Why Aquaphotomics?

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Aquaphotomics is a paradigm shift. It originated from near infrared (NIR) spectral analysis of biological and aqueous systems while answering the questions why NIRS can be used to measure simultaneously not only so many chemical components in the same sample, but its physical parameters as well. Water has very strong absorbance in UV and IR range and has been avoided in spectral analysis. In opposite, after the discovery that there is a NIR specific spectral pattern of water in raw milk from healthy and disease cows, aquaphotomics was introduced as complimentary to all "–omics" disciplines, in the same way as water is the complimentary environment for all biological and aqueous systems. Water absorbs, at different degree, energies from all over the electromagnetic spectrum. Thus, it can be measured even in real time using all kinds of spectroscopy. Spectroscopy and multivariate data analysis are the main tools used in aquaphotomics. The aim of aquaphotomics is to understand and utilize the holistic role of water aiming at understanding biological and aqueous system functionality and to be able to control it. Aquaphotomics uses the water spectral pattern defined under certain perturbation and its changes in respective environments as holistic biomarker directly related to system functionality.

Multidimensionality and fractality are key words when it comes to water. Water is a 4-dimensional molecular network that changes its hydrogen bonded conformation structure as a mirror of physical and chemical changes in the respective system or its surroundings over the time. Knowing the water on a nanoscale opens horizons to describe it in a macroscale, as well. The results when analysing water at high frequencies are consistent with those at low frequencies. Some ranges of EMS are more suitable to investigate water nanostructures, other ones – water macro structures, some of them are more suitable for experimental work, some of them, for theoretical work. Aquaphotomics, as a scientific platform, gives the vocabulary to "speak and write in the same language", using the same letters and words, the Water Matrix Coordinates, WAMACS (the water frequencies) and water Spectral Patterns, WASP (the words). The aim is to establish the entire aquaphotome, i.e. to know all the specific water bands which in different combinations form WASP related to system specific water structures and respective functionalities. We have established the aquaphotoms of plants, biofluids and various aqueous systems adding different

solvents under various perturbations. We were able to observe dynamic and systematic changes of water absorbance at specific frequencies in relation to respective biofunctions.

We concentrate on experimental work using NIRS as very suitable technique for non-invasive monitoring to gain basic knowledge about how the molecular structure of different waters changes under physical and chemical perturbations like vortex, dilution, temperature variations etc. The aim is to seek for consistency between our results and other EMF ranges results and Quantum Field Theory theoretical models.

In our recent work on bacterial growth, embryo development, plants and animals response to stress, we have found common frequencies (aquaphotome), specific water spectral patterns for each system and its respective condition. We were able to monitor biosystems non-invasively and discovered that free and trapped water molecules, as well as hydronium H3O+ and protonated water clusters play an important role in development and organism adaptation to the environment. In the future we want to connect these studies to QFT and the theory of weak signals.

What does aquaphotomics need as future developments?

1. New interactive instruments for real time spectral data acquisition.
2. New powerful methods for spectral data analysis aiming at band assignments and supporting functional studies
3. Deepen the studies of the relation between physical perturbations and water structure-function relationship
4. Integration between aquaphotomics and other "-omics" disciplines for development of closed feedback controlled systems.

Reference

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