

## Summer Research Program 2011/2012

**Project Title:** Inactivation mechanisms of probiotic cells during convective drying

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### Objectives

*This project aims to develop understandings of the main cause responsible for cell death during convective drying.*

- 1. Investigate the cell inactivation kinetics when different carrier systems are used.*
- 2. Monitor the damages to DNA and ribosome to determine the cellular structure that is the main cause of probiotic cell death under simultaneous heat and dehydration stresses.*

### Description

*Heat inactivation of microbial cells has been described using the well established first-order kinetics. However, for centuries, researchers have argued about whether there is a critical cellular structure that is the main cause for the cell death due to heat damage. During a drying process, dehydration stress simultaneous occurs with the heat stress, making the inactivation mechanism more complex. The understandings on the cell death kinetics and mechanisms during drying will contribute not only to industry for manufacturing active probiotic products, but also to microbiology on fundamental aspects relating to the functions of cellular structures.*

*The study will use the single droplet drying approach combined with in situ analysis of particle evolution to determine the cell inactivation kinetics and the accumulation of damages to cellular DNA and ribosome.*

### Requirements

*The ability to perform aseptic technique using flame sterilization is required for this project. Microbiology background with the ability to independently conduct viable cell count experiment is desired.*