DATA BULLETIN

elementar
EXCELLENCE IN ELEMENTS

Cellulose test with the vario TOC cube

In compliance with ISO 8245 (Annex B) and DIN EN 1484 (Annex C), the suitability of a TOC analyzer for the analysis of particle-containing samples has to be tested with a suspension of cellulose. For the cellulose test, 225 mg of cellulose have to be placed in 1 Liter of water, which results in a carbon concentration of 100 mg/l. This test suspension has to be stirred with a magnetic stirrer until the suspension is homogeneous. Ultrasonic treatment should not be used because it reduces the particle size. The mean value from a triple measurement should be between 90 mg/l and 110 mg/l, the repeatability variation coefficient should be < 10%.

OVERVIEW

1500 analyses of cellulose to test the performance of the vario TOC cube instrument for the analysis of particle containing samples.

Elementar Analysensysteme GmbH tested the suitability of cellulose test for the vario TOC systems over two years with 225 individual analyzers operated by varying users representing different levels of experience. In total 1500 analyses (498 samples) have been made (triplicate or quintuplicate) and a maximum of three samples have been analyzed with the same analyzer.

Depending on the user experience, excellent recovery and reproducibility could be achieved (Table 1), but also if including all obtained results, the mean recovery was 95.3% and the mean RSD among all replicates was 3.4% (Table 2). In total, more than 85% of all mean sample values and more than 80% of all single analyses, respectively, showed a recovery in the target range between 90% and 110% (Figure 1).

These values clearly indicate the perfect suitability and high performance of the vario TOC systems for particle-containing samples.

Table 1. Selected results of the cellulose test achieved by experienced users

ANALYZER NUMBER	USER LEVEL	RECOVERY [%]	RSD [%]	n
11	experienced	99.4	0.95	3
38	experienced	98.7	0.79	3
135	experienced	98.5	0.39	3
173	experienced	100.6	1.22	3

Table 2. Summary of the cellulose test experiment

DURATION	MEAN RECOVERY [%]	RSD AMONG ALL ANALYSES [%]	MEAN RSD AMONG ALL SAMPLES [%]	ANALYSES [n]	PARTICIPATING ANALYZERS [n]	INJECTION VOLUME [ml]
2 years	95.3	5.2	3.4	1500	225	0.2

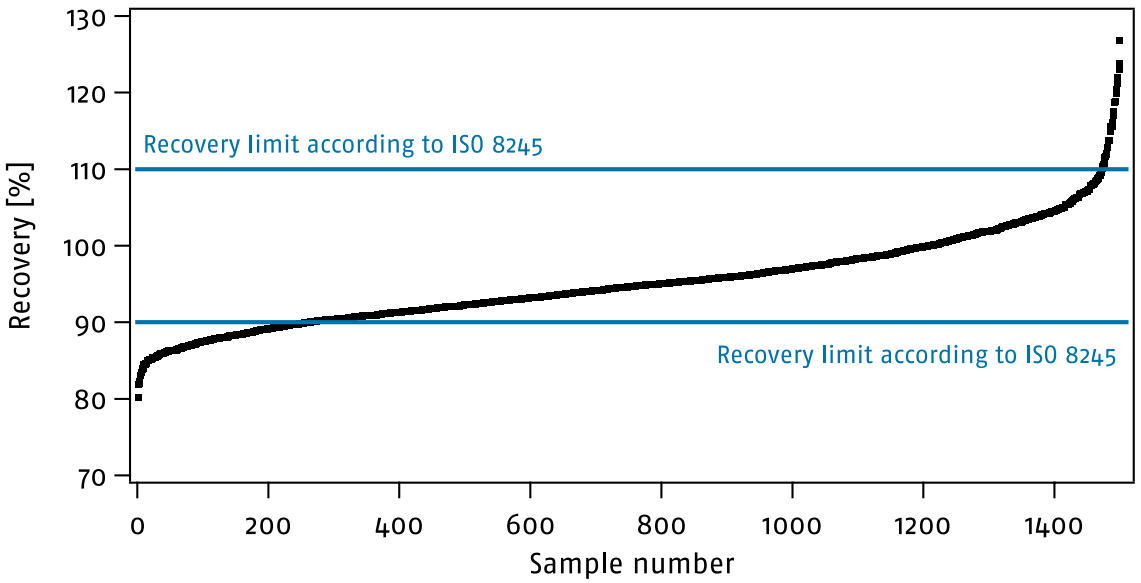

Figure 1. Distribution of the measured cellulose samples ordered by recovery

Conclusion

The analysis of a cellulose solution as a test substance for particle containing samples has been performed with the vario TOC cube with different instruments by different users over a time period of 2 years. In total 1500 analyses have been performed on 225 different vario TOC cube analyzers. More than 85% of the mean sample values showed a recovery rate well within the required limits of the international standards ISO 8245 and DIN EN 1484.

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