Yakult International Symposia Beneficial Microbes

March 27th and 28th, 2025
27 e 28 de Março, 2025
WYNDHAM SÃO PAULO IBIRAPUERA CONVENTION PLAZA
SÃO PAULO - BRAZIL

Beneficial and safety properties of bacteriocinogenic lactic acid bacteria obtained from Bulgarian feta cheeses

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The beneficial effects of selected bacteria on human and animal nutrition have been recognized for a long time, with traditional medicine even suggesting the use of numerous fermented products. Cheese are one of the traditional dairy products, where lactic acid bacteria (LAB) plays an essential role in the fermentation, biopreservation, health promoting and organoleptic properties. Moreover, cheese can be regarded as vector for delivery of probiotics to the consumers. Certain strains, part of the commercial microbiota of the cheese, have the ability to produce bacteriocins, which help control undesirable bacterial cultures. Additionally, assessing the safety profile of these strains is a crucial step in selecting them for evaluation as starter, biopreservation or probiotics.

Focus of current study was to evaluate safety profile of *Pediococcus pentosaceus* ST408KOC, *Pediococcus pentosaceus* ST401KOC and *Lactiplantibacillus plantarum* ST414KOC all of them isolated from Bulgarian feta cheese, part of the collection of ProBacLab, University of Sao Paulo, Brazil. In the recent study we have evaluated dynamic of the bacteriocin production for *P. pentosaceus* ST408KOC, *P. pentosaceus* ST401KOC and *Lpb. plantarum* ST414KOC, cultured at 37^{o}C for 24h in MRS broth. Moreover, dynamic of the effect of bacteriocins produced by *P. pentosaceus* ST408KOC, *P. pentosaceus* ST401KOC and *Lpb. plantarum* ST414KOC versus *Listeria monocytogenes* 603 was evaluated over 24h. All tested strains were characterized as gelatinase negative and ?-hemolytic and antibiotic susceptivity/resistance profiles when cultured at 37^{o}C was recorded. Moreover, when exposed to presence of the conditions simulating gastrointestinal conditions, cultured at 37^{o}C the stability and survival were observed. For *P. pentosaceus* ST408KOC when exposed to stomach conditions viable cells were reduced from 8.86×10^{8} CFU/ml for 8.94×10^{8} CFU/ml and further after lower GIT conditions bacterial titer was 3.36×10^{8} CFU/ml. Similar results were observed for *P. pentosaceus* ST401KOC, from 7.56×10^{8} CFU/ml to 8.0×10^{3} CFU/ml and further to <100 CFU/ml. When *Lpb. plantarum* ST414KOC was tested, the results were 8.60×10^{10} CFU/ml to 1.33×10^{9} CFU/ml and further to 1.20×10^{9} CFU/ml, respectively initial microbial load, after stomach and lowered GIT environment. Enzymatic productions recorded for the *P. pentosaceus* ST408KOC pointed expression of leucine and cystine arylamidase, acid phosphatase, naphthol-AS-BI-phosphohydrolase, ß-galactosidase and ß-glucosidase, for *P. pentosaceus* ST401KOC was leucine, valine and cystine arylamidase, acid phosphatase, naphthol-AS-BI-phosphohydrolase, ß-galactosidase, ß-glucosidase and N-acetyl-ß-glucosaminidase and for *Lpb. plantarum* ST414KOC was alkaline phosphatase, esterase (C4), leucine, valine and cystine arylamidase, acid phosphatase, naphthol-AS-BI-phosphohydrolase, ?-galactosidase, ß-galactosidase, ?-glucosidase, ß-glucosidase and N-acetyl-ß-glucosaminidase. Studied strains were presenting stability and microbial growth in initial pH between 6.0 and 10.0, presence of oxbile 0.1% or NaCl below 5.0 %. Moreover, based on performed PCR was shown that *P. pentosaceus* ST408KOC, *P. pentosaceus* ST401KOC and *Lpb. plantarum* ST414KOC were negative regarding presence of *gel*, *asa* and vancomycin resistance genes.

It is essential to ensures that the new strains do not pose any health risks to consumers, such as causing infections or adverse reactions. Moreover, safety testing helps confirm that the probiotics do not carry harmful genes, such as antibiotic resistance genes, which could be transferred to pathogenic bacteria.

References

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Acknowledgements: FCT (UIDB/05937/2020 and UIDP/05937/2020), FAPESP (2023/05394-9; 2023/14944-2), CAPES (88887.977258/2024-00).