

Xanthan Gum Hydration Method

Scope

- Assess viscous properties of xanthan gum in water and other solutions at various heating and shear rates.

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

Xanthan gum is a fermentation product of *Xanthomonas campestris*. The polymer has a (1→4) linked β -D-glucose backbone with a trisaccharide side chain on every second residue. This side chain carries a charge and can align with the backbone to stabilize this gum at high temperatures, high ionic strength conditions and low pH. Xanthan also forms helical molecules that can be disrupted at high temperature to form more flexible coil conformations. These changes in conformations alter the rheological properties of xanthan (Hill and Sereno, 2005). Effects of sample concentration, temperature and salt on xanthan viscosity are shown in the two following figures.

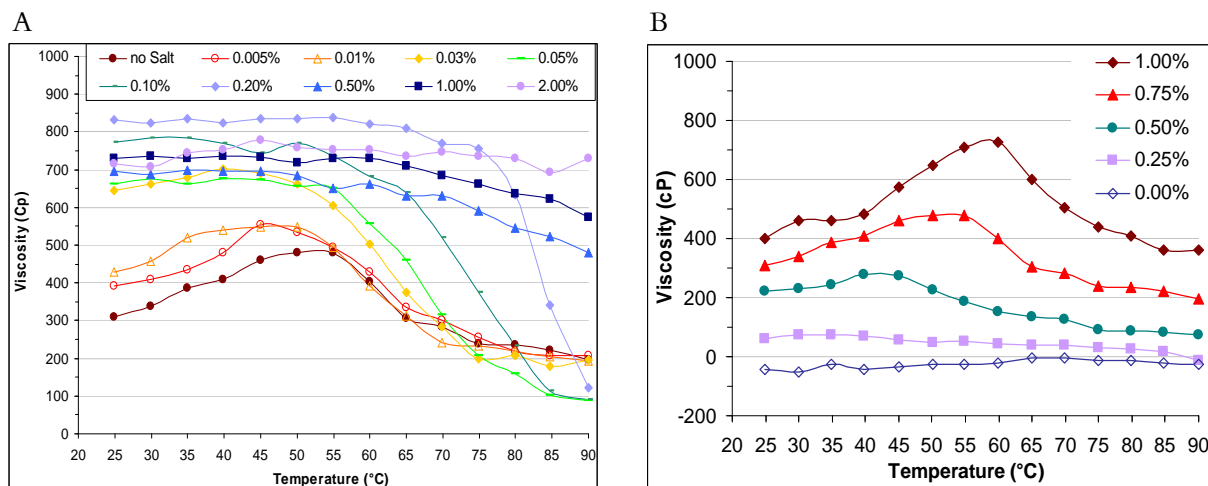


Fig. 1. Effect of concentration and temperature on xanthan viscosity in distilled water (A) and 0.75% (wet basis) in salt (NaCl) solution (B). Source: Hill and Sereno (2005).

Method

The sample is pre-hydrated then subjected to variable (high and low) speed mixing in the RVA, with the temperature ramped up at 5°C/min. High speed mixing ensures that all the material is in suspension. Actual viscosity values used for comparison are recorded at the low speed.

Sample Preparation

Pre-RVA Hydration: Add sample powder to solvent (water or salt solution) at the required concentrations (w/w) and mix at high shear (~750 rpm) for 30 min at room temperature. Allow sample to rest for 2 hr prior to testing.

RVA Analysis: Analyze the sample in the RVA using the following profile.

Profile

Time	Type	Value
00:00:00	Temp	20°C
00:00:00	Speed	960 rpm
00:00:20	Speed	60 rpm
00:01:00	Speed	960 rpm
00:01:20	Speed	60 rpm
Same speed and time changes up to 14 min.		
00:14:00	Temp	90°C
00:14:00	End	
Idle Temperature: 20 ± 1°C Time Between Readings: 4 s		

Measure

Viscosity at 2 min. intervals until the end of test (2, 4, 6, 8, min.)

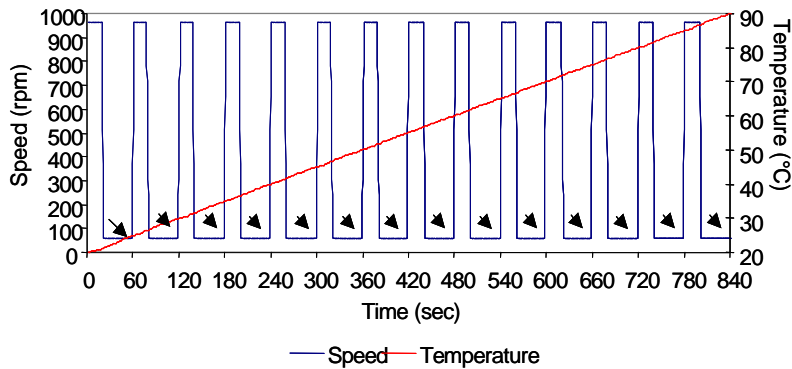


Fig. 2. Profile for Xanthan Gum Hydration method.

See also RVA Method 41: Gelling Capacity of Gums Method.