Moisture Analysis for the Cannabis Industry

Summary

CEM has been a pioneer in moisture analysis for over 40 years, working with companies, large and small, to develop better processes for improved product quality. In this application note, we show the benefits of accurate moisture analysis in cannabis products, from flowers to edibles. Having the right moisture level is critical for producing high-quality products that are safe and long-lasting.

Introduction

The cannabis industry has undergone unprecedented growth in recent years, due to rapidly changing laws and a general shift in public perception. With federal approval of hemp production, as well as medical or recreational marijuana legalization in a majority of US states, the cannabis market is expected to continue to grow. Rapid changes in legal status means standardized quality and safety testing is continuously evolving. Tests commonly required by state and local regulations include pesticide residue, potency (THC and CBD), and heavy metal analysis. Moisture testing is relevant to plant materials as well as value-add products, such as edibles. If moisture levels are too high in plant material, such as flower, there is a risk of mold, which can have negative health impacts on users, particularly if the product is inhaled. For edible products, shelf life, flavor, texture, and processability are all affected by moisture content.

The SMART Q™ moisture analyzer is uniquely designed to accurately measure low moisture levels, common in raw and processed cannabis products. With a highly accurate 4-place analytical balance and 3-digit moisture readout, the SMART Q provides reliable, repeatable results in approximately five minutes. The SMART Q uses direct sample temperature feedback and active cavity ventilation to dry samples faster than any other infrared moisture analyzer and requires no cavity preheat.

This study demonstrates that the SMART Q can rapidly analyze a wide range of cannabis products for moisture with an average difference of 0.07%, compared to air oven reference results.

Experimental

To evaluate the performance of the SMART Q, four cannabis products were obtained: hemp flower, CBD extract, gummy bears containing CBD, and brownies. For moisture determination, a 2 gram sample of each product was analyzed in the SMART Q. Reference testing was performed in an air oven in triplicate to establish a basis of comparison. The air oven method was set for 8 h at 100 °C, followed by a cooling period under desiccation to ensure complete drying (not required with SMART Q).

Results

Results for average percent moisture using the SMART Q compared closely to air oven results, as shown in **Table 1**. The average absolute difference between the SMART Q results and air oven results are 0.07%. **Table 2** highlights the precision of the SMART Q, which exhibited average standard deviations of 0.11%. The average dry time for the SMART Q was approximately five minutes with no cavity preheat, a necessary feature common among other brands of infrared moisture analyzers.

Conclusion

For cannabis products where moisture level is important for quality and safety, the SMART Q offers reliable results that match air oven reference methods, in only a few minutes. The SMART Q combines proprietary and patented technology, which translates into one of the shortest primary moisture test times on the market. With rapid testing times and accurate results, the SMART Q is an ideal choice in either a production or laboratory setting.

Table 1: Accuracy of SMART Q for Moisture Analysis of Cannabis Products

	Percent Moisture		
Sample	**SMART Q**	**Air Oven**	**Difference**
Hemp Flower	12.19	12.05	-0.14
CBD Concentrate	5.04	5.09	0.05
Gummy Candy	15.32	15.35	0.03
Brownie	14.39	14.31	-0.08

Table 2: Precision of SMART Q for Moisture Analysis of Cannabis Products

	Percent Moisture Replicates						
Sample	**1**	**2**	**3**	**4**	**5**	**Average**	**Standard Deviation**
Hemp Flower	12.34	12.17	12.25	12.04	12.13	12.19	0.11
CBD Concentrate	5.02	5.08	5.01	5.12	4.99	5.04	0.05
Gummy Candy	15.34	15.16	15.20	15.29	15.62	15.32	0.18
Brownie	14.29	14.39	14.37	14.38	14.53	14.39	0.09

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