



# A Reliable Method for Quantification of Phosphonates and Their Impurities

## Abstract

A written report of the phosphorus-31 nuclear magnetic resonance ( $^{31}\text{P}$ -NMR) approach to determine four alkylpolyphosphonates, aminotris(methylene phosphonic acid) (ATMP), 1-hydroxyethylidene diphosphonic acid (HEDP), ethylene diamine tetra (methylene phosphonic) acid (EDTMP), and diethylenetriamine penta(methylene phosphonic) acid (DTPMP), in addition to impurities (orthophosphoric acid and phosphorous acid) is described. Initially, the purity of phosphonate standards was verified. Next, calibration curves using methylphosphonic acid were built and validated. The outcomes were compared using single point calibration. Subsequently, 24 commercial examples of phosphonates were analyzed utilizing the two NMR methods. Concentrations based on the 2 techniques were statistically equivalent. Limits of detection of 1.7, 2.4, 3.4, 2.4, .9, and .8 mg mL<sup>-1</sup> were obtained for ATMP, HEDP, EDTMP, DTPMP, orthophosphoric acid, and phosphorous acid, respectively.  $^{31}\text{P}$  NMR having a single point calibration is really a rapid and accurate approach to analyze commercial phosphonate samples. This method allows straightforward sample preparation and particular determination from the richness and main impurities of phosphonate samples. For more information about [hydroxyethylidene diphosphonic acid](#), simply visit our website.