

Fat determination in Mayonnaise and Chocolate using the SpeedExtractor E-916



The work presented is the result of collaboration between BUCHI and Nestlé. The purpose of this study was to compare Pressurized Liquid Extraction (PLE) results with those gathered by the application of the classical Mojonnier and Weibull-Stoldt (Soxhlet) methods. The described method has been validated in-house amongst other samples for mayonnaise and chocolate and can be extended to other type of foods as well. The results of the extraction with the SpeedExtractor E-916 are equivalent to the results achieved by the classical extraction methods (i.e. Mojonnier and Weibull-Stoldt).

Introduction

Pressurized Liquid Extraction (PLE) is a well-established alternative for extracting lipids and/or various components faster and cheaper, but less frequently used for the verification of fat labels in food products. A reliable and fast procedure using PLE to determine the fat content in samples with easily accessible fat is presented below. The extraction was carried out using the SpeedExtractor E-916 in combination with Multivapor™ P-12 for solvent evaporation in parallel. The fat content was determined gravimetrically after the extract has been dried to a constant weight.



Figure 1: Mayonnaise

Experimental

Instrumentation: SpeedExtractor E-916, Multivapor™ P-12 with Vacuum pump V-700 and Controller V-855, drying oven

Samples: Mayonnaise and chocolate (Round robin test MCL-3/2011)

The samples were ground with diatomaceous earth in a mortar to a homogeneous powder and quantitatively transferred into a 20 ml extraction cell. The extraction was carried out with the SpeedExtractor E-916 using the parameters shown in Table 1. The samples were extracted in triplicate. Per Position (sample) about 30 ml of solvent was used.

Table 1: Extraction method for fat determination with SpeedExtractor E-916

Temperature	100 °C
Pressure	100 bar
Solvent	n-Hexane 90 %; Ethanol 10 %
Cells	20 ml
Vials	60 ml
Cycles	2
Heat-up	1/1 min
Hold	10/10 min
Discharge	2/2 min
Flush with solvent	1 min
Flush with gas	3 min
Total time	42 min

During the extraction the extracts of each sample were collected simultaneously in 60 ml vials. The solvent was

evaporated to dryness using the Multivapor™ P-12 with the pressure gradient shown in Fig 2.

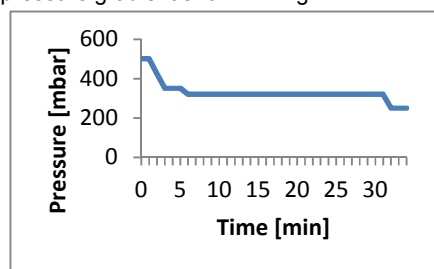


Figure 2: Pressure gradient for the evaporation of the solvent using Multivapor™ P-12

The extracts were dried to a constant weight in a drying oven (102 °C) and the fat contents were calculated.

Results

The fat content of mayonnaise and chocolate are shown in Table 2. The results correspond to the reference values.

Table 2: Determined fat contents in food samples, fat in g/100 g (relative standard deviation for the experimental results in brackets), n = 3

Sample	Expected fat contents	Experimental results
Chocolate	40.62	40.84 (0.26 %)
Mayonnaise	79.03	79.29 (0.30 %)

Conclusion

The determination of the fat content in food samples by PLE using SpeedExtractor E-916 provides reliable and reproducible results that correspond to the expected values. This method increases the sample throughput and is more environmental friendly due to less solvent consumption compared to Soxhlet extraction.

Acknowledgement

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References

SpeedExtractor E-916 operation manual

For more detailed information refer to Application note 088/2012