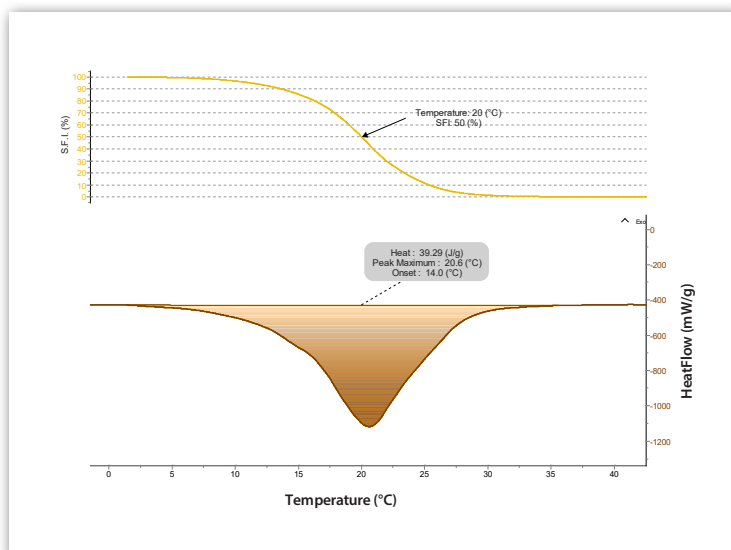


Determination of the Solid Fat Index (SFI) of Chocolate by DSC

INTRODUCTION

The melting curve of a fat is generally complex: for a given fat, there is not a melting point, but more a melting range. In processing fat, it is also interesting to know, for a given temperature, what is the amount of fat melted.

The DSC technique is now widely used to determine solid-liquid ratios in fats, called the Solid Fat Index (SFI). This method is based on measuring the heat of fusion successively at different temperatures. By reference to the total melting heat, the fraction of fat melted is determined. This technique is faster than dilatometry, and gives results comparable with NMR. DSC gives the possibility of tempering the fat at different temperatures prior to index determining.



EXPERIMENT

Sample:

Chocolate, 70% cocoa

Experimental conditions:

- Atmosphere: Nitrogen, atmospheric pressure
- Sample mass: About 25 mg in a Aluminum 100 μ L crucible (S08/12768) closed with a standard lid (S08/HBB37409).

Experimental procedure:

The temperature is programmed from -15°C up to 50°C at 5°C.min⁻¹.

RESULTS AND CONCLUSION

During the heating, an large endotherm corresponding to the melting of the chocolate is observed. The amount of chocolate that is already melted at a given temperature is equal to the ratio of the partial heat of melting at this temperature and the total heat of melting. By difference, the percentage of solid phase or Solid Fat Index (SFI), can be obtained. Calisto Data Processing enables the automatic calculation of the SFI curve versus temperature of the chocolate sample. For a given temperature, this curve enables the determination of the melted amount or of the amount of fat remaining solid.

At room temperature (20°C) the tested chocolate is 50% melted. Then, the chocolate is soft but solid enough to be easily eatable.

INSTRUMENT

SETLINE DSC / DSC+

-170 to 700°C



EASY TO USE WITH ROBUST SENSOR TECHNOLOGY
ensuring quality, consistent and reliable data

AVAILABLE WITH HIGH PRESSURE CRUCIBLES
up to 500 bar at 600°C

REASONABLY PRICED INSTRUMENT & SENSOR
for easy, cost effective replacement

LOWER COST OF OWNERSHIP
through simplified maintenance and a Replacement Parts Guarantee

TECHNICAL & APPLICATION SUPPORT
for fast expert help with any questions

CALISTO 2.0 EXCLUSIVE SOFTWARE
for intuitive and easy data handling