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Product Information

Trifluoroacetic acid

Product Number **T 0274**
Store at Room Temperature

Product Description

Molecular Formula: $C_2HF_3O_2$
Molecular Weight: 114.0
CAS Number: 76-05-1
 pK_a : 0.3;¹ 0.23 (water at 25 °C),²
0.50 (water at 25 °C)³
Melting point: -15.4 °C¹
Boiling point: 72.4 °C;¹ 70.5-72 °C²
Density: 1.49 g/ml (20 °C)⁴
Synonym: TFA

This product is designated as protein sequencing grade, and is suitable for use in gas phase protein sequencing experiments. It is distilled from chromium(VI) oxide under nitrogen, treated with aluminum oxide, then redistilled from dithiothreitol under nitrogen.

Trifluoroacetic acid (TFA) is a very strong acid that is widely used in analytical chemistry, notably in liquid chromatography and mass spectrometry. Its strong acidity ensures that other acidic groups such as carboxylic acid moieties on biomolecules remain protonated, and thus the biomolecule samples are able to interact with organic solvents in such processes as reverse phase chromatography. TFA prevents the ionization of silanol groups on silica-based reverse-phase HPLC columns, which minimizes interaction of active silanol sites with amine moieties on analytes and enhances chromatographic peak resolution. The volatility and ease of removal of TFA contribute to its widespread use as an ion pairing agent. TFA is also highly UV transparent, which allows for UV analysis of compounds below 220 nm.⁶

TFA is extensively utilized in the analysis of peptides and proteins.^{7,8} A review of the use of TFA in development of HPLC and capillary electrophoresis methodologies in reverse phase, size exclusion, and ion exchange chromatographies has been published.⁹

The use of TFA in the cleavage and deprotection of resin-bound peptides after Fmoc synthesis has been reviewed.¹⁰ A procedure has been published on the in-solution digestion and mass spectrometry analysis of gel-separated proteins that incorporates TFA in the extraction of the proteins from electroblotted membranes.¹¹ TFA has been used in the mobile phase for reversed phase liquid chromatography-electrospray mass spectrometry (LC-ESI MS) analysis of intact proteins.¹²

A review has been published on the pre-column derivatization of aflatoxins with TFA for analysis by fluorescence and liquid chromatography.¹³ TFA has been used in the chiral recognition capabilities of three macrocyclic glycopeptide chiral selectors by supercritical and subcritical fluid chromatography.¹⁴ A protocol that uses TFA in the analysis of pneumococcal polysaccharides and conjugates by high-performance anion-exchange chromatography with pulsed-amperometric detection has been reported.¹⁵ Variation in cell wall polysaccharide composition in *Arabidopsis thaliana* after TFA hydrolysis has been investigated.¹⁶

A study on signal suppression in LC-ESI MS using volatile ion-pairing reagents, including TFA, has been reported.¹⁷ A preliminary investigation has been published about the on-line membrane extraction of trifluoroacetic acid for the improvement of negative ion ESI-MS data.¹⁸

A method of preparation for TFA has been reported.¹⁹ Infrared, Raman and neutron scattering spectroscopic data on TFA have been published.²⁰

Precautions and Disclaimer

For Laboratory Use Only. Not for drug, household or other uses.

Preparation Instructions

This product is miscible in ethanol (0.33 ml/ml). TFA is miscible with ether, acetone, ethanol, benzene, carbon tetrachloride and hexane.¹ TFA has a molarity of 12.98 M, based on a density of 1.48 g/ml. This product is moisture sensitive and hygroscopic.⁵

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