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**ORIGINAL TECHNOLOGY OF WATER PROCESSING IN
HYDROPONIC SYSTEM**

Dr. Sc. , Senior Scientist Dubovkina I.

**Institute of Engineering Thermophysics of National Academy of Sciences of
Ukraine**

At the present time the agriculture and food industry are measured as one of the largest sectors international with significant contribution to the economic development. Use of safety modern technologies gives the potential to reduce the energy and recourses consumption of food production. The production of vegetables, fruits, herbs and other agricultural plants by the method of hydroponic are flattering more popularity.

The main features of hydroponics growing are:

- the plant growth medium or without it;
- water solution (water, nutrients, and fertilizers)[1].

The growing medium is an inert substance that doesn't supply any nutrition to the plants. All the nutrition comes from the nutrient solution (water and fertilizer combined)[2]. Growing medium is the material in which the roots of the plant are growing. This covers a vast variety of substances which include: Rockwool, perlite, vermiculite, coconut fiber, gravel, sand and many more.

The most important dissimilarity in hydroponic fertilizers is that they contain the proper amounts of all the essential micronutrients which fertilizers intended for use with soil do not[3]. The control of potential of hydrogen is extremely important. Therefore pH control is a requirement in hydroponic solutions, because the plant growth depends on this. The pH range from 5,0 to 7,9 is most favorable for the availability of nutrients from most water nutrient solutions.

The purpose of this research work is to process water in hydroponics system by original method such as alternating impulses of pressure and investigate change of the potential of hydrogen in the hydroponic.

This research investigation was carried out at the pilot unit designed and created by the scientists at the Institute of Engineering Thermophysics of National Academy of Sciences of Ukraine, the main equipment of the unit give possibility to realize hydrodynamic processing, such as alternating impulses of pressure[4].

Through the dispensation of water processing in the conditions of alternating impulses of pressures the main parameters of the equipment represented: $\Delta P = 370$ kPa near an external surface of an internal rotor; $\Delta P = 240$ kPa near an external surface stator; $\Delta P = 155$ kPa near an internal surface stator; $\Delta P = 190$ kPa near an internal surface of an external rotor[5]. The changing of dispersion of components shows on fig.1, besides the pH was changing too.

Through researches were processed different types of hydroponic: alkaline water and water with low pH. The pH can decrease and increase after processing. The pH of the water prepared on technology by alternating impulses of pressure for hydroponic system in alkaline water decreased on 22-26% and increased on 22-24%.

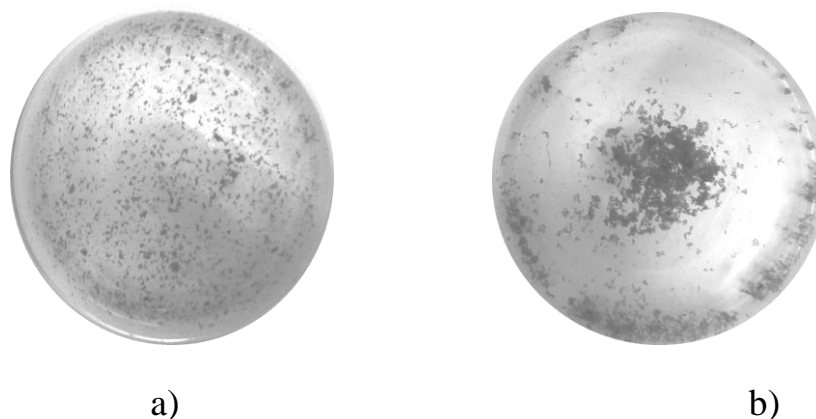


Fig. 1 – Processed water in hydroponic system:

a – the time of processing is 30s without vacuumization; b - the time of processing is 30s without vacuumization

Such changes of pH give potential to obtain water for hydroponic with improved physical and chemical properties that need crops for intensive and safety growing.

Investigational studies have shown that the method of the alternating impulses of pressure may be suitable for technology of water treatment in recirculation hydroponics system.

A detailed analysis of experimental data showed that the use of alternating impulses of pressure in hydroponics system allows obtaining solutions with improved physical and chemical parameters.

As a result of research, it was found that the original safety technology of water processing by alternating impulses of pressure can greatly reduce energy, power and resource consumption, increase efficiency of the growing crops.

References

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