

Retorting Method

Scope

- Ingredient suitability for retorting
- Product development
- Sample sterilization
- Mimic the retorting process for quality assurance

Rapid Visco Analyser 4800 (RVA 4800)

The Rapid Visco Analyser (RVA) is a cooking viscometer with ramped temperature and variable shear capability optimized for testing viscous properties of starch and similar temperature-dependent hydrocolloids. The RVA 4800 can perform regular tests below 100°C, as well as high-temperature tests up to 140°C in a specially designed pressure vessel. The RVA 4800 can be used to assess the viscous potential and stability of polysaccharide thickeners under high temperatures required for retorting and similar sterilization processes. The instrument provides a tool for performing more relevant analyses for a variety of applications.



Description

The ability of the components of a product to withstand high-temperature processing conditions is of interest to formulators, who must balance the need for acceptable product rheology with safety and throughput. Pasteurization, blanching and sterilization are thermal processes that eliminate a desired number of microorganisms from food products. The severity of the thermal process, a combination of the temperature and time, determines the degree of pathogen (or risk) removal. The time and temperature required for sterilization are influenced by the type of microorganism found on the food, the size of the container, the acidity (pH) of the food, and the method of heating.

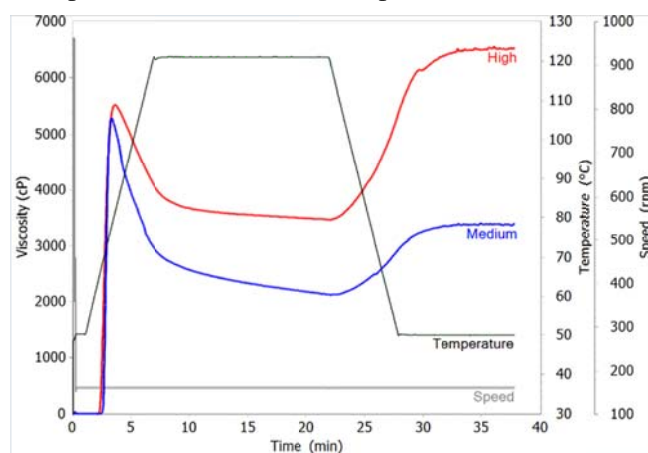


Figure 1. Pasting curves of corn starch showing greater thermal tolerance of the more highly cross-linked sample to 121°C retorting conditions.

Improper calculation of thermal treatment requirements for retorted products can lead to spoilage and infection risk, or more commonly to over-processing of the areas of the food furthest from the cold spot. Over-processing may result in loss of nutrients, impairment of rheological functionality and reduction of overall product quality.

This high-temperature RVA method is designed to mimic retorting, allowing assessment of the suitability and stability of polysaccharide thickeners (eg. gums, modified starches) in the formulation for high temperature processing.

Method

High-temperature profile with maximum test temperature of 121°C held for 15 minutes.

Test requirements

RVA mode: High temperature coupling, lever forward
Cans & paddles: High temperature, tray of 42 (PN NS106944)



Sample preparation:

X g sample at 14% moisture and 25.0 mL distilled water. The amount of sample to use depends on the material. Table 1 may be used as a general guide.

Table 1. Amount of sample for various materials.

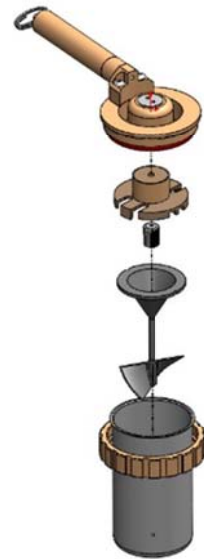
Material	Amount (g)
Gums	0.25-0.75
Modified Starch:	
Acid Modified	4.00-22.00 ¹
Oxidized	4.00-22.00 ¹
Substituted	2.50
Cross-Linked	2.50

¹The amount to use depends on the degree of modification

Profile

Table 2. Retorting method.

Time	Type	Value
00:00:00	Temperature	50°C
00:00:00	Speed	960 rpm
00:00:10	Speed	160 rpm
00:01:00	Temperature	50°C
00:06:55	Temperature	121°C
00:21:55	Temperature	121°C
00:27:50	Temperature	50°C
00:37:50	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)