

**Investigation of the appliance of the alternating  
impulses of pressure for water solutions treatment**

Dubovkina I. A.

Institute of Engineering Thermophysics of National Academy  
of Sciences of Ukraine

During the past decade, there has been considerable investigation of the many alternative technological methods of treatment liquids. Innovative technological methods of treatment liquids are characterized by high quality of the end-products, short duration of the treatment, low energy consumption, low outlay. There are many methods for water treatment to obtain water solutions with necessary physico-chemical properties which require for the technologies. Alternating impulses of pressure is a physical method which is used for treatment of water and water solutions; it realizes hydrodynamic effects which can power structural transformations in water solutions on a micro level and gives opportunity to begin physical and chemical transformations in these complex systems. In pure clean water and in the watery solutions there is a continuous volume grid of hydrogen bonds, it proves to be true many researches and mathematical and numerical experiments. Water and water solutions are metastable systems which have a definite structural association and configuration. It is an open system, which can exchange energy and substance with the environment. Its properties and parameters depend on many factors which are not enough studied.

The purpose of this scientific investigation is to study physical and chemical parameters and properties of water and water solutions after treatment by alternating impulses of pressure.

General scientific methods and special methods were used for the analyzing of the results of research work. Distilled water, pure water, water solutions of hydrated lime slurry, hydroponic solutions, water-ethanol mixtures in a wide range of concentration (perc. of ethanol was varied from 10 to 80%) were used for experiments as model systems.

It was established that appliance of the alternating impulses of pressure for water solutions treatment give possibility to decrease redox on 20-70%, to increase pH on 13-17%, to decrease mass of the dissolved oxygen on 50-55%.

Investigational studies have shown that water treatment by alternating impulses of pressure may be suitable for many technologies in food industry, such as: production of sugar from sugar beets, growing crops in recirculation hydroponics systems in greenhouses, production of alcoholic beverages etc.