

Introduction to Instrumental Water Analysis

Dušan Kojić

*Department of Pharmacology at Keio University School of Medicine, 35 Shinanomachi, Shinjuku-ku,
160-8582 Tokyo, Japan*

Aquaphotomics [1] is a method of instrumental analysis of water. Questions about stability of the measuring system, influence of measuring conditions [2-3] and the inherent variability of pure water naturally arise in analytical contexts, therefore, it seems suitable to try to provide some answers on this occasion. Previous work has pointed out requirements about instrumental wavelength [4] and absorbance [5] accuracies that are too stringent to be met by a majority of commercially available instruments. We need a discussion on where do current limits of detection reside and whether they be improved upon? This fundamental topic is complex as incorporates a broad range of fields, but it has a potential to answer some questions before they appear in more developed stages of water research.

Another closely related question is the subtraction of solvent spectrum that is a preprocessing method often used to visualize spectral variance and suppress some unwanted effects that may not related to solute-solvent interactions. However, it is often not viewed as a method to improve accuracy, since its meets the same restrictions of limited reproducibility that are encountered with non-subtracted spectra. New approach to spectral subtraction is presented as a way to improve instrumental reproducibility and compare different sources of perturbation that finally shape the appearance of the spectra of pure water.

We conclude with recommendations about points of interest that need to be addressed in order to circumvent difficulties and improve results.

References

1. Tsenkova, R. (2009). *JNIRS*, 17(1), 2009, 303-314.
2. Maeda H., Ozaki Y., Tanaka M., Hayashi N., Kojima T., *JNIRS* 3, 1995, 191–201.
3. Segtnan V.H., Šašić S., Isaksson T., Ozaki Y., *Anal. Chem.* 73 (13), 2001, 3153–3161.
4. Hirschfeld T., *Appl. Spectrosc.* 30, 5, 1976, 549-550.
5. Hirschfeld T., *Appl. Spectrosc.* 30, 5, 1976, 550-551.