

Monitoring Distillery Processes in Whisky Production Method

Scope

- Characterize malt quality for distilling.
- Monitor malt modification.
- Characterize wheat quality for grain distilleries.

Rapid Visco Analyser

The Rapid Visco Analyser (RVA) is a cooking stirring viscometer with ramped temperature and variable shear profiles optimized for testing viscous properties. The instrument includes international standard methods as well as full flexibility for customer tailor-made profiles. Combining speed, precision, flexibility and automation, the RVA is a unique tool for product development, quality and process control and quality assurance.



Description

The profiles in this method are modified from the procedures of Broadhead *et al.* (2004), using malted barley and wheat.

In studying barley malt and modified malt samples for distilling performance, Broadhead *et al.* (2004) used a 30-minute heating profile on the RVA to successfully identify malts which caused wort separation problems. These samples had higher peak viscosity values and lower pasting temperatures compared to well-performing samples (Fig. 1A).

The RVA was also used by Broadhead *et al.* (2004) to study the quality of wheat used in grain distilleries. RVA analyses showed differences between pasting characteristics of well-performing and poor-performing wheat. The samples that were known to cause problems in processing due to the thickness of the cooks they created showed RVA curves with higher peak and viscosities than the well-performing samples (Fig. 1B).

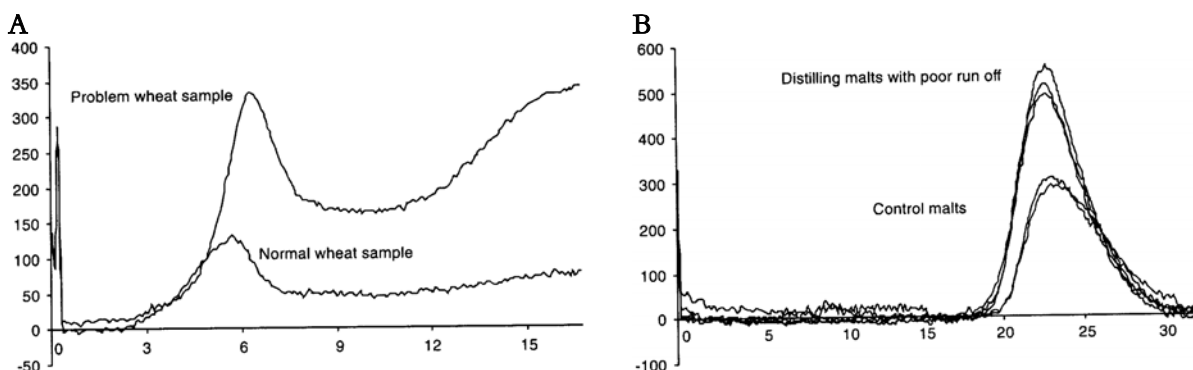


Fig. 1. RVA pasting curves of (A) distilling malt and (B) grain distillery wheat samples. Source: Broadhead *et al.* (2004).

Method

Modified from methods described in Broadhead *et al.* (2004).

Sample Preparation

Barley Malt: Test 8.50 ± 0.01 g flour (14% moisture) and 19.5 ± 0.1 g distilled water using **Profile 1**.

Wheat: Test 3.00 ± 0.01 g ground grain (14% moisture) and 25.0 ± 0.1 g distilled water using **Profile 2**.

Profile

Profile 1: Barley Malt

Time	Type	Value
00:00:00	Temp	30°C
00:00:00	Speed	960 rpm
00:00:10	Speed	160 rpm
00:30:00	Temp	69°C
00:30:00	End	
Idle Temperature: $50 \pm 1^\circ\text{C}$ Time Between Readings: 4 s		

Profile 2: Wheat

Time	Type	Value
00:00:00	Temp	50°C
00:00:00	Speed	960 rpm
00:00:10	Speed	160 rpm
00:01:00	Temp	50°C
00:04:42	Temp	95°C
00:07:12	Temp	95°C
00:11:00	Temp	50°C
00:13:00	End	
Idle Temperature: $50 \pm 1^\circ\text{C}$ Time Between Readings: 4 s		

Measure

Pasting temperature
Peak viscosity
Final viscosity

Reference

Broadhead, A.L., Brosnan, J.M. and Bringham, T.A. 2004. The role of the Rapid Visco Analyser (RVA) in minimising distillery processing problems. In: Distilled Spirits: Tradition and Innovation. J.H. Bryce and G.G. Stewart (Eds.). Iowa State, Chapt. 13, pp.89–94.