Fat Determination in Food and Feed Products using Speed-Extractor E-914 after Acid Hydrolysis

The determination of fat in food and feed is a routine procedure in quality assurance and labeling. A simple and fast procedure for fat determination in various food and feed matrices is introduced below. The sample is hydrolyzed with the Hydrolysis Unit E-416, followed by an extraction with the SpeedExtractor E-914. The total fat content is determined gravimetrically after the extract has been dried to a constant weight. The fat contents correspond to the values determined by Weibull-Stoldt.

Introduction

Fat determination is one of the key analyses performed in the food industry. Complex matrices such as food typically require acid hydrolysis prior to solvent extraction, to free bound lipids and to facilitate the extraction.

An easy and reliable procedure to determine the fat content in different food and feed matrices is presented below.

Experimental

Instrumentation: Hydrolysis unit E-416, SpeedExtractor E-914, Multivapor P-6, drying oven.

Samples: Milk chocolate, cat feed (dry pellets) and processed meat.

Figure 1: The samples milk chocolate, cat feed and processed meat samples

The homogenized samples were hydrolyzed with 4 N HCl for 30 min, filtered, washed to a neutral pH, and dried before they were carefully transferred to the extraction cells and extracted using the parameters shown in Table 1. The samples were extracted fourfold.

Table 1: Extraction method of the SpeedExtractor E-914

Temperature	100 °C
Pressure	100 bar
Solvent	Petroleum ether 100%
Cells	80 ml
Vials	240 ml
Cycles	2
Heat-up	5 min / 1 min (1st/2nd cycle)
Hold	5 min
Discharge	4 min /3 min (1st/2nd cycle)
Flush with solvent	3 min
Flush with gas	5 min

The solvent was evaporated in parallel using the Multivapor P-6. The extracts were then dried to a constant weight in a drying oven (102 °C) and the fat content was calculated.

The fat contents of the samples were also determined by Weibull-Stoldt (includes acid hydrolysis and Soxhlet extraction), see corresponding Application note.

Results

The determined fat contents are presented in Table 3. They are in accordance to the values determined with the classic method (Weibull-Stoldt) and have low relative standard deviations.

Table 2: Determined fat contents in food and feed samples, fat in g/100g, (relative standard deviation in brackets)

	SpeedExtractor E-914	Weibull-Stoldt
Milk chocolate	35.04 (0.15 %)	34.92 (0.07 %)
Cat feed	11.00 (0.16 %)	11.02 (0.23 %)
Processed meat	20.48 (0.26 %)	20.31 (0.13 %)

Conclusion

The determination of the fat contents in hydrolyzed food and feed samples by solvent extraction using Speed-Extractor E-916 provides reliable and reproducible results that correspond to those obtained by Soxhlet. The total extraction time is approx. 45 min; approx. 100 ml solvent are used per position.

References

SpeedExtractor E-914 operation manual

Hydrolysis Unit E-416 operation manual

Application Note E-416-E-816-Sox-001: Fat determination according to Weibull-Stoldt - Standard application.

For more details see Application note 006/2009