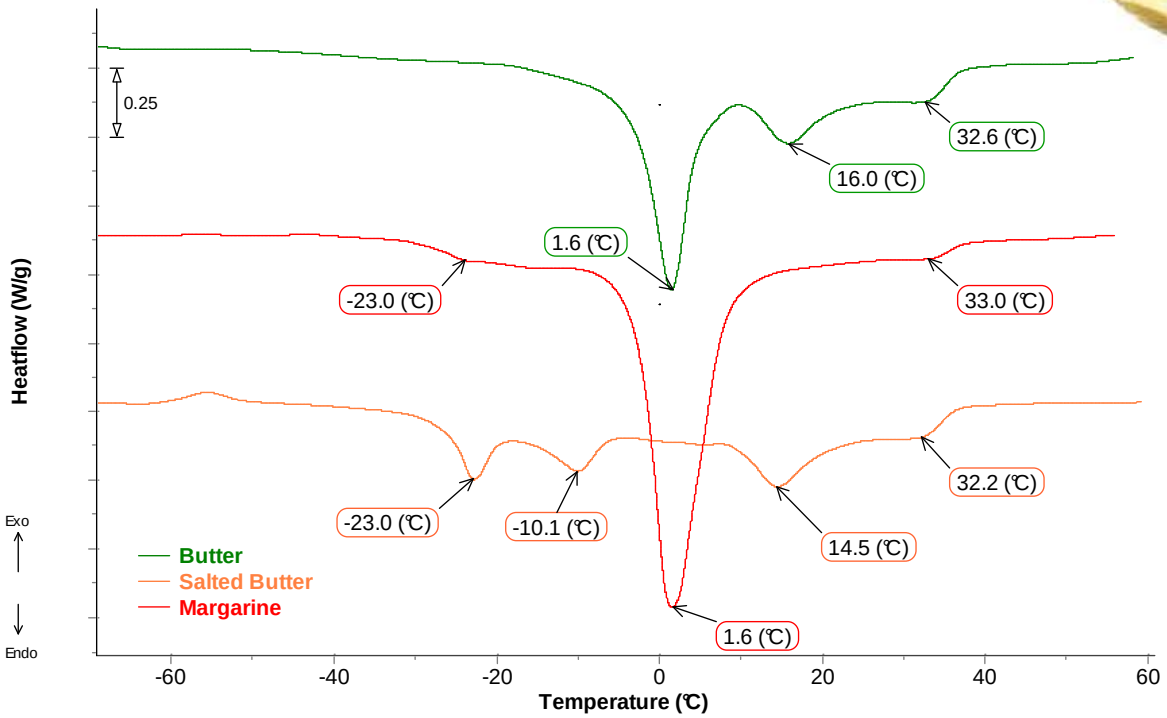
Melting of butters and margarine by DSC

Introduction

Butters and margarines are mainly composed of droplets of water (about a concentration of 16%) in a fatty matrix. The proportions of these components induce the thermal characteristics of the final product. In the industry, determination of their thermal profiles is essential to control their properties in term of "easy-to-spread" and good thermal stability, especially at room temperature. The DSC technique is the ideal tool for such investigations.



Experimental

Samples:

Butter, Salted butter and Margarine

DSC 131 Evo experimental conditions:

Atmosphere: air, atmospheric pressure

Sample mass: about 40 mg in a 100µl sealed aluminum crucible

Experimental procedure:

The temperature is programmed from -80℃ up to 70℃ at 5℃.min $^{-1}$.

Instrument

DSC 131 Evo

-170℃ / 700℃

Results

In the case of butter, two endothermic effects are observed :

- melting of water at 1.6℃
- melting of fatty acids at 16℃ and 32.6℃

The peak of water for the salted butter is shifted to lower temperature and split :

- melting of salt/water eutectic at -23℃
- melting of ice at -10.1℃

Concerning margarine, the peak of water is larger and the one of fat is smaller, according to the low fat concentration of such a product. Then, it appears that margarine contains more water than butter and will be in consequence softer at room temperature.