

Crystallization of Palm Oils by DSC

Introduction:

Classically, crude palm oil has to undergo processes to improve its qualities before being proposed on the market. In a first step, an absorption bleaching is performed to produce refined palm oil. This latter is constituted by a liquid phase and a solid phase which could be separated by a fractionation process. This process is based on the crystallization temperature of each phase, that is why, the thermal profile of palm oil should be clearly established. It will be shown that DSC 131 is an equipment perfectly adapted to characterize palm oil in terms of crystallization and quality control.

Experimental:

Samples:

Refined Palm Oil (PO)
Refined Palm kernel Oil (PKO)

DSC 131 Evo experimental conditions:

Atmosphere: nitrogen N₂, atmospheric pressure

Sample mass: about 20 mg in a 100 µl aluminum crucible

Experimental procedure:

- ❖ +60 → -60°C at different temperature scanning rates
- ❖ isotherm at -60°C during 30 min
- ❖ -60 → +60°C at the same rate

Instruments:

DSC 131 Evo

-170°C up to 700°C



Results:

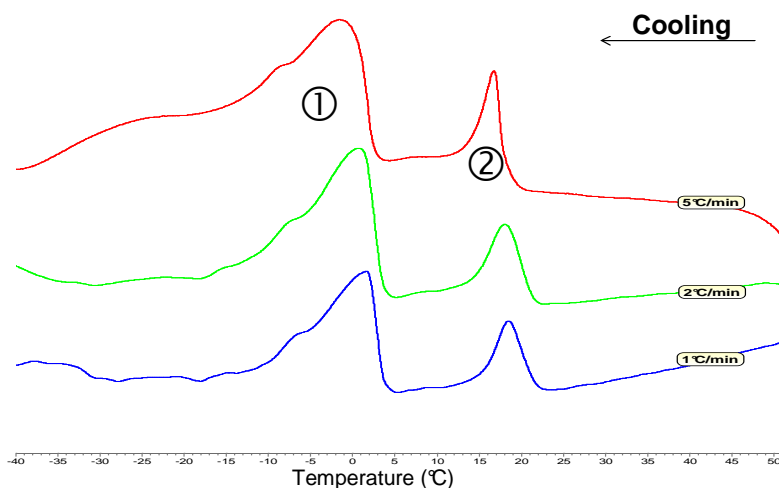


Figure 1 : Cooling thermograms of PO

On the PO thermogram, the two main peaks represent the low and high melting points fractions. These fractions are Olein ① (liquid at room temperature) and Stearin ② (solid at room temperature). The temperature range between these two peaks is an essential information to control palm oil refining processes.

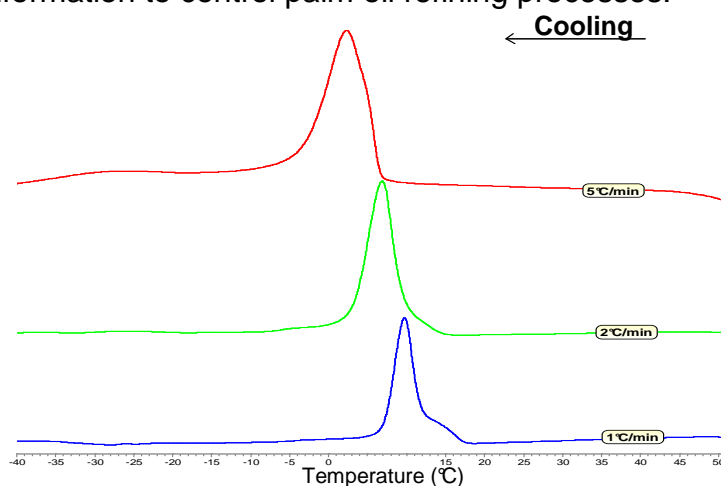


Figure 2 : Cooling thermograms of PKO

The PKO thermograms present only one peak even when using a slow temperature ramp. This can be explained because it is particularly concentrated in saturated triglycerides.