

Aquaphotomics: Introduction

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The importance of water in biological systems has not been very well explored and understood. Recently, with the development of computer science, data analysis and new measurement technologies, water has been studied by scientific teams in wide variety of disciplines. The concept of Aquaphotomics¹ has been introduced as a new “– omics” discipline by the Laboratory of Bio Measurement Technology at Faculty of Agriculture, Kobe University, Japan and presented, for the first time, in 2005 at the International Conference of Near Infrared Spectroscopy (NIRS) held in New Zealand. It was inspired by the finding that the light absorbance of milk at specific water absorbance bands curved respective characteristic spectral patterns of milk from healthy and diseased animals. Further on, aqueous and biological systems, from DNA water solutions, cells, plants, animals to humans have been non-invasively analysed with NIRS under various perturbations. It has been proven that specific water spectral patterns mirror the system’s chemical and physical state. The main object of this new field is to understand the role of the water molecular system by monitoring water spectrum of bio – and aqueous systems under various perturbations. Aquaphotomics presents water spectrum as holistic bio marker that epitomizes the respective system. Specific water spectral patterns have been found to be characteristic for certain diseases. Further on, combination of specific water absorbance bands, called Water Matrix Coordinates (WAMACS) have been related to system functionality. In the talk, examples of water spectral patterns called aquagrams will be shown for various aqueous systems under perturbation shedding more light on the role of water in biology.

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.