

Sami-Sabinsa researchers find Flow Cytometry effective for formulation



Scientists from the Sami-Sabinsa Group have discovered that Flow cytometry is an effective test method to assess the viable spore count in commercial probiotic formulations of *B. coagulans* MTCC 5856, known world-wide as LactoSpore®, solving a formulation challenge in condition-specific probiotic products.

The research was published as: Majeed M, Majeed S, Nagabhusanam K, Punnapuzha A, Philip S, Mundkur L (2018) Rapid assessment of viable but non-culturable *Bacillus coagulans* MTCC 5856 in commercial formulations using Flow cytometry. *PLoS ONE* 13(2): e0192836.

Dietary supplements containing probiotic bacteria are an expanding market, with condition-specific products a fast growing segment as scientific research continues to document health benefits of these bacteria in several acute and chronic diseases (*Molecular Nutrition & Food Research*, 61(1) 2017). Accurate enumeration of viable bacteria is the key to ensuring strain-specific health benefits of probiotics.

The soaring demand for probiotic products has also created a need for high-throughput quantification of these bacteria. Standard microbiological techniques such as plate count have been typically used to estimate bacterial counts, but these approaches are time consuming and only measure replication of bacteria under selected culture conditions. Intermediate states between viable and dead bacteria, like injured and stressed cells, are difficult to detect by microbiological method and are often termed as being in a viable but non-culturable state (VBNC), a protective response by the bacteria to evade a stressful condition.

This research shows that Flow Cytometry is a sensitive and effective method to enumerate the *B. coagulans* MTCC 5856 spores under normal and stressed conditions. It also shows that Flow cytometry is a fast and accurate method for evaluating viable spore count in various commercial probiotic preparations, including capsule and tablet formulations, and in fruit juices.

Flow cytometry has emerged as a superior method for enumerating probiotic bacteria for multiple reasons: it does not require multi-day bacterial culture steps; it can measure multiple bacterial parameters including DNA replication, metabolic activity, and membrane integrity; it can be adapted to enumerate probiotics from commercial formulations; and it can also be scaled up for high throughput screening.

Sabinsa sells LactoSpore at various strengths: 6 billion, 15 billion and 100 billion bacteria /gram. The health benefits and stability of LactoSpore have been published in several peer-reviewed journals and the present investigation further supports the shelf stable property of this branded probiotic in commercial formulations.