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Review of robust measurement of phosphorus in river water: sampling, storage, fractionation and sensitivity

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Abstract. This paper reviews current knowledge on sampling, storage and analysis of phosphorus (P) in river waters. Potential sensitivity of rivers with different physical, chemical and biological characteristics (trophic status, turbidity, flow regime, matrix chemistry) is examined in terms of errors associated with sampling, sample preparation, storage, contamination, interference and analytical errors. Key issues identified include:

- The need to tailor analytical reagents and concentrations to take into account the characteristics of the sample matrix.
- The effects of matrix interference on the colorimetric analysis.
- The influence of variable rates of phospho-molybdenum blue colour formation.
- The differing responses of river waters to physical and chemical conditions of storage.
- The higher sensitivities of samples with low P concentrations to storage and analytical errors.

Given high variability of river water characteristics in space and time, no single standardised methodology for sampling, storage and analysis of P in rivers can be offered. 'Good Practice' guidelines are suggested, which recommend that protocols for sampling, storage and analysis of river water for P is based on thorough site-specific method testing and assessment of P stability on storage. For wider sampling programmes at the regional/national scale where intensive site-specific method and stability testing are not feasible, 'Precautionary Practice' guidelines are suggested. The study highlights key areas requiring further investigation for improving methodological rigour.

Keywords: phosphorus, orthophosphate, soluble reactive, particulate, colorimetry, stability, sensitivity, analytical error, storage, sampling, filtration, preservative, fractionation, digestion

[Final Revised Paper](#) (PDF, 605 KB)

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