Analysis of soap weight loss with water-content measures by Karl Fisher titrator as part of quality control

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Introduction

Sagal is one of three entities of the group ALKOS, designer and manufacturer of cosmetics. The company produces soap and deodorant sticks that have to meet many quality requirements. Indeed, to achieve the correct weight of the finished product, a manufacturing weight is specified. This is why a study of the weight loss of soap over time was carried out. The aim is to see if it is actually necessary to define a manufacturing weight and to assess if the soap only loses water.

Material and methods

The experiment was carried out over a 30 day period on 60 different soaps with a claimed weight of 50g.
To measure the water content of the soap at the beginning and at the end of the study, the equipment used was a Karl Fisher 870 Trinito plus titrator. The soap is neutralized by hydranal composite 5 and hydranal composolver E.

Karl Fischer parameters :
- Start drift : 20 µL/min
- Output: 166 mL/min
- Temperature : 44°C
- Stirring rate : 1000 rpm
- Extraction time : 500 seconds

Results and discussion

Figure 1 represents the variations of soap's weight loss according to their date of cellophane wrapping at room temperature.
It means that the quicker soap is put in cellophane after its manufacture, the less it loses weight. Moreover, the weight loss begins to stabilize from day 10.
Furthermore, from Figure 2 it seems that the soaps weight loss is proportional to the time in cellophane wrapping,that is why soap-weight loss at Day 30 can be predicted.

Secondly, measures of Karl Fischer confirm that soap's weight loss comes only from its loss of water, also there isn't loss of perfume, as shown in Table 1, that represents the loss of water, compared to soap's weight loss.

Conclusion

Claimed weight by clients is assured if soaps are put in cellophane at the latest 2 days after their manufacture.

Figure 1 : Average weight loss of soaps kept at 20°C according time.

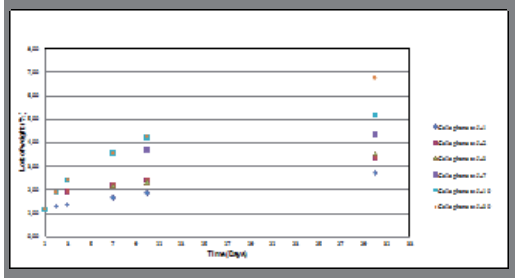

Figure 2 : Weight loss at J+30, of soaps kept at 20 °C according their day of cellophane

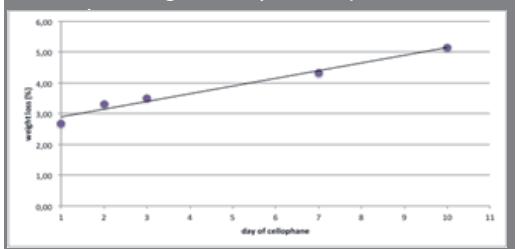

Table 1 : Results of soaps weight loss and water loss at T=20°C.

Cellophane wrapping	J+1	J+2	J+3
Weight loss (%)	2.32	3.27	3.57
Water loss (%)	3.17	3.69	3.76

Cellophane wrapping	J+7	J+10	J+30
Weight loss (%)	4.42	5.25	6.73
Water loss (%)	4.55	6.39	6.80

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