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A lab-scale model system for cocoa bean fermentation

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Fermented dry cocoa beans are the basic raw material for the production of chocolate. Their fermentation is a spontaneous process and is characterized by a succession of yeasts, lactic acid bacteria (LAB) and acetic acid bacteria (AAB). Metabolites produced in the fermentation process are involved in the development of flavor precursors and the characteristic color of fully fermented beans. As it is carried out on farms, cocoa bean fermentation is subject to various agricultural and operational practices and hence the quality of the fermented dry cocoa beans obtained varies. The aim of our research was to develop a lab-scale model system adapted to a 5 days on farm fermentation in Honduras, which can be used as a simple tool for optimizing the fermentation process. Five-day fermentations, each with up to 1 kg pulp-bean mass from hybrids of Trinitario were performed in laboratory incubators followed by subsequent drying of beans in a small drying oven. During the fermentation process different parameters, such as temperature, pH, pulp content and microbial counts of LAB, yeasts and AAB were monitored. A final quality test of the dried beans was carried out using a traditional cut-test and sensory analysis. The lab-scale model system developed during our study achieved similar physical parameters and microbial counts when compared to a Honduran on farm cocoa bean fermentation. This enables the testing of various influencing factors, such as genetics, operational practices, or the application of starter cultures at small scale.

Biography

Edwina Romanens has completed her Master of Science from ETH Zurich in Food Science in 2009. While working on her Master's thesis at the Vrije Universiteit Brussel in the Research Group of Industrial Microbiology and Food Biotechnology, she studied the Microbiology of Ecuadorian cocoa bean fermentation. After having worked for 4 years in the food industry as a Technical Sales Assistant and Project Manager, she started her PhD at ETH Zurich with a focus on cocoa bean fermentation in Honduras.

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