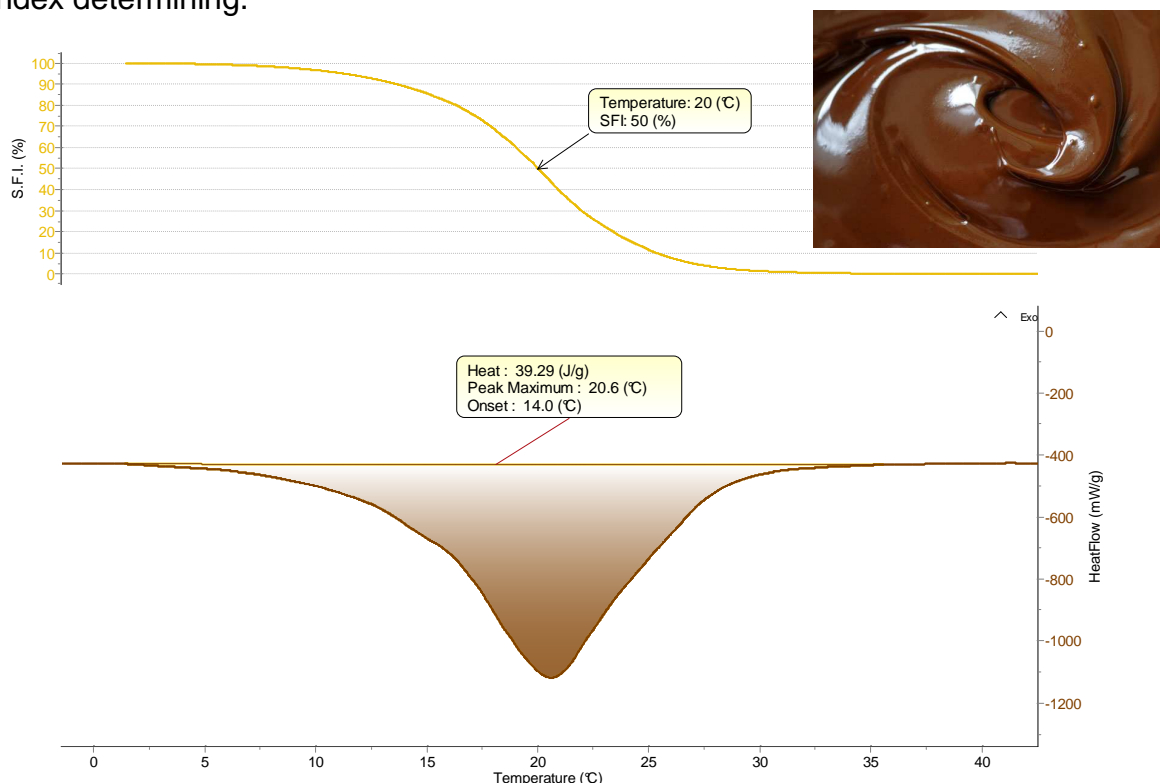


Determination of the Solid Fat Index (SFI) of Chocolate by DSC

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 give results comparable with NMR. DSC gives the possibility of tempering the fat at different temperatures prior to index determining.



Experimental

Sample: Chocolate 70% cocoa

DSC 131 Evo experimental conditions:

Atmosphere: Nitrogen, atmospheric pressure

Sample mass: about 25 mg in a 100 μ l sealed aluminium crucible

Experimental procedure:

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

Instrument

DSC 131 Evo
-170°C up to 700°C



Results

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 obtained by the ratio of the partial heat of melting at this temperature on the total heat of melting. By difference, the percentage of the solid phase is obtained.

Appropriate software package enables the Solid Fat Index (SFI) to be determined and printed for the chocolate sample, versus the temperature. For a given temperature, this curve enables the amount melted or the amount of fat remaining solid to be known.

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

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