The method that we have developed will help companies make decisions about selected barley.'

To be selected and used for malting, barley should retain 95% germination energy (GE). The capacity of barley to maintain a high level of germination energy during long-term storage is diminished by pre-germination. Pre-germination, which may not be visible on the kernel, can occur before harvest and reduces the capacity of barley to retain germination energy. Barley initially accepted for malting may be rejected after several months in storage if it loses germination capacity and no longer has the high, uniform germination rates that produce good quality malt extract.

RVA STARCHMASTER™ — FINAL VISCOSITY < 100 RVA UNITS

- Pre-germinated.
- Probability that they will lose germination energy (GE) after storage is ~95%.
- Should be malted as soon as possible.

RVA STARCHMASTER™ — FINAL VISCOSITY BETWEEN 100 AND 135 RVA UNITS

- Probability that they will lose GE after storage is ~75%.
- The loss will occur especially in samples with high moisture contents.
- Better chance to retain GE during storage if the storage conditions are good (cool and dry).

RVA STARCHMASTER™ — FINAL VISCOSITY > 135 RVA UNITS

- Sound and they should retain GE even after a long-term storage.
- Probability that they will retain GE after storage is about 99%.

CANADIAN
GRAIN COMMISSION

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