

## Homogenization of Cocoa Beans Fermentation to Upgrade Quality Using an Original Improved Fermenter

**Authors :** Aka S. Koffi, N’Goran Yao, Philippe Bastide, Denis Bruneau, Diby Kadjo

**Abstract :** Cocoa beans (*Theobroma cocoa* L.) are the main components for chocolate manufacturing. The beans must be correctly fermented at first. Traditional process to perform the first fermentation (lactic fermentation) often consists in confining cacao beans using banana leaves or a fermentation basket, both of them leading to a poor product thermal insulation and to an inability to mix the product. Box fermenter reduces this loss by using a wood with large thickness ( $\approx 3\text{cm}$ ), but mixing to homogenize the product is still hard to perform. Automatic fermenters are not rentable for most of producers. Heat ( $T \approx 45^\circ\text{C}$ ) and acidity produced during the fermentation by microbiology activity of yeasts and bacteria are enabling the emergence of potential flavor and taste of future chocolate. In this study, a cylindro-rotative fermenter (FCR-V1) has been built and coconut fibers were used in its structure to confine heat. An axis of rotation ( $360^\circ$ ) has been integrated to facilitate the turning and homogenization of beans in the fermenter. This axis permits to put fermenter in a vertical position during the anaerobic alcoholic phase of fermentation, and horizontally during acetic phase to take advantage of the mid height filling. For circulation of air flow during turning in acetic phase, two woven rattan with grid have been made, one for the top and second for the bottom of the fermenter. In order to reduce air flow during acetic phase, two airtight covers are put on each grid cover. The efficiency of the turning by this kind of rotation, coupled with homogenization of the temperature, caused by the horizontal position in the acetic phase of the fermenter, contribute to having a good proportion of well-fermented beans (83.23%). In addition, beans’ pH values ranged between 4.5 and 5.5. These values are ideal for enzymatic activity in the production of the aromatic compounds inside beans. The regularity of mass loss during all fermentation makes it possible to predict the drying surface corresponding to the amount being fermented.

**Keywords :** cocoa fermentation, fermenter, microbial activity, temperature, turning

**Conference Title :** ICPEFE 2017 : International Conference on Postharvest Engineering and Food Engineering

**Conference Location :** Rome, Italy

**Conference Dates :** July 17-18, 2017