

Understanding the Importance of Ash and Total Solids in Cosmetic Manufacturing



Introduction

Due to the rapid growth and increasing competition of the global cosmetics industry, accurate, low cost and rapid technology to control cosmetic quality and production are a priority. Shampoos, lotions, soaps, detergents, polishes, and other consumer or industrial products require extremely tight formulation specifications, which is why having quality control equipment that is fast, while still maintaining accuracy can help improve formulations, increase yields, and boost profitability. The testing of solids and ash content are critical for ensuring proper formulation and the data from these analyses have the largest impact on bottom line and product quality.

Technology

SMART 6

The SMART 6™ moisture and solids analyzer is the only instrument of its kind, using dual-frequency heating technology to analyze any product, regardless of whether it is liquid, powder, cream, gel, or in any other form. Most analyses are complete in less than three minutes, with results that will compare to the precision previously only obtainable by ASTM oven methods, which can take hours to perform. With a touchscreen interface, built-in training videos, and full LIMS integration potential, the SMART 6 is the most advanced moisture and solids analyzer on the market. This means data can be sent directly to the production floor to release batches for packaging more quickly and with more confidence. The increased accuracy of the SMART 6, compared to other methods means more expensive additives such as surfactants and modifiers can be used more sparingly, while still maintaining the products formulation specifications.

Phoenix BLACK

The Phoenix BLACK™ is the fastest, safest, and easiest to use ash analyzer on the market. The Phoenix BLACK can ash samples in as little as 10 minutes, when it typically takes 1-2 hours in other muffle furnaces. With programmable methods that can set ramps and dwell times, the only steps the user has to take is weighing of the sample and placing it in the muffle furnace. The Phoenix BLACK will ash the sample and calculate the results, ensuring the right result every time. Fully ASTM and USP compliant, the Phoenix BLACK is the best-in-class ash analyzer.

Experimental

To evaluate the performance of the SMART 6, eight cosmetic products were obtained. For moisture determination, a 2 g sample of each product was analyzed in the SMART 6. Reference testing was performed in an air oven, in triplicate to establish a basis of comparison. The air oven method was performed according to sample-specific requirements, followed by a cooling period under desiccation to ensure complete drying (not required with SMART 6).

Results

Total solids analysis on the SMART 6 is shown in comparison to air oven results in **Table 1**. Standard deviation of shown in the far right column of **Table 1** highlights the repeatability of the SMART 6. Ash analysis using the Phoenix BLACK, including total test time, is shown in **Table 2**.

Table 1: Accuracy of CEM's SMART 6 for Solids Analysis of Cosmetics

Product	Air Oven Results	SMART 6 Results	STDEV
Sodium Laureth Sulfate	76.00	76.07	0.05
Lotion	37.18	37.28	0.07
Conditioner	38.10	38.07	0.16
Quaternized, Hydrolyzed Corn Starch	23.10	23.17	0.07
Detergent	60.10	60.09	0.05
Ethyl Acetate	75.69	75.63	0.08

Table 2: Precision and Total Test Time of CEM's Phoenix BLACK for Ash Analysis of Cosmetics

Product	Results	STDEV	Time (minutes)
Gelatin	0.19	0.04	120
Anhydrous Lotion	10.58	0.09	60
Hydroxypropylcellulose	0.19	0.02	15

Conclusion

For consumer and industrial products, total solids and ash content need to be tightly controlled to increase yields, and boost profitability. The testing of solids and ash content are also critical for ensuring proper formulation and product quality. CEM's combination of proprietary and patented technology translates into the fastest and most accurate moisture, total solids, and ash analyses on the market.

With short test times and accurate results, the SMART 6 and Phoenix BLACK analyzers save time, improve least-cost formulation, and ultimately, save money.

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