

## Slip Melting Point Determination of Lipstick

Measuring the slip melting point (SMP) is important to the quality control in the cosmetic- and food industries. Here, we demonstrate the feasibility to employ the M-565 for SMP measurements of a lipstick sample. We report a SMP of  $74.7 \pm 0.9$  °C for the evaluated lipstick sample when following the USP 741 class II procedure. Obtained results confirm that the M-565 is a reliable tool to record the SMP for waxy or fatty samples as cosmetics and food components. With the M-565 the melting process can be recorded and analysed without modification of the instrument.

### Introduction

The slip melting point (SMP) is defined as the temperature at which a sample rises in an open capillary upon heating under defined conditions (Figure 1).

In the quality control of cosmetics the SMP plays a prominent role. Furthermore, this method can be employed to control the quality of fats for edibles as cacao butter or palm oil [1].

Here, as an example, it is shown how the SMP of lipstick can be determined using the M-565.

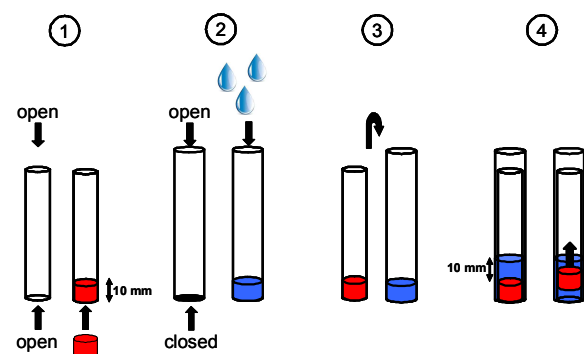


Figure 1. Illustration of the sample preparation (steps 1-3) and the rising sample (step 4).

### Experimental

For SMP measurements the procedure according to the US Pharmacopeia 741 for class II was followed.

About 1 g of the lipstick sample (Nivea Beauté, Cardinal 25 Colour Passion) was melted in a glass beaker using a heating plate. The melted liquid sample was filled into a capillary (open on both ends), by dipping the capillary into the solution. The height of the lipstick sample in the capillary was 9 to 10 mm. To harden the sample it was cooled in the refrigerator to 4 °C for 24 h.

The sample capillary was immersed in a boiling point tube containing water. To obtain reproducible results the upper edge of the sample has to be below the water surface at a defined distance (immersion depth). In the standard experiment, the immersion depth was 10 mm (Figure 1).

The lipstick sample was placed in the M-565 and a temperature gradient (0.5 °C/min in the standard experiment) was applied. The melting process was recorded using the Melting Point Monitor software. By programming a heating ramp, starting 5 °C below to about 5 °C above the expected melting point, the process can run without supervision. Recorded data were analysed after each run.

### Results

Three measurements from samples of the same lipstick revealed a SMP of  $74.7 \pm 0.9$  °C. The slip melting process is shown in Figure 2. Obtained standard deviation of less than 1.0 °C is well comparable to values found in literature for SMP measurements of fatty products [2].

When using an immersion depth of 30 mm instead of 10 mm a slip point of 72.5 °C was observed. Hence, the SMP is about 2 °C lower than when performing the experiment with an immersion depth of only 10 mm. These findings underline the importance to work according to a reproducible experimental procedure.

Another result of the deeper immersion depth is that the sample plug rises quicker and a longer distance in its capillary.

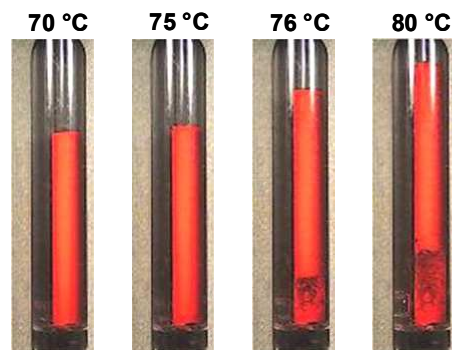


Figure 2. Lipstick sample, rising in its capillary by heating up. Measured slip melting point:  $74.7 \pm 0.9$  °C.

### Conclusion

It was successfully demonstrated that the slip melting point of lipstick can be determined using the M-565. Reproduction of the measurements was performed, yielding a standard deviation of less than 1.0 °C.

Clearly, the found results confirm that the M-565 can be applied to perform SMP measurements, in addition to its conventional use for the determination of melting and boiling points. This makes the M-565 an economic and versatile instrument for the quality control of cosmetic products.

### References

- [1] See for example: I. Karabulut et al, *Eur Food Res Technol*, 218, 3, 224-229, 2004.; P.S. Keng et al, *Ind Crop Prod.*, Vol 29, no 1, p. 37, 2009.; SLMB 1024.1
- [2] J.M. Deman et al, *JOACS*, 60, 1, 91, 1983.