Dynamic Electrophotonic Analysis of Water and Liquids

Korotkov Konstantin, PhD.

Saint Petersburg State University of Informational Technologies, Mechanics and Optics

kk@korotkov.org

Computerized Dynamic Electrophotonic Analysis (DEPA) is based on Gas Discharge Visualization (GDV) technique which have found a lot of applications in medicine and biology [1,2].

The DEPA method is based on the stimulation of photon and electron emissions from the surface of the object whilst transmitting short electrical pulses – 5-7 mcs. In other words, when the object is placed in high intensity electromagnetic field, it is primarily electrons, and to a certain degree photons, which are 'extracted' from the surface of the object. This process is called 'photo-electron emissions' and it has been quite well studied with physical electronic methods. The emitted particles accelerate in the electromagnetic field, generating electronic avalanches around the subject (water drop). The discharge causes glow due to the excitement of molecules in the surrounding gas, and this glow is what are being measured by the DEPA method. Therefore, voltage pulses stimulate optoelectronic emission whilst intensifying this emission in the gas discharge, owing to the electric field created. Commercially available device "GDV Camera" produced by Russian company KTI (www.kti.spb.ru) is being used in the technique.

Informativity of DEPA method for studying liquid-phase subjects has been demonstrated during research of glow of microbiological cultures [3] blood response to allergens [4], ultra-low concentration of different salts [5] comparison of natural and synthetic, organic and ordinary, clockwise and counterclockwise rotating samples of essential oils [6], homoeopathic preparations of 30C potency [7],. In particular, ddifference of solutions and distilled water glow parameters stays up to 2^{-15} dilution, though dynamic trends of 2^{-15} dilution and distilled water show different directions in this case as well. The works on revealing differences in glow of natural and synthetic essential oils of the same composition [9] have aroused great interest.

The DEPA method was found to be highly reproducible, sensitive and relatively simple in use. Data collected in several laboratories demonstrate that DEPA method has high selectiveness and sensitivity if applied to study of liquid-phase subjects and different types of water in particular. The information being obtained depends on chemical composition of water but determinative and most interesting is the dependence on structural composition of liquid. DEPA glow parameters are determined by emissive activity of liquid surface layer, which depends on availability of surface-active valences. Obviously, this feature is determined by structure of the near-surface clusters, i.e. DEPA method is one of the informative methods of structural and informational liquid properties research. At present time there is every reason to include DEPA method into the set of integrated tests of liquid and water properties.

References

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