APPLICATION BRIEF

Physical Testing - Food

AUTHOR

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RVA Method 30.04 Cheese Melt Method

Introduction

Cheese melting temperature and viscosity are important quality characteristics for the processing and consumption of cheeses such as mozzarella. The minimum viscosity is a measure of how flowable the cheese is when held at a fixed temperature, with a more flowable cheese having a lower minimum viscosity. The melting and solidification temperature indicate how soon a cheese will start melting when heated and how quickly a cheese will solidify on cooling. Cheeses with the same value for minimum viscosity can have different temperatures for melting or solidification.[1]

In this application brief, a thirteen-minute pasting profile utilizing grated cheese is presented utilizing a Rapid Visco Analyzer (RVA) to assess melt characteristics in processed food. Combining speed, precision, flexibility and automation, the RVA is a unique tool for product development, quality and process control and quality assurance. The melt characteristics of grated cheese can be measured in the RVA in the presence of a small amount of propylene glycol. The RVA parameters including temperature at melting, minimum viscosity and temperature at solidification are good indicators of the meltability of a processed cheese sample.[1]

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Experimental

Rapid Visco Analyzer (RVA)

The Rapid Visco Analyzer (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. Figure 1 displays a typical RVA curve for processed cheese, with Point A indicating the melting of the cheese sample, Point B indicating flowability, and Point C the solidification of melted cheese when cooled.

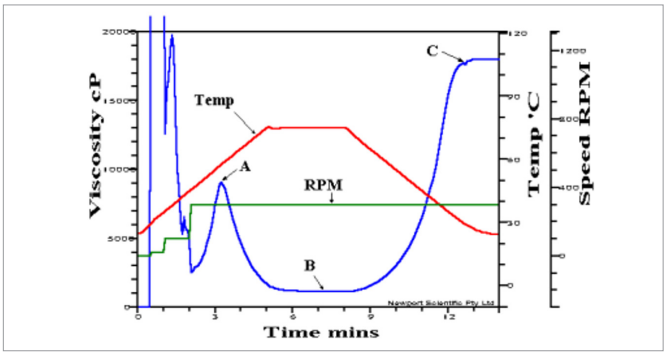

Figure 1. Typical RVA curve for processed cheese.

Method

Grate representative amount of cheese and return to refrigerator for at least 30 min. to temper prior to analysis. Line bottom of canister with 1.0 g propylene glycol, add 14.00 g grated cheese. Propylene glycol is not needed if a processed cheese spread is used (in this case, use 15.00 g sample).

The following profile was utilized in this work:

Time	Type	Value
00:00:00	Temp	25 °C
00:00:00	Speed	0 rpm
00:00:30	Speed	20 rpm
00:01:00	Speed	100 rpm
00:02:00	Speed	300 rpm
00:05:00	Temp	80 °C
00:08:00	Temp	80 °C
00:13:00	Temp	25 °C
00:13:00	End	
Idle Temperature 25 ± 1 °C Time Between Readings: 4 seconds		

The following measurements should be taken:

V7: Viscosity at 7 minutes (cP)

P1V: Peak 1 viscosity (cP) (melting viscosity)

P1Ti: Time to peak between 3-5 minutes (min) (melting time)

P2V: Peak 2 viscosity (cP) (solidification viscosity)

P2Ti: Time to peak between 10-13 minutes (min) (solidification time)

The viscosity at 7 minutes is the RVA cheese melt viscosity index.

Cheese that is higher in moisture or fat will be softer and have lower values for temperature at melting, solidification and minimum viscosity. Cheeses with higher total solids and higher ash content will be harder and have higher values for temperature at melting, solidification and minimum viscosity. Cheese that has undergone greater proteolysis will be softer and have lower values for temperature at melting, solidification and minimum viscosity. The emulsifying salt used will shift the values for temperature at melting, solidification and minimum viscosity. Cheeses that use mainly phosphates will be firmer and have higher values then cheeses containing citrates.[1]

Sources

L.A. Rosenberg, L.E. Metzger, M.R. Acharya, V.V. Mistry. *Evaluation of process cheese melting characteristics using a Rapid Visco Analyzer.* Book of Abstracts, 2002 IFT Annual Meeting and Food Expo, Anaheim, CA (2002).

Reference

1. Rosenberg et al., 2002.

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