

Aquaphotomics: Introduction

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The concept of Aquaphotomics¹ has been 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, biological systems, from DNA water solutions, cells, plants, animals to humans have been non-invasively analysed with NIRS under various perturbations and it was proven that specific water spectral patterns mirror the system's chemical and physical state.

In this course, examples of various biological and aqueous systems, from single molecules in water, cells, bacteria, whole plants to animals that have been subjected to various perturbations and biomonitoring in order to acquire their near infrared spectra, non-invasively and in real time over a certain period of time will be discussed. Systems have been subjected to near infrared multivariate spectral analysis where near infrared light penetrates into the water and the living tissue and interacts with the water molecular system there. The results have shown that physiological abnormalities have changed the spectra in a respectively systematic way. 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.

Assignment table with water absorbance bands that have been experimentally discovered, theoretically proven and found to be related to various water molecular conformations will be provided.

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.