

Application of LAB as a Useful Tool in Biopreservation. Where is the Limit between Reality and Fiction?

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Received: August 02, 2017; **Published:** August 08, 2017

Industrial revolution was mark big changes not only in the way of production, but was catalyzing the development of different areas of science, including microbiology, biochemistry and nutrition. Migration of the large numbers of workers to the industrial areas was requested need of supply of sufficient quantity in an acceptable quality of food products and this was link to development of various methods for preservation of food commodities. However, in later years evolution of the human society and development of the idea for the healthier life style, rejected the application of unhealthier supplements, including numerous chemical food preservatives, and requested application of natural preservatives. Production of fermented meat products faced the challenge to be prepared with reduced chemical preservatives and in addition to the nutritional value, to be providing the beneficial properties to the consumers. Idea to have fermented food products that can be delivering to the consumer's healthier food products with beneficial/probiotic properties was born.

In last few decades' research for an appropriate starter culture combining different beneficial properties from technological, bio-preservation, bacteriocin production to the probiotics characteristics been explored by for different lactic acid bacteria (LAB) cultures by several research groups. The challenge of combining different desirable characteristics in a same starter culture was faced. Different approaches were applied and results were a development of innovative applications of LAB in biopreservation of fermented products. However, with the development of different branches of the life sciences and build of new knowledge in microbiology new challenges were faced. Traditional knowledge on safety of LAB was not any more sufficient to certificate safe application of used for centuries LAB starter cultures. Besides all beneficial properties studied for various LAB, a special attention need to be pay on the safety of LAB: the possible presence of virulence factors, production of biogenic amines and antibiotic resistance. This virulence determinants have been well detected and studied in *Enterococci* and *Streptococci*, however, in last few years report on presence of virulence factors in otherwise GRAS *Lactobacilli* have been showing the potential upcoming problems. Horizontal gene transfer of virulence factors between pathogenic and LAB, including probiotics is a highly possible scenario in case of uncontrolled application of probiotics [1-5].

Antibiotic resistance is a serious problem in a treatment of several infection diseases. From one side antibiotics can be answer in a treatment in several diseases and we cannot even imagine 21st century medicine without them. However, more and more infection diseases are consequence of development of multidrug resistant microorganisms. What is the reason, why penicillin was almost *panacea* in treatment of infection diseases 80 years ago and not anymore effective? The answer of this rhetoric question is a very simple - the uncontrolled application of antibiotics from one side, and natural evolution of microorganisms from other side. We need to acknowledge that legislation in several countries is strictly controlling/banning application of antibiotics in animal farming as growth promoters. Human medical application is under strict control, however, some additional mechanisms can be involve in the increasing the antibiotics resistance as well. Maybe for this reason, antimicrobial peptides (different from known antibiotics) can be answer in the control of multidrug resistant pathogens [4-8].

Different biocides, including some commercially used preservatives are widely used as disinfectants because of their broad antimicrobial spectrum. However, their frequent use for disinfection in different settings may promote bacterial drug resistance against both biocides and clinically relevant antibiotics. These processes can be related to changes in the tolerance to the biocide itself, the tolerance to other biocides, and cross-resistance to clinically important antibiotics [9-11].

In this paper we want to point attention on application of beneficial LAB in production of fermented products, however, with focus of some challenges that this process can face. How this can be solved, what are the realistic way of application of LAB as a useful tools of biopreservation and what are the limitation? Where is the limit between reality and fiction?

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Volume 10 Issue 3 August 2017

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