SCF 514

Fat Extraction from Chocolate Liquors Using Supercritical Fluids

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Introduction

Gravimetric fat determinations in the chocolate industry are normally performed using a soxhlet apparatus with petroleum ether. In addition, specialized equipment and methods have been developed to determine fat content in a perchloroethylene extract using a magnetically driven hydrometer.

Supercritical carbon dioxide extraction of fats from chocolate products eliminates solvent cost, exposure to hazardous solvents, and additional solvent disposal costs.

Sample preparation and processing time was reduced significantly using SC-CO_2 as a replacement for standard soxhlet or Foss-Let techniques.

Equipment

- ✓ Applied Separations' *Spe-ed* SFE Supercritical Extraction System

Materials

- ✓ *Spe-ed* Matrix (Cat. #7950)
- ✓ *Spe-ed* Wool (Cat. #7953)
- ✓ Carbon dioxide – Instrument grade

Method

Weigh 3g of ground chocolate sample onto 5g of *Spe-ed* Matrix. Mix chocolate and *Spe-ed* Matrix thoroughly and pour sample into an extraction vessel. Place a preweighed collection vial onto the *Spe-ed* SFE discharge tube and extract at specified conditions. Remove preweighed collection vial with fat extract and weigh.

Extraction Conditions

Extraction vessel:	24mL
Pressure:	9000 psi
Temperature:	80ºC
Valve temperature:	100ºC
CO_2 Flow Rate:	3L/min
Static time:	5 minutes
Dynamic time:	15 minutes
Extractor vessel Configuration:	4 simultaneous extractions

Results

Sample	% Fat SFE (N=4)	SD	CV%	%Fat Foss-lett (N=1)
Chocolate Liquors	52.30	0.42	0.80%	52.30

Conclusion

Chocolate liquors were extracted without hazardous solvents and the results compared closely with a standard extraction technique. In addition, the precision for the SFE extracts was excellent, the procedure was simple, and significant time was saved.

References

AOAC Method 936.15

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