

Precise Moisture Analysis of Soft Candy



Summary

CEM equipment has been trusted for almost 40 years as a source of dependable process control instruments. The SMART 6™ analyzer provides fast, repeatable, and precise moisture content for soft candies, with an accuracy closely matching that of the reference method.

Introduction

Proper moisture composition of food products is critical to maintaining shelf life, inhibiting microbial growth, and achieving favorable consistency and mouthfeel. Moisture analysis of soft candies, such as gummies and toffees pose unique challenges, due to their relatively low melting point. As samples are heated to drive off moisture, soft candies tend to melt, which can trap moisture within the sample and lead to extended drying times.

The SMART 6 moisture analyzer overcomes the traditional barriers to direct moisture measurements. Using a combination of microwave and infrared energy, soft candies are accurately analyzed in only three minutes. Microwave energy excites polar molecules, such as water and sugar, throughout the entire sample, rapidly heating it to a set point that will drive out moisture throughout the entire sample. Infrared energy is used to maintain a stable temperature throughout the test and prevent scorching.

Experimental

To demonstrate the ability of the SMART 6 to accurately and reliably determine the moisture content, an assortment of soft candy samples were obtained and analyzed. Each sample was prepared by freezing and then blending in a food processor to a small, uniform particle size. Samples were placed in the SMART 6 and dried at 160 °C for a set time of 3 min. Sample sizes ranged from 1.6 to 1.8 g. Each sample was analyzed in triplicate for the reference analyses (AOAC 925.45). For analysis in the SMART 6, samples were measured a total of 10 times to highlight the precision of the rapid analysis.

Results and Discussion

The precision of the SMART 6 is demonstrated in **Table 1**, where the standard deviations ranged from 0.15 to 0.21% for moisture. **Table 2** highlights the accuracy of the SMART 6. The average difference between the SMART 6 and air oven ranged from 0.08 to 0.18% for moisture.

Table 1: SMART 6 Moisture Analysis Results for Various Soft Candy Samples

Replicate	Gummy Bear	Soft Mint	Toffee
1	14.99	8.22	4.53
2	15.16	8.31	4.70
3	15.38	8.22	4.29
4	15.16	8.09	4.56
5	15.10	8.10	4.21
6	15.63	7.92	4.55
7	15.18	8.45	4.40
8	15.18	8.48	4.57
9	15.32	7.94	4.41
10	15.27	7.87	4.32
SMART 6 Average	15.24	8.16	4.45
St. Dev.	0.18	0.21	0.15

Conclusion

These results demonstrate the ability of the SMART 6 to reliably determine the moisture content in soft candy samples with an accuracy closely matching that of the reference method. In addition, there are inherent repeatability advantages over error-prone air oven reference methods. Due to the physical characteristics of soft candies, which tend to melt and are difficult to dry completely, the SMART 6 offers the most accurate and repeatable solution.

Table 2: SMART 6 Accuracy Compared to Air Oven Method

	Gummy Bear	Soft Mint	Toffee
SMART 6 Average	15.24	8.16	4.45
Air Oven Average	15.35	8.34	4.53
Difference	0.11	0.18	0.08

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