

Solvent Retention Capacity Method

Scope

- Assess flour quality and functionality.
- Predict baking performance.

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

Traditionally, the Solvent Retention Capacity (SRC) test (AACC International Method 56-11.02) involves suspending wheat flour in four solvents (water, lactic acid, sodium carbonate, sucrose). The SRC is the weight of the solvent held by flour after centrifugation, expressed as percent of flour weight on a 14% moisture basis. The four SRC values obtained from the tests are used to assess flour quality and functionality, and are useful for predicting baking performance. The method is tedious and time consuming, requiring at least 45 minutes.

The RVA can be used as a rapid means to assess the SRC of wheat flour, with results that are well correlated with those obtained from the conventional SRC method of the AACC International. The method involves holding a concentrated suspension of flour and solvent at 25°C, then heating and holding at 50°C. Each test is completed within 10 min, with the four solvents giving results within 40 min. The main advantage of the method is that tedious sample preparation/manipulation steps are eliminated.

During the test the viscosity reaches a plateau, then when heated to 50°C the viscosity decreases. The viscosities at 3 min and 10 min are useful indicators of product quality.

Below are found RVA profiles of flour samples tested with water, 5% lactic acid, 5% sodium carbonate, and 50% sucrose using the RVA SRC.

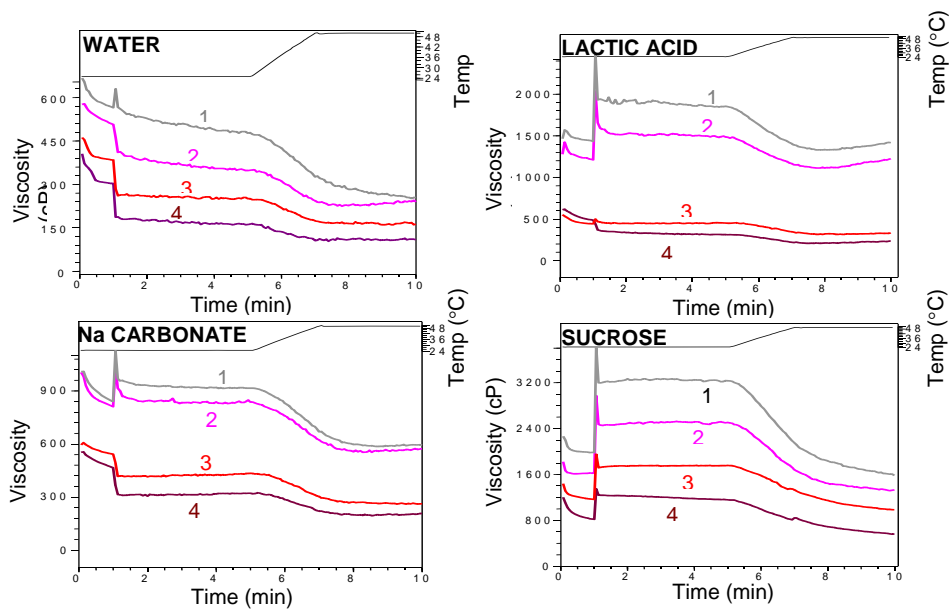


Fig.1. RVA curves for each of the four solvents.

Method

Ten-minute profile for each of the four solvents (distilled water, 5% (w/w) lactic acid, 5% (w/w) sodium carbonate, 50% (w/w) sucrose).

Sample Preparation

15.00 g wheat flour at 12% moisture and 25.0 g solvent.

Preparation of Solvents

1. Distilled water as is.
2. Lactic acid solution, 5% (w/w). Using assay value given on reagent bottle, calculate the weight of reagent required to give 50 g lactic acid (e.g. if lactic acid is 88.50% concentration, add $50 \div 0.885 = 56.497$ g lactic acid). Weigh that amount of reagent into a 1 liter container. Add distilled water to make 1000 g.
3. Sodium carbonate solution, 5% (w/w). Weigh 50 g of reagent grade anhydrous sodium carbonate into a 1 liter container. Add distilled water to make 1000 g.
4. Sucrose solution, 50% (w/w). Make sucrose solution 12 h in advance. Weigh 500 g of reagent grade sucrose into a 1 liter container. Add distilled water to make 1000 g. Make sucrose solution 12 h in advance. Reagents can be stored at room temperature up to 7 days.

Profile

Time	Type	Value
00:00:00	Temp	25°C
00:00:00	Speed	1000 rpm
00:01:00	Speed	160 rpm
00:05:00	Temp	25°C
00:07:00	Temp	50°C
00:10:00	End	
Idle Temperature: 25 ± 1°C Time Between Readings: 4 s		

Measure

V3: Viscosity at 3 minutes (cP)

V10: Viscosity at 10 minutes (cP)

BD: Breakdown $[100 \times (V3 - V10) / V3]$