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Editorial

"Probiotic", "beneficial microbes" or how can we call them?

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Lactic acid bacteria (LAB), *Bifidobacterium* spp. and some yeast were actively studied in last few decades as potential candidates in preventive and active humans and other animal's medicine as probiotic candidates. The concept of application of beneficial microorganisms in human and other animal's health is not new. Idea for exploring beneficial potential of microorganisms has been scientifically proposed almost one century ago by Ilia Metchnikov and Stamen Grigorov, being subject of numerous studies and patents related to nutrition, human and veterinary medicine. However, application of the LAB, *Bifidobacteria* and yeasts and theirs metabolites have been part of the humans practice since antique time as part of the preparation of various fermented food products and some of them to be a part of traditional medicine. In second half of XX century scientific basis of probiotic concepts was established and according to World Health Organization/ Food and Agricultural Organization (WHO/FAO) probiotics are "*live microorganisms which when administered in adequate amounts confer a health benefit to the host*".[1] In addition, in 2009, according to the International Scientific Association for Probiotics and Prebiotics (ISAPP), the term probiotic is commonly misused in the commercial environment related to the products with no scientific proof benefits to human and other animals health benefits, and scientifically, when the term has been used to describe bacterial components, dead bacteria or bacteria with uncharacterized health effects.[2]

However, according to FAO/WHO definition, probiotic must:

i. be alive when administered in specific level (10^6-10^7 CFU per gram of food product);

ii. have undergone controlled evaluation to document health benefits in the target host;

iii. be a taxonomically defined microbe or combination of microbes (genus, species and strain level); and

iv. be safe for its intended use.[3–6]

According to the Scopus database (www.scopus.com), almost 26,000 articles related to probiotics have been published since 1954, including more than 5,000 review articles. Over the past 20years, research in this area has progressed considerably. There have been significant advances in the selection and characterization of probiotic cultures, focusing on benefits to consumer health. However, random screening to this enormous research was pointing on one very specific and in fact very common error. Taking in consideration definition mentioned above,[1] term "probiotic/s" supposed to be used only in the specifically mentioned cases. Most of the papers published very frequently reports only of selection of microorganisms (LAB more often, and more rarely *Bifidobacterium* spp. or yeast) and study of their survival and safety of potential application. Are these tests are sufficient to be described one microorganism as probiotic/s? Definitely not! Some of the works even not providing modern methods of identification; no studies on effect of these microorganisms to the host been provided; not even sufficient evidences that these potential "probiotic/s" will survive transit via gastro intestinal tract (GIT). Very frequently non appropriate approaches in the study were applied, including selection of GIT conditions in study of potential probiotics candidates for humans, farm animals, pets, fish, even honey bees. And obviously GIT conditions and specificity for different animals are different. Application of cell lines is other significant problem: most of the studies are based on Caco-2 cell lines, however, we need to consider that this is a cancel derivate cell line and interpretation of the results needs to be in accordance with the nature of the cell lines.

But more important points are that we can call "probiotic" one microbial culture, only after proven scientifically beneficial role of this bacterial population to the stimulation of the health for target macro organisms. In this case, most of the studies need to be downgrade to terms as "beneficial organisms", "potential probiotics", "nutrabiotics" or other terms.

From the commercial point of view, term "probiotic/s" is a well accepted by the consumers and can be considered as a symbol of the health and well being. However, un-appropriate use of the term "probiotic/s" needs to be well controlled and not allowed. Big international companies normally labels their products according to the law, and only if scientifically and clinical trials are available they clime that their products are probiotic/s. Moreover, they spend billions in studies focusing on the health promoting properties of the probiotic cultures. In contrast, several other products can be found on the markets bringing in their labels the word "probiotic/s", used in an unappropriated way. Very frequently clinical studies are not performed, viable cells inside the products are not according to the guidelines of FAO/WHO, and some products are labelled with wrong spelled scientific names of microorganism, and even present some "undescribed yet" genus and species.

Probiotic/s may be an answer in the treatment and prevention of the diseases, however, an ethics in the study - development of the new pharmaceutical or nutritional probiotic/s products needs to be priority. Appropriate use of the term "probiotic/s" needs to be allowed only for the cases if guidelines of the FAO/WHO are covered and more important, scientifically performed clinical trials were presented.

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Conflict of interest

Author declares that there is no conflict of interest.

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