

Aquaphotomics opens a new venue in non-invasive measurement technology

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The concept of Aquaphotomics¹ has been presented for the first time in 2005. It was inspired by the finding that milk from healthy and diseased animals has respective water absorbance spectral patterns. Further on, various biological systems, from DNA water solutions, cells, plants, animals to humans have been non-invasively analysed with Near Infrared Spectroscopy (NIRS) under various perturbations and it was proved that their specific water spectral patterns mirror the respective system's chemical and physical state and can be used as a holistic marker related directly to its functionality.

In this study, various aqueous systems perturbed by single molecules, cells, bacteria, whole plants have been subjected to non-invasive analysis in order to acquire their near infrared spectra of water following the aquaphotomics protocol. Further on, all the spectra have been analysed using aquaphotomics multivariate analysis. The results have shown that perturbations have changed the water spectra in a respectively systematic way. Further on, specific water absorbance bands, called Water Matrix Coordinates (WAMACS) have been related to system functionality and water spectral patterns have been used as holistic markers for diagnosis. Portable devices have been used for fast, inexpensive analysis and diagnosis, for discovery of new phenomena.

Key words : NIRS, water spectral pattern, diagnosis

Reference

1. Tsenkova, R., (2009) Introduction Aquaphotomics: dynamic spectroscopy of aqueous and biological systems describes peculiarities of water, *J. Near Infrared Spectroscopy* 17 pp303-313.