THE DEVELOPMENT OF THE REAL-TIME PCR FOR DETECTING COMMON FOODBORNE PATHOGENS

Irina MITINA[2], ORCID: 0000-0002-1550-6739
Valentin MITIN[2], ORCID: 0000-0001-9328-9672
Rodica STURZA[1], ORCID: 0000-0002-2412-5874
Dan ZGARDAN[1*], ORCID: 0000-0002-1296-0864,
Emilia BEHTA[1], ORCID: 0000-0001-8519-9714
Silvia RUBTOVA[1], ORCID: 0000-0002-4153-1065

[1]Technical University of Moldova, 168, Stefan cel Mare Bd., Chisinau, RM
[2] Institute of Genetics, Physiology and Plant Protection, 20, Padurilor st., Chisinau, RM

*Corresponding author: Dan Zgardan, dan.zgardan@enl.utm.md

Foodborne diseases are a major global public health challenge in the entire world. An important way of assuring food safety is controlling the food for the presence of foodborne pathogens. The conventional methods of foodborne pathogen detection are highly precise and sensitive, but are laborious and time consuming. Besides, it may take several days to obtain the results, and sometimes it is important to detect rapidly the potential hazard. So, there is an urging need for development of rapid methods of detection of foodborne pathogens. In this work, we describe the development and testing of the home-designed primers for Sybr Green I real-time PCR (Polymerase Chain Reaction) detection of some common foodborne pathogens*: Listeria monocytogenes, Salmonella enterica subsp. enterica, Staphylococcus aureus, Escherichia coli*.

The primers were designed using the gene sequence listeriolysin O (hly) for detection of *Listeria monocytogenes,* InvA gene for detection of *Salmonella enterica,* Spa gene for detection of *Staphylococcus aureus,* and uidA gene for detection of *Escherichia coli.* The primer specificity was tested in silico by BLASTing their sequences against the GeneBank database. The performance of the primers was tested in vitro, using the DNA of the corresponding pathogens as a positive control.

All tested primer pairs could specifically recognize the template DNA of the corresponding pathogens, which make them suitable for real-time PCR analysis of foodborne pathogens. Sybr Green I real-time PCR using the designed primer pairs can be a rapid alternative to the traditional culture-based methods for detection of pathogens in food samples.

Keywords: foodborne pathogens, Escherichia coli, Listeria monocytogenes, Salmonella enterica, Staphylococcus aureus, primers, PCR

Acknowledgements: This work was funded by the State Project 20.80009.5107.09 "Improving of food quality and safety through biotechnology and food engineering", running at Technical University of Moldova.