

International E-Conference on

# NUTRITION AND FOOD SCIENCE

December 09-10, 2020 | Virtual Webinar

## Flow cytometric viability assessment of probiotics

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Probiotics, thanks to their pro-health properties, are a group of microorganisms that are frequently studied. Methods of their preservation gain growing interest as a research subject and among them, fluid bed drying shows promising results and high cost-effectiveness. The most important factor lowering the viability of dried bacteria are different stresses to which the cells are exposed during drying. Those include thermal, osmotic, acid and mechanical stresses. To increase cell resistance they can be cultured with exposure to stress conditions which, if introduced in a controlled manner can help the bacteria to adapt to those stress factors. In this research, we analyze samples of three probiotic strains (*Leuconostoc mesenteroides*, *Enterococcus faecium* and *Carnobacterium divergens*) prepared by culturing in standard conditions, as well as under heat stress and dried by fluid bed drying. Flow cytometry is a cell count method that is being used either as an alternative or as a complementary method to classical plate analyses. The viability and activity of probiotic bacteria cells in the sample were determined by fluorescence staining with SYBRGreen I and PI (propidium iodide). The cells in the samples were counted and assessed for morphology (microscopic image), activity (signal for SYBR Green I) and integrity of the cell membrane (signal for PI). Samples for all strains were obtained during the logarithmic and stationary growth phase and also after the induction of stress factor. Additionally, flow cytometry was used to measure the activity of cells during rehydration in different media, such as MRS, MRD and NaCl.

**Keywords:** Fluid Bed Drying, Probiotics, Lactic Acid Bacteria, Flow Cytometry, Stress Conditions, Rehydration.

### Biography:

Jakub Kieps is a PhD student at the Department of Biotechnology and Food Microbiology in Poznań University of Life Sciences. He is studying Biotechnology at the Poznań University of Life Sciences, Poznań, Poland and obtained his Masters Degree in 2019. To pursue further scientific development he started PhD studies in the field of Food Technology and Nutrition at the Department of Biotechnology and Food Microbiology. Research interests include drying techniques, development of probiotics and improvement of their viability and activity.