Effect of roasting time and temperature on volatile component profiles during nib roasting of cocoa beans (Theobroma cacao)

ABSTRACT

The effect of nib roasting time and temperature on volatile component profiles was studied using response surface methodology (RSM) which consisted of two independent variables: time (5ï 65 min) and temperature (110ï 170°C). A steam distillation extraction (SDE) method was used to extract and gas chromatographï mass spectrometry equipped with an ICIS data system was used to identify the volatile compounds. Tetramethylpyrazine, trimethylpyrazine, phenethyl acetate, isoamyl acetate, 3-methylbutyl acetate, phenylacetaldehyde, benzaldehyde and 2-phenylethanol were present in all treatments. Pyrazine formation increased as roasting time and temperature were increased. The number of pyrazines increased from 4 to 11 and 25, respectively, when roasting, time was increased from 5 to 35 and 65 min at 140°C. The unit area of esters increased (up to 1700ï 1800) when the roasting time was increased from 15 to 65 min (at 110ï 120°C). However, the unit area of carbonyls linearly decreased with an increasing roasting temperature at shorter time (5ï 25 min). The unit area of phenols was enormously reduced at the highest roasting temperature (160ï 170°C) with longest roasting time (45ï 65 min) while that of alcohol slightly decreased as roasting time and temperature were increased.

Keyword: Carbonyls; Esters; Nib; Pyrazines; Roasting; Temperature; Time