

91°C General Pasting Method

Scope

- Modified general pasting method for testing at high altitude.
- Assess the cooked viscosity of ground materials: carbohydrates (starch, flour, whole meal), proteins (soy, gluten, milk), gums.
- Quality control.
- Compare samples (e.g. examine competitive products).
- Assess amylase activity in flour.
- Investigate effect of formulation.

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

This method is a modification of RVA Method 1 - General Pasting Method, for testing at high altitude. The method uses a maximum test temperature of 91°C, to avoid boiling of water in the RVA canister at high altitudes (900-2100 m, or 3000-7000 ft).

The pasting properties of starch and starch-containing products are readily assessed in the RVA. During the test, the starch is gelatinized with consequent rise in viscosity, subject to high temperature and controlled shear during which its stability is revealed, then cooled to provide an indication of setback during gelation. Samples can be assessed for pasting temperature, peak paste viscosity, time to peak, temperature at peak, hot and cold paste viscosity, breakdown, setback, final viscosity and other parameters.

The method is applicable to any ground material including, but not limited to, cereal and other starches, flours, wholemeals and formulations. It may also be used to assess α -amylase activity.

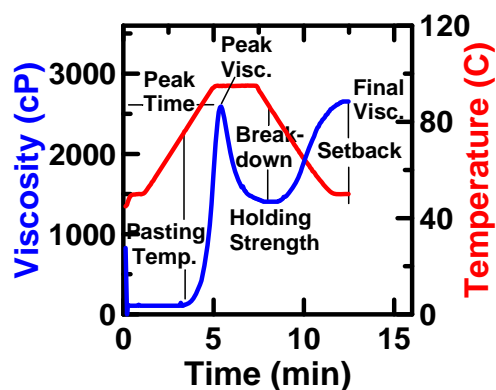


Fig. 1. Pasting curve of starch using the 91C_STD1 profile, showing the commonly measured parameters.

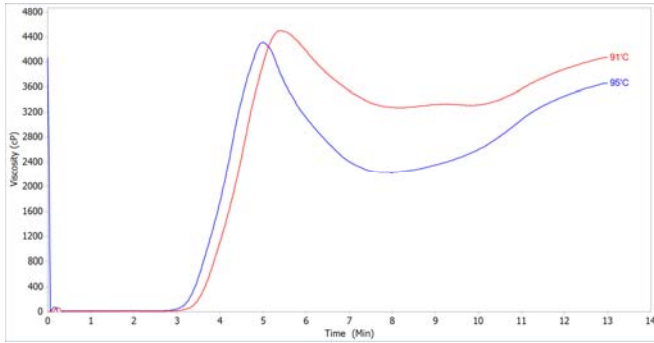


Fig. 2. Pasting curve of starch tested at 95°C (STD1) and 91°C (91C_STD1).

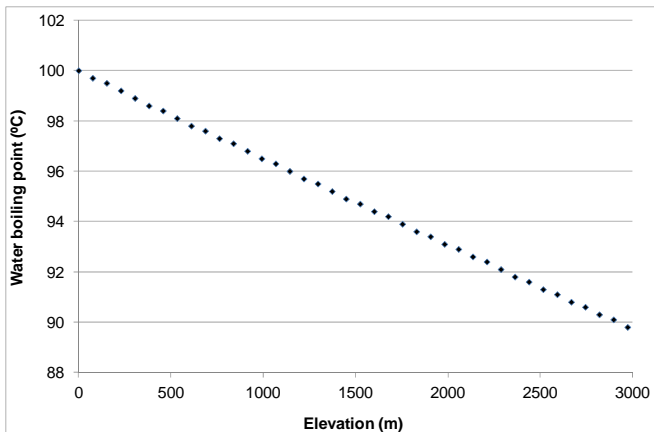


Fig. 3. Water boiling point as a function of elevation.

Method

91C_STD1 and 91C_STD2 pasting profiles

Sample preparation:

X g sample at 14% moisture and 25.0 ml distilled water. The amount of sample to use depends on the material. The following table may be used as a general guide.

Table 1. Amount of sample for various materials.

Material	Amount (g)
Whole meal	4.00
Flour	3.50
Native Starch:	
Cereal, Non-Waxy	3.00
Cereal, Waxy	2.50
Potato	2.00 ¹
Tapioca	2.50
Modified Starch:	
Acid Modified	4.00-22.00 ²
Oxidized	4.00-22.00 ²
Substituted	2.50
Cross-Linked	2.50

¹Use 1.20 g if the starch was not prepared commercially

²The amount to use depends on the degree of modification

Profile

91C_STD1

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	91°C
00:07:12	Temp	91°C
00:11:00	Temp	50°C
00:13:00	End	
Idle Temperature: 50 ± 1°C Time Between Readings: 4 s		

91C_STD2

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
00:08:30	Temp	91°C
00:13:30	Temp	91°C
00:21:00	Temp	50°C
00:23:00	End	
Idle Temperature: 50 ± 1°C Time Between Readings: 4 s		

Measure

PT: Pasting temperature (°C)

PV: Peak viscosity (cP)

PTi: Time to peak (min)

BD: Breakdown (cP)

TV: Trough/minimum viscosity (cP)

SB: Setback (cP)

FV: Final viscosity (cP)

See also RVA Method 1 - General Pasting Method.