rva the new standard world

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Applications Book

Applications of the Rapid Visco Analyser, edited by C. E. Walker and J. L. Hazelton, has just been published. It is a compilation of 16 papers, most presented at the 1994 AACC RVA Symposium along with other useful information. Applications covered include assessing cereal and fungal amylase activity, corn hardness, and qualities of wheat, rice, sorghum, soy sauce and extrudates. Sample testing methodology is described along with the effects of varying testing conditions such as temperature ramping rates. Copies are available from Newport Scientific at an introductory price of US$25 plus postage and handling.

Check Sample Service

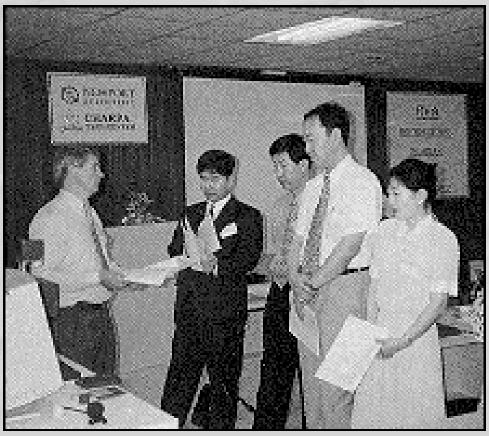
In November 1996, the American Association of Cereal Chemists gave another seal of approval to the Rapid Visco Analyser, by including it in the AACC Check Sample Program. This follows earlier approval of RVA methods by the AACC and other international cereal chemistry standards bodies. This latest milestone recognises the Rapid Visco Analyser as both a significant and widely applied technology in the cereals and starch quality testing industries.

Distributed samples will be available for testing using the international standard methods for stirring number and general pasting properties. Further information can be obtained by contacting Mr Steve Weiland, Check Sample Coordinator, American Association of Cereal Chemists.

Thailand Training Seminar

In February, Newport Scientific's Managing Director Rod Booth, Senior Research Scientist Mark Bason and Product Manager Bronwyn Elliott travelled to Thailand for our first Asian Distributors' Meeting. The two-day meeting had a strong emphasis on practical skills, with plenty of time to analyse samples on the RVA, and a full day devoted to service and maintenance procedures.

A customer seminar sponsored by local RVA representatives, Charpa Techcentre, with the theme 'Viscosity Measurement for Quality Control and Development of Starch Product' was held in association with the distributor training. The seminar, with addresses by Dr Klanerong Sriroth, Assistant Professor in the Department of Biotechnology at Kasetsart University, Bangkok, and Mark Bason, attracted over 80 participants.



Mark Bason from Newport Scientific (left) at the Asian Distributors' meeting.

Thermocline for Windows 1.2

TCW version 1.2 has been released. It contains all of Newport Scientific's RVA application methods pre-configured as automode tests, along with a number of bug fixes. Please contact your agent for more details.

IN THIS ISSUE

If you're serious about starch . . . there is only the Rapid Visco Analyser

RVA Viscograms of Flours Prepared from Cooked Rice

A.B. Blakeney[1], L.A. Welsh[1], M. Martin[1], R.I. Booth[2] and N.E. Turner[2]

The effect of amylose on cooked rice texture has been studied more than any other parameter that affects the rheoiogical properties of rice. Amylose content of rice influences cooked grain texture and the resistance of the starch to overcooking, The relationship between amylose and texture is well known: the higher the amylose content of rice the higher the resistance to overcooking.

Rice genotypes vary in amylose size and content, thus response to overcooking or industrial processing can vary with variety. Prediction of rice quality using the Rapid Visco Analyser (RVA) is a well-established, approved method (RACI, 1995; AACC, 1995). Cooked rice texture can also be estimated using the RVA, by testing a cooked rice sample and determining peak viscosity and temperature.

When rices were cooked in excess water for times between 5 minutes (under-cooked) and 60 minutes (excessively cooked) changes were observed throughout the cooking period. These changes have been demonstrated in the RVA using cooked, low-temperature dried rice ground to flour.

Materials and Methods

In order to demonstrate that amylose content is an important parameter influencing changes that occur throughout cooking, three rice varieties differing in amylose content were selected. The first was Calmochi 202, a waxy variety (0% amylose) developed in California and grown for this study at Yanco Agricultural Institute, NSW. Peldi was selected as a low level amylose rice (22% amylose), commonly grown in Australia as a soft cooking long grain rice, available as a commercial sample as 'Sunlong'. The high amylose rice used was Doongara (28% amylose), a firm cooking long grain rice grown in southern NSW and available commonly as 'Regal'.

1 Yanco Agricultural Institute, Yanco NSW 2703, Australia.
2 Newport Scientific, 1/2 Apollo St, Warriewood NSW 2102, Australia.

Rices were cooked to 75% wet weight basis (Juliano, 1985) in stainless steel 250 mm beakers with lids. Rice (100 g) of known moisture content together with an appropriate amount of water to give a final wet weight of 75% w/w were placed in a beaker and the beaker was immersed in a rapidly boiling water bath for cooking times varying between 5 and 60 minutes. Timing started from the moment the beaker was immersed into boiling water and continued until the beaker was removed. The contents of the beaker were immediately tipped into a stainless steel tray (18 x 23 cm) to aid in rapidly cooling the cooked rice.

Samples were dried at 40°C for 48 hours then they were ground to pass a 0.5 mm screen using a Newport Scientific 6200 cyclone mill, prior to RVA analysis. The RVA method used was according to RACI Method 06-05 (1995) with the profile shortened to 11 minutes with an additional step. An initial shaking step was included. Following the addition of the sample to water, a large inverted stopper was placed over the top of the RVA can and samples were shaken in a uniform way.This process aided in the hydration of the sample and has been previously described for extruded materials (Whalen et al, 1995).

Results

For the rices, peak viscosity and/or the temperature of the peak viscosity due to gelatinisation progressively decreased with cooking time. The peak temperature progressively decreased with increasing cooking time for the waxy rice while for the high amylose rice, peak viscosities decreased with increasing length of cook, however the temperature of the peak remained the same for all samples. The low amylose rice displayed trends seen for both the high and no amylose rice samples, that is, with increasing length of cook there was a reduction in temperature and viscosity for the peak.

The appearance of a pre-gelatinisation peak with increasing length of cooking time for waxy rice could be attributed to cold swelling of the gelatinised starch. This phenomenon is easily seen in Figure 1, where cold peak viscosities of a similar magnitude to raw gelatinisation peaks occurred at cooking times in excess of 20 to 30 minutes.

The high amylose rice (Figure 2) didn't show true cold swelling peaks but rather a continuing increase in viscosity throughout the RVA program when cooked for more than 40 minutes.

The low amylose rice (Figure 3) exhibited patterns intermediate between high amylose and waxy rices, showing a cold peak viscosity after being cooked for one hour. Cold viscosity was higher than for the high amylose rice but peak viscosities were still higher than the cold viscosities, unlike those for the waxy rice.

Conclusions

The progressive nature of the curves may be explained in terms of degree of cook and amylose content. The effect of cook is best seen with the waxy rice where cold viscosity increases with increasing length of cooking time. The differences between the rice varieties may demonstrate the different responses of amylopectin versus amylose containing starches to shear thinning as previously demonstrated by Bourne (1982).

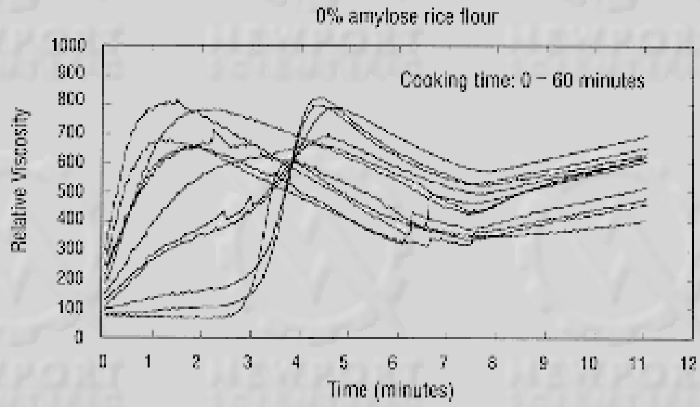


Figure 1. ***Viscosity traces of waxy rice, cooking times 0-60 minutes.***

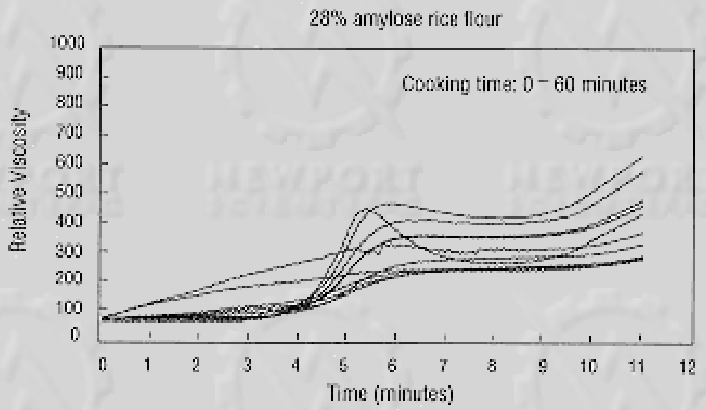


Figure 2. ***Viscosity traces of high amylose rice, cooking times 0-60 minutes.***

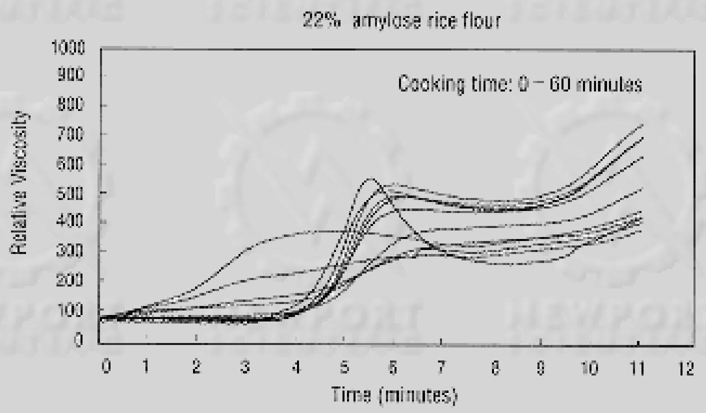


Figure 3. ***Viscosity traces of low amylose rice, cooking times 0-60 minutes.***

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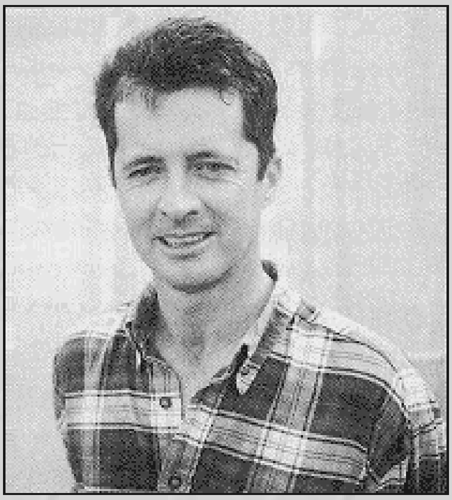
Meet the People:

Aidan Harmon



Aidan has been working as Newport Scientific's Production Manager for the past year. With a degree in electronics from the University of Limerick, Ireland, Aidan has 20 years' experience in the electronics manufacturing industry.

Aidan originally had a five-year stint in Australia during the '80s, including three years as an Electronics Design Engineer with Gilbarco, the manufacturers of petrol pumps. Returning to Ireland in 1988, Aidan worked as a Process Engineer with Harris Semiconductor. Then as a Product Engineer for Microsoft in their European Operations Centre in Dublin. Aidan was charged with bringing Microsoft mice designs into high volume production.

Now, as Production Manager at Newport Scientific, Aidan is responsible for establishing and maintaining a flexible manufacturing facility, better able to meet the delivery requirements of the international market.

Newport Scientific P/L
Unit 1, 2 Apollo Street
Warriewood NSW 2102 Australia
Tel: +61 (02) 9979 6992
Fax: +61 (02) 9979 6993
Email: support@newport.com.au

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