Production and viability time of a probiotic powder from milk cultured with S. Thermophilus and enriched with encapsulated L. Fermentum before drying.

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Fermented milk is the leading carrier of probiotics, but their cell viability decreases during storage, even under refrigeration. The literature has reported the production of fermented milk powder with encapsulated microorganisms. This study investigated the impact of encapsulation and drying on *L. fermentum* cells viability during storage at RH of 11, 44, and 64%. For that, *Lactobacillus fermentum*, free (LFL) or encapsulated (LFE), was added to milk fermented by *Streptococcus thermophilus* before dehydration by freeze-drying (LIO), Cast-Tape Drying (CTD), and Vacuum Cast-Tape Drying (V-CTD). CTD has been used to dehydrate heat-sensitive products by spreading and drying a thin suspension layer on a flexible-and-impervious mat heated from its bottom by a controlled-temperature fluid. The semi-log model described the thermal inactivation kinetics of *L. fermentum* correctly during drying. This approach allowed the calculation of parameters analogous to the decimal reduction time D and z. There was a reduction of less than 1 log CFU/g in fermented milk dried at 50 ºC and 60 ºC, and approximately 2 and 3 logs reduction when dried at 70 ºC and 80 ºC, respectively. The fermented milk dried between 50 ºC and 80 ºC remained with viability above the expected for probiotic products (minimum of 106 CFU/g). z values were 20.3 °C for LFL, and 22.3 °C for LFE. After 180 days of storage, the powder samples dehydrated by CTD at 50 °C had only 1 log reduction for LFL and LFE at 11% and 44% RH. LIO samples with LFL, stored at UR 44%, showed a 2.5 log reduction. No viable cells were present in powders stored at RH of 64% after 10 days. Therefore, CTD at 50 °C or 70 °C produces fermented milk powders with encapsulated *L. fermentum* that maintain cells' viability for at least 180 days at room temperature.