

## ***Development of Predictive Microbiology-Based Test Method to Validate the Log Reduction of Escherichia Coli in Spray Drying of Coconut Milk***

S.P.S. Imalka<sup>1</sup>, D.M.W.D. Divisekara<sup>2\*</sup>, S.S.K. Madage<sup>2</sup>, A.B.G.C.J. De Silva<sup>2</sup>,  
I.G.N. Hewajulige<sup>2</sup>, T.M.D.A. Jayawardena<sup>2</sup>, H.A. Prasad<sup>2</sup>

<sup>1</sup>*Department of Botany, Faculty of Applied Sciences, University of Sri Jayewardenepura, Gangodawila, Nugegoda, 10250, Sri Lanka*

<sup>2</sup>*Food Technology Section, Modern Research and Development Complex, Industrial Technology Institute, Malabe, 10115, Sri Lanka*

*\*wasu@iti.lk*

Aqueous extract of coconut endosperm (coconut milk) in its native liquid form has short shelf-life due to the growth of spoilage-inducing microorganisms and chemical deterioration caused by lipid autoxidation, lipolysis, and oxidation of unsaturated fatty acids. Spray drying is a commercially viable option for extending its shelf-life with no major loss of the nutrients. Thermal treatment supplied during the spray drying of coconut milk should ensure its microbial safety. Main objective of this study was to develop a test method to validate the efficacy of the spray drying technology of coconut milk using surrogate microorganism *Escherichia coli* (Migula) Castellani and Chalmers ATCC® BAA-1427™. *Escherichia coli* is one of the most potential microbial contaminants associated with coconut milk spray drying process. *Escherichia coli* ATCC® BAA-1427 was purchased from the American Type Culture Collection, retrieved as per the manufacturers' instructions. Coconut milk was extracted, mixed with additives and inoculated with pre-determined concentration ( $1.5 \times 10^8$  CFU/ml) of *Escherichia coli*. Inoculated coconut milk was spray dried in a centrifugal atomizer type spray drier at 165 °C at a feeding rate of 4 liters/hr. Inlet and outlet temperatures were maintained 29 °C and 78 °C, respectively throughout the drying. Pressure maintained was near atmospheric. Resulting coconut milk powder was evaluated for the log reduction of inoculum using Tryptone soy agar. Log reduction was calculated by comparing the viable colony counts of the control samples (before the heat treatment) with the colony count of the spray dried samples (n=9). Three log reductions of *Escherichia coli* ATCC® BAA-1427 indicated the efficacy of temperature – time combination of the spray drying process to ensure a safe, shelf-stable coconut milk powder. Results revealed that developed test method can be applied to verify the microbial safety in coconut milk spray drying in commercial applications. Development of the predictive microbiological tools using surrogate of target pathogens can be utilize to verify the efficacy of thermal process of food operations.

**Keywords:** Coconut Milk Powder, Surrogate, *Escherichia Coli*, Spray Drying

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