Extraction Unit E-816 ECE:
Fat Determination in Chips samples using Twisselmann extraction

The determination of fat in food is a routine procedure used in quality assurance and for labelling. Below, a simple and easy procedure for fat determination in chips samples, according to "Arrêté aux methods officielles d'analyse des produits diététiques et de régime" is introduced. The sample is hydrolyzed with hydrochloric acid, followed by a Twisselmann extraction with the Extraction Unit E-816 ECE (Economic Continuous Extraction). The determined fat contents correspond well to the labelled values.

1. Introduction

Fat determination is one of the key analysis performed in the food industry. The samples are hydrolyzed with hydrochloric acid to break the chemically bound and naturally encased fat from the matrix. Afterwards, the fat is extracted with a suitable solvent according to Twisselmann. With this extraction technique the sample is constantly kept in hot vapor whilst being efficiently rinsed with freshly distilled solvent. After the extract has been dried to a constant weight the total fat content is determined gravimetrically.

The reference value was determined with Soxhlet extraction following Weibull-Stoldt.

2. Experimental

Equipment: Extraction Unit E-816 ECE

Samples: Chips samples with fat contents of 27.26-31.01 %.

Determination: The samples were hydrolyzed with 100 mL hydrochloric acid (3 M) for 1 hour, filtered and rinsed with hot water, until a neutral pH was reached. The filters were dried in a drying oven and cooled down in a desiccator. The extraction was performed using the E-816 ECE (Figure 1) applying the parameters specified in Table 1.

Table 1: Parameters for the extraction using the Extraction Unit E-816 ECE

Method parameters	
Solvent	Petroleum ether
Extraction step	50 min (Heater 100 %)
Drying step	10 min (Heater 100 %)
Solvent volume	70 mL

The samples were extracted in triplicate or fourfold. The extracts were dried to a constant weight in a drying oven at 102 °C and the total fat content was calculated.

Figure 1: Extraction Unit E-816 ECE (Economic Continuous Extraction)

3. Results

The determined fat contents are shown in Table 2. The results obtained with the Extraction Unit E-816 ECE correspond well with the results from the Soxhlet extraction method. The results show low relative standard deviations.

Table 2: Determined fat content in chips samples, fat in g/100g (relative standard deviation in brackets)

	Mean value E-816 ECE (rsd in %)	Reference value
Chips Wasabi, n=4	26.41 (2.12)	27.26
Chips Vinegar, n=3	33.57 (1.60)	31.01

4. Conclusion

The determination of fat content in chips samples using Twisselmann extraction on the E-816 ECE provide results which are comparable to the results received with the Soxhlet extraction method.

5. References

Arrêté du 8 Septembre 1977 relatif aux methods officielles d'analyse des produits diététiques et de régime

· Operation Manual of Extraction Unit E-816 ECE

For more detailed information and safety considerations please refer to the Application Note no. 188/2015.