INSTRUCTIONS

BF_3-Methanol (Borontrifluoride-Methanol)

TS-49370

0879w

Product Description

Number	Description
TS-49370	BF_3-Methanol (14% Borontrifluoride, 86% Methanol), 100 ml Store at 4°C

Introduction

BF_3-Methanol is one of the most convenient methods for the derivatization of fatty acids. Classical esterification chemistry calls for the reaction of a carboxylic acid with an alcohol in the presence of an acid catalyst. BF_3-Methanol provides a convenient methanol-catalyst system which, when used in excess with heating, quickly and quantitatively converts carboxylic acids to their methyl esters. Similarly, this combination of methanol and strong acid can be used to prepare methyl esters directly from a variety of esters, including glycerides.[1] As most protocols for preparation of methyl esters with BF_3-Methanol require separation of the methyl ester from the reaction mixture by some form of extraction followed by evaporation of the solvent, this reagent is most suitable for derivatizing higher boiling carboxylic acids. Special techniques are required to obtain reproducible results from fatty acids below C_8. BF_3 is a relatively strong Lewis acid; therefore, compounds that undergo reactions or rearrangements under acidic conditions should be derivatized with caution when using this reagent.[2]

Protocol for Preparing Fatty Acid Methyl Esters

1. Combine 100 mg of fatty acid and 3 ml of BF_3-Methanol in a 5 ml Reacti-Vial™ Small Reaction Vial (Prod. No. TS-13223).
2. Cap the vial and heat at 60°C for 5-9 minutes.
3. Cool and transfer to a separatory funnel with 30 ml of hexane.
4. Wash two times with a saturated NaCl solution.
5. Discard the aqueous (bottom) layer after each wash.
6. Dry the hexane extracts over anhydrous sodium sulfate and transfer to a clean, dry container.
7. Analyze the hexane layer by gas chromatography directly or, if concentration is desirable, evaporate the hexane and analyze the residue.

Alternate Protocol for Preparing Methyl Esters of C_8 – C_{17} Fatty Acids

1. Combine 500 mg of fatty acid sample with 5 ml of BF_3-Methanol in a 50 ml volumetric flask.
2. Heat on a steam bath for 5-10 minutes.
3. Add enough saturated NaCl solution to raise the fluid level in the flask well into the neck.

4. Cap the flask and mix well by repeatedly inverting the flask.
5. Allow the organic phase to collect in the neck of the flask, and remove it from the top of the aqueous phase (bottom layer).
6. Dry the hexane extracts over anhydrous sodium sulfate and transfer to a clean, dry container.
7. Analyze the hexane layer by gas chromatography directly or, if concentration is desirable, evaporate the hexane and analyze the residue.

References

1. Morrison, W.R. and Smith, L.M. (1964). Preparation of fatty acid methyl esters and dimethylacetals from lipids with boron fluoride-methanol. *J. Lipid Res.* **5**, 600-608.
2. Dawidowicz, E.A. and Thompson, T.E. (1971). Artifacts produced by boron trifluoride methanolysis of a synthetic lecithin containing cyclopropane fatty acids (1-2-dihydrosterculoyl-*sn*-phosphatidylcholine). *J. Lipid. Res.* **12**, 636.
3. Yao, Z., *et.al*. (1988). Choline deficiency causes translocation of CTP: phosphocholine cytidylyltransferase from cytosol to endoplasmic reticulum in rat liver. *J. Biol. Chem.* **256**, 4326-4331.

Current versions of product instructions are available at *www.thermo.com/columns*.