THE USE OF BACTERIOPHAGE T7 IN BIOTECHNOLOGY FOR FOOD PROTECTION FROM *ESCHERICHIA COLI*

Kozoriz A.
Department of Microbiology, Virology and Biotechnology, Odessa National I. I. Mechnikov University, Dvoryanska str. 2, 65082 Odessa, Ukraine
E-mail: alinakozoriz5@gmail.com

In the developing countries, the lack of clean drinking water and food is a critical health problem. The World Health Organization (WHO) estimated that 1.5 million children die from diarrheal diseases every year. 88% of such diseases were caused by unsafe drinking water and inadequate sanitation of food products. Traditional microbiological cultural methods for the detection of bacterial contamination require 2 days or more. Verification of species identity requires additional morphological testing or further subcultivation in differential media. While the rapid detection of these cells it is very important to prevent the risk of foodborne diarrheal diseases. Other culture-independent methods such as those based on polymerase chain reaction (PCR) are also used for identifying bacteria in water and food samples. These DNA-targeted methods detect the presence of genes specific to bacterial species or strains and they offer good sensitivity and speed using minimal number of sample. However, PCR is unable to discriminate viable bacterial cells from dead. Such false positive results can only be verified through microbiological or other methods.

Recent researches show that the use of bacteriophages (phages) for recognition is sensitive and specific method of microorganisms' detection and quantification. One of the major causative agents of food-born diarrheal diseases is *Escherichia coli. E. coli* is the predominant nonpathogenic facultative microbiota of the human and animal intestine. However, several strains of *E. coli* have developed the ability to cause diseases in humans.

Bacteriophage T7 is a lytic phage which infects *E. coli.* Phages infect only metabolically active viable cells of the host and use it for their own replication. Phage production is relatively cheap even at large production volumes. Phages are highly resistant to heat, pH, solvents, acids, alkali and chemicals. The studies conducted on coconut water and apple juice demonstrated that bacteriophage amplification could perform quantification of *E. coli* over a linear dynamic range of 6-log orders.

Consequently, this method of biocontrol microorganisms cause of food related diarrheal diseases offers speed, sensitivity, specificity and dynamic quantification in comparison with the classical methods of determination. Moreover, as diagnostic agents, bacteriophages have the advantage of extensive shelf-lives and low production cost.