Recently, the global consumption of ready-to-eat seafoods constantly increases. It is mostly due to their positive effect on health: they are source of highly digestible protein, polyunsaturated fatty acids belonging to omega-3 family and other valuable nutrients such as iodine, zinc, calcium and vitamin D. The consequence of the increase in fish consumption is the intensification of their farming, which was achieved through the preventive use of antibiotics. The most extensive reared and commercially available fish species is Atlantic salmon subjected to cold-smoking processing, that belongs to ready-to-eat foods. In this technology, the preservation effect is mostly related with adding salt, dehydrating, smoking and sometimes packaging in modified atmosphere with lower oxygen content. However, due to current trends minimizing the salt content within the food products the occurrence of foodborne pathogens in seafoods become common.

Considering the high risk of presence of undesired microflora in minimally processed fish-based products, we performed the preliminary studies to assess its microbiological quality. Among specific spoilage microorganisms of above mentioned products, *Pseudomonas aeruginosa* dominated. *Pseudomonas aeruginosa* is the Gram-negative bacterium with extensive metabolic adaptability, enabling to survive of cells in food ecosystem. It is also an opportunistic pathogen, causing acute and chronic infections due to production of a large repertoire of virulence factors that are regulated by *quorum sensing* system. The prevalence of *Pseudomonas aeruginosa* infections is 11.5% in Europe and 17% in developing countries. For this reason, it becomes necessary to develop effective methods of protecting seafoods against *Pseudomonas* ~~spp~~. *aeruginosa* rods, and also to conduct their in-depth characterisation. Moreover, there is an urgent need to conducting research describing the effect of alternative antimicrobials, that can be used in minimal processing technology, on bacterial physiological activities, and evaluating–potential resistance mechanism of applied factors.. For in depth investigation of those changes, the implementation of transcriptome analysis is crucial.

The particular aim of the Project will be analysis of transcriptome and physiological response of *Pseudomonas aeruginosa* isolates on selected concentrations of alternative antimicrobials that can be used in minimal processing technology of seafoods - potassium chloride (KCl) and sodium salts of organic acids – sodium lactate (NaL), sodium citrate (NaC), and sodium acetate (NaA). The cultures will be conducted in microaerophilic conditions, imitating modified atmosphere conditions of the product. Because *Pseudomonas aeruginosa* is a potential foodborne pathogen, in the first step of the research, the factual antibiotic resistance among analyzed strains will be examined. Then, after the treatment with selected concentrations of alternative antimicrobials, the cells viability and vitality will be studied by flow cytometry technique that scans the culture "cell by cell". This analysis will guaranty selection of the most resistant/sensitive strains that will be subjected for transcriptomic analysis. This will give insights into sets of genes that are actually expressed and the cells response to the presence of given concentrations of antimicrobial agents and microaerophilic conditions. Expression levels of these genes will be *in vitro* analysed by quantitative real time polymerase chain reaction (RT-qPCR). Additionally, the performance of *in situ* experiments will characterise the metabolic activities of *Pseudomonas aeruginosa* in food ecosystem.