

## **Effects of different fermentation approaches on the microbiological and physicochemical changes during cocoa bean fermentation**

### **Abstract**

The influence of different fermentation methods and turning of cocoa beans on the cocoa bean's quality was studied. Both shallow box covered with banana leaves (SBBL) and shallow box without banana leaves (SBWL) were used throughout fermentation (120 hours). The initial microbial load for SBBL and SBWL was  $5.35 \pm 0.18$  and  $5.19 \pm 0.21$  log CFU/g before increased to  $6.27 \pm 0.08$  and  $6.17 \pm 0.03$  log CFU/g, respectively at the end of fermentation (120 hours). The titratable acidity of the cocoa beans increased steadily until 72 hours before decreased slightly to  $1.34 \pm 0.07$  (SBBL) and  $0.75 \pm 0.15$  (SBWL) at the latter stage of fermentation. The cocoa beans fermented under SBBL were less acidic than those found in SBWL. Turned cocoa beans produced better quality of cocoa with less acidic compared to the one without turning. Cocoa beans with periodical turning recorded higher percentage of brown beans for both SBBL (73%) and SBWL (69%); percentage of purple beans decreased to about 7-8% for cocoa fermented in respective methods mentioned above. No slaty beans were recorded throughout the study. This study suggests that the use of shallow box with banana leaves can produce cocoa beans with superior quality.