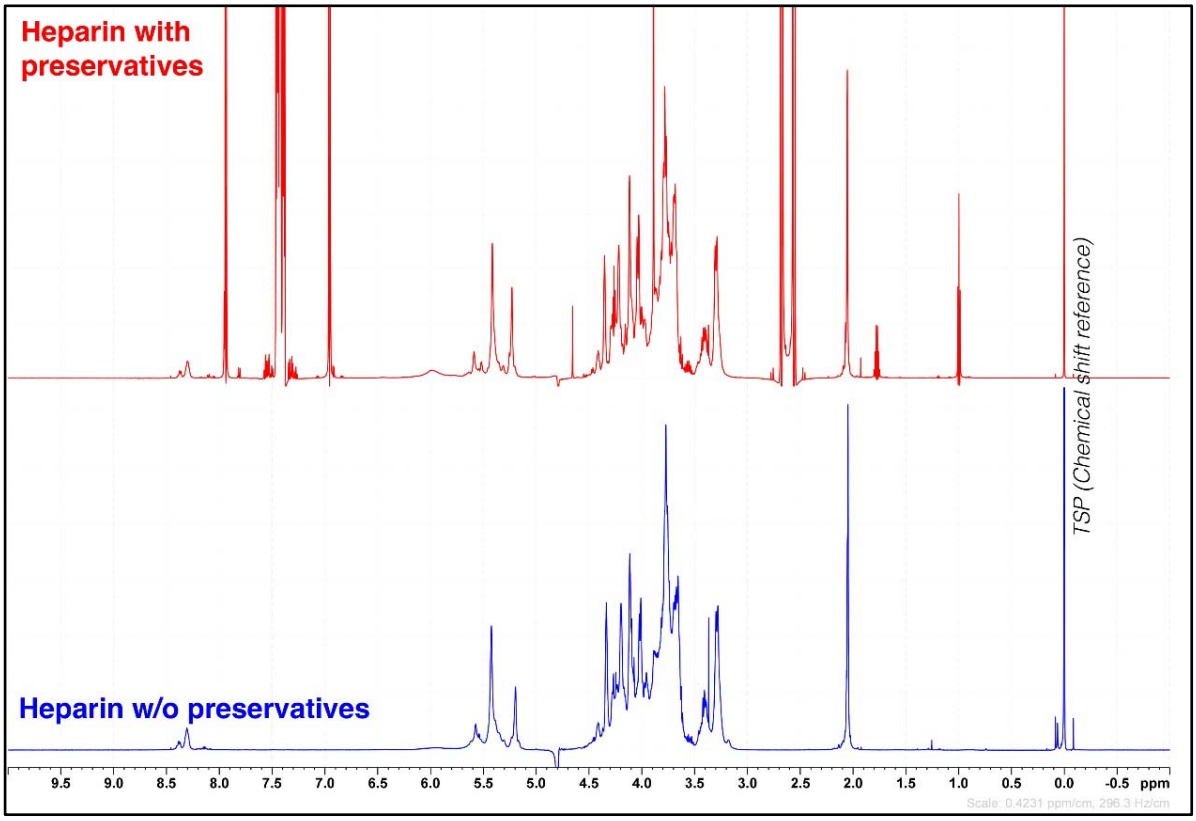
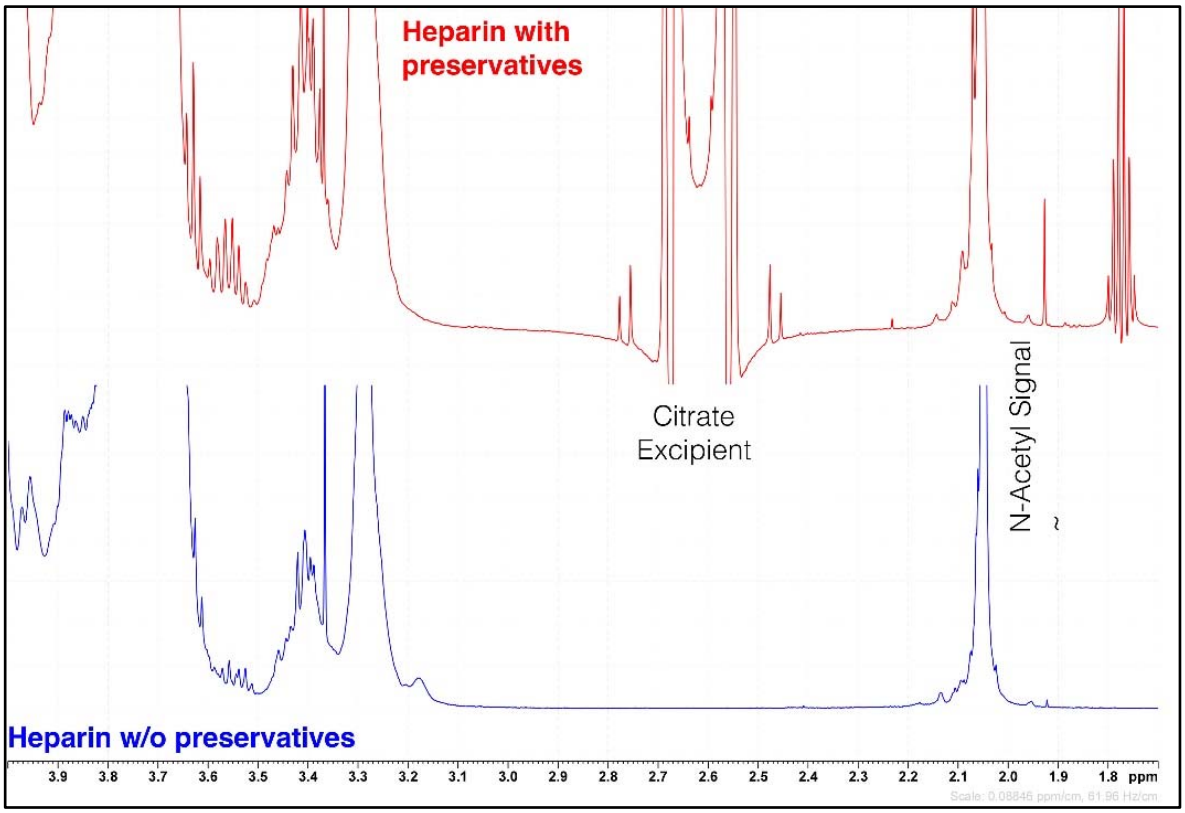
Heparin Injection – BP 2025

These spectra are provided for information only as an aid to analysts and is intended as guidance for the interpretation and application of BP monographs.

Typical spectra for the Identification for Heparin Injection as published. Spectral overlay of heparin EDQM standard without preservatives noted in blue and heparin injection finished product with the presence of preservatives in red.



^{1}H NMR Spectrum 1: Spectral region between -1.0 ppm and 10.0 ppm

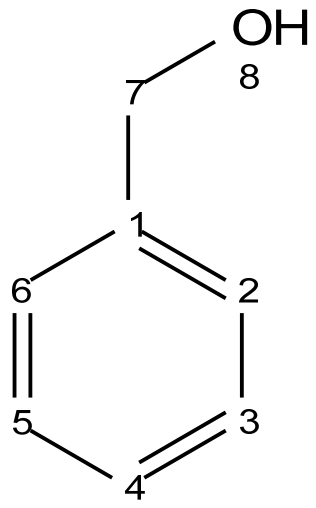


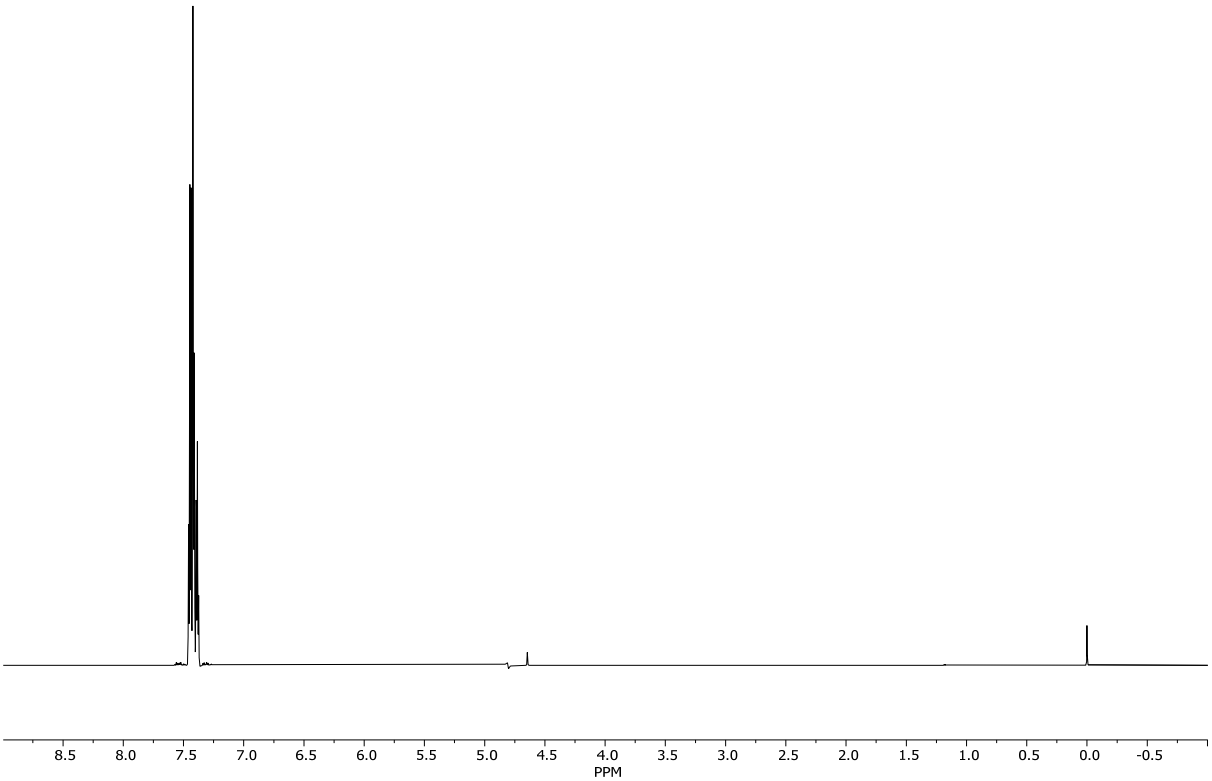
^{1}H NMR Spectrum 2: extended spectral region between 1.7 ppm – 4.0 ppm.

Heparin Final Product Excipients

^{1}H NMR spectra of heparin final product excipients measured in water using the ZGESGP (Bruker ^{1}H pulse sequence with water suppression through excitation scalping) pulse sequence at 298 K.

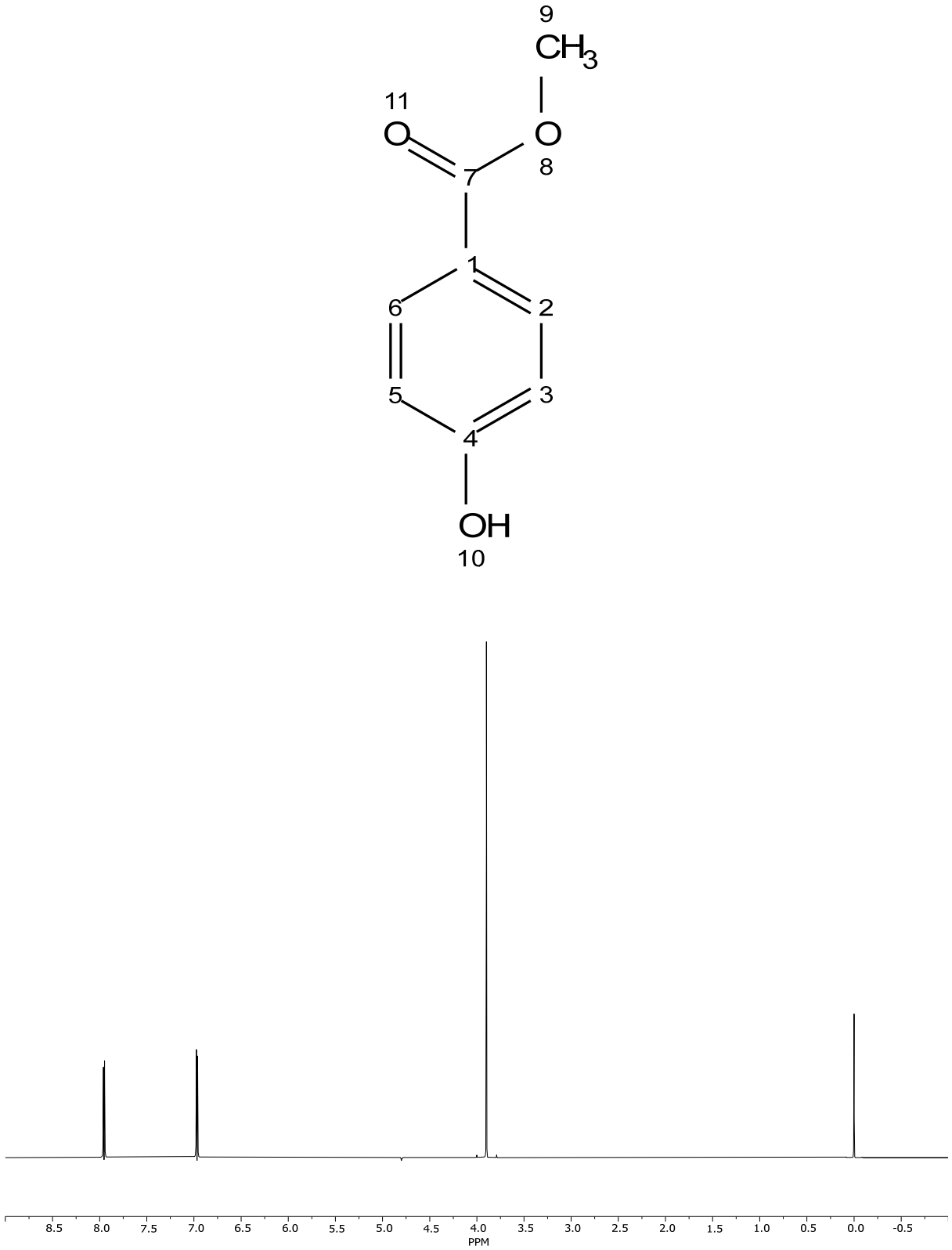
Benzyl Alcohol (CAS: 100-51-6, SMILES: C(O)C1=CC=CC=C1)





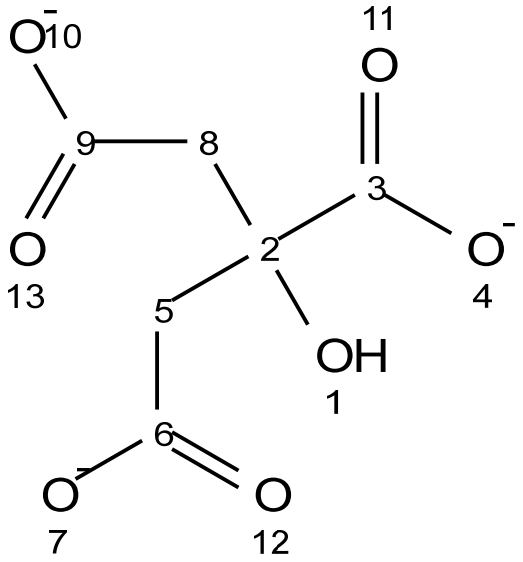
Assignment: Atom 7 (CH_2) 4.65 ppm, signal attenuated due to proximity to water signal; Atoms 2, 3, 4, 5 and 6 (CH) overlapping multiplet between 7.59-7.25 ppm and TSP, 0.00 ppm.

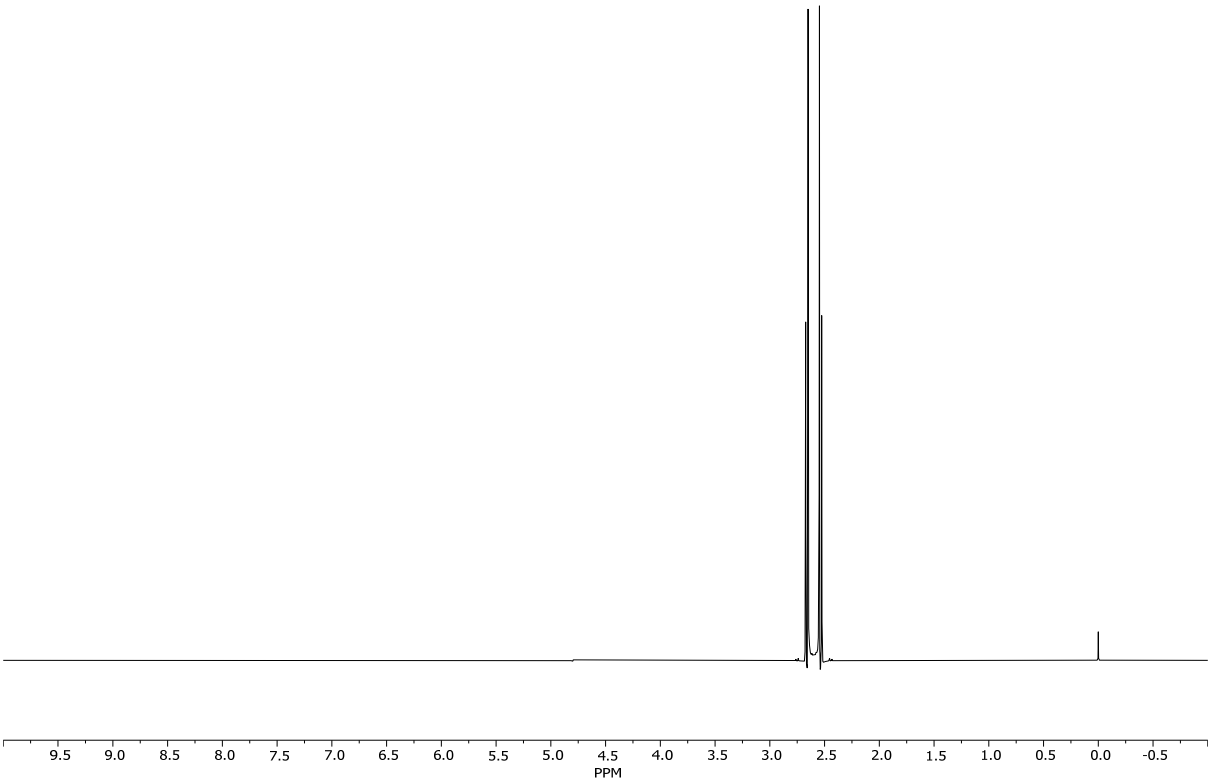
Methyl Parahydroxybenzoate (CAS: 99-76-3 and SMILES: COC(=O)C1=CC=C(C=C1)O)



Assignment: Atoms 2 and 6 (CH), 7.95 ppm; Atoms 3 and 5 (CH), 6.97 ppm, Atom 9 (CH_3), 3.90 ppm and TSP, 0.00 ppm.

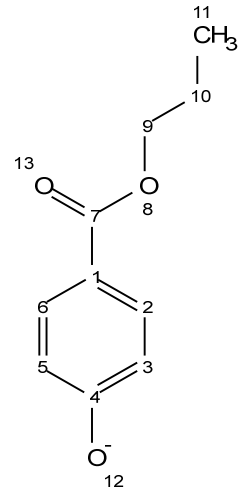
Sodium Citrate (CAS: 6132-04-3 and SMILES: C(C(=O)[O-])C(CC(=O)[O-])(C(=O)[O-])O)

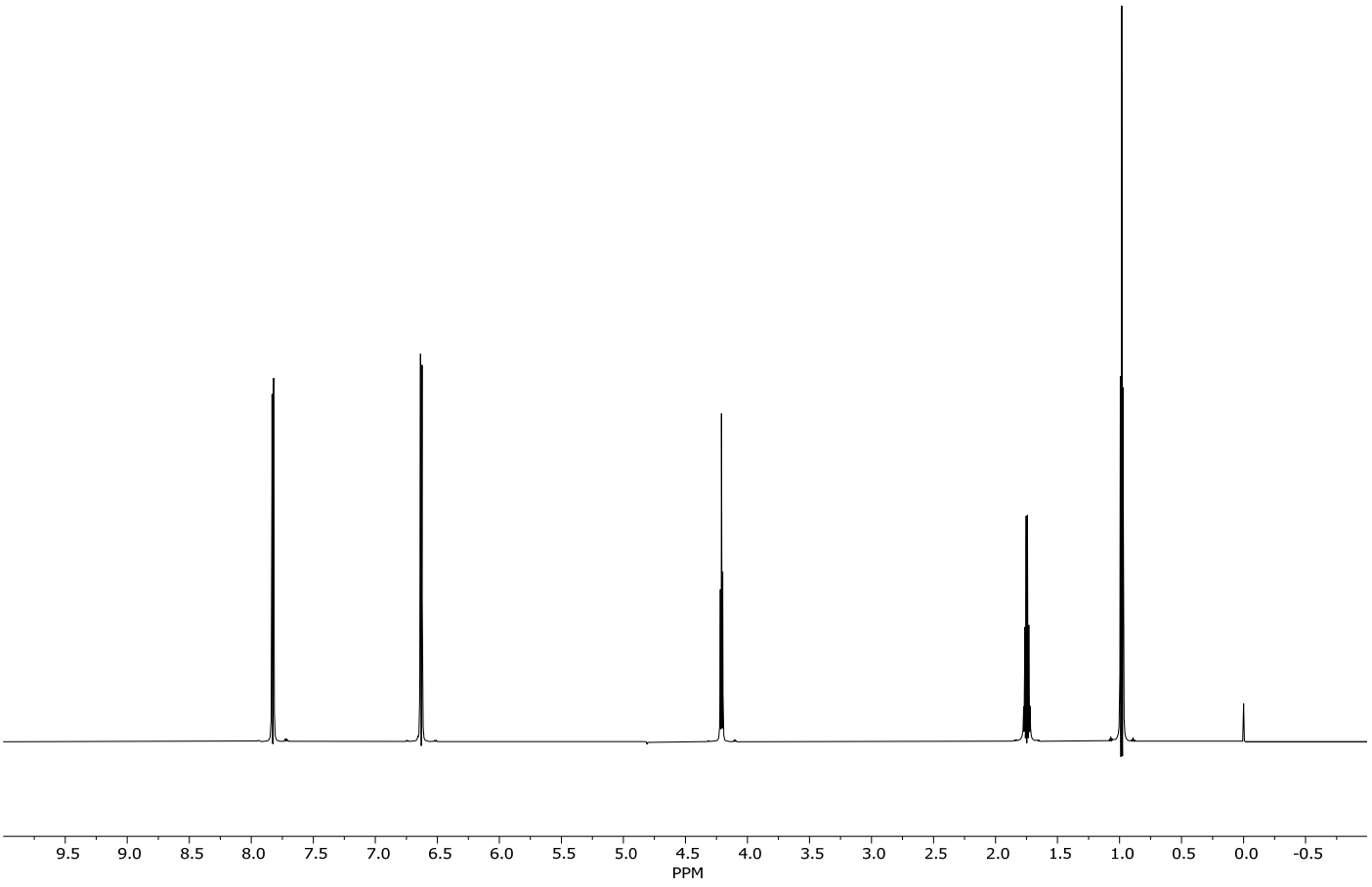




Assignment: Atoms 5' and 8' (CH_2), 2.54 ppm, Atoms 5'' and 8'' (CH_2), 2.66 ppm and TSP, 0.00 ppm.

Sodium Propylparaben (CAS: 35285-69-9 and SMILES: CCCOC(=O)C1=CC=C(C=C1)[O-])





Assignment: Atoms 2 and 6 (CH), 7.83 ppm; Atoms 3 and 5 (CH), 6.63 ppm; Atom 9 (CH_2), 4.21 ppm; Atom 10 (CH_2), 1.75 ppm; Atom 11 (CH_3), 0.98 ppm and TSP, 0.00 ppm.