

Effect of mass and turning time on free amino acid, peptide-N, sugar and pyrazine concentration during cocoa fermentation

ABSTRACT

A response surface methodology (RSM) was used to determine the optimum condition for mass and turning time during cocoa fermentation. Mass and turning time were used as independent variables; concentrations of free amino acids, peptide-N, sugars and pyrazines were the dependent variables. The R^2 values for peptide-N, tetramethylpyrazine and total pyrazines were greater than 0.9. Both lower (10 kg) and higher (100 kg) cocoa mass together with lower (0 min) and higher (10 min) turning time gave products containing low concentrations of hydrophobic, total and other free amino acids, peptide-N, fructose, glucose and total reducing sugars; in contrast, those of acidic free amino acids gave higher concentrations. Trimethyl-, tetramethyl- and total pyrazines increased significantly ($P < 0.05$) at higher mass (100 kg) and higher turning time (10 min). From the highest concentration of the important flavour precursors ie hydrophobic free amino acids, total reducing sugars and peptide-N, the recommended mass of cocoa beans and turning time for an optimum cocoa fermentation condition was 60 kg and 5 min, respectively.

Keyword: Cocoa fermentation; Cocoa mass; Flavour precursors; Free amino acid; Peptide-N; Pyrazine; Response surface methodology; Sugar; Turning time