

ABSTRACT

About 300 compounds have been identified in cacao and chocolate. Not all of these are essential to flavour and this thesis attempts to assess the contribution of some of them and to investigate some mechanisms involved in the production of volatiles during processing. Precursors of aroma volatiles are formed continuously during fermentation. The maximum amount of volatiles occurs midway through fermentation, coinciding with the time at which hydrolysis products in the bean have been reported to reach a maximum. Optimum flavour, however, develops some time later, indicating the importance of oxidizing reactions. The quantity of volatiles formed is influenced by variations in processing technique. These quantitative differences are noticeable chiefly in the major components and appear to affect the auxiliary flavours only.

No single compound possesses chocolate odour but mixtures of aldehydes and organo-sulphur compounds especially isovaleraldehyde and dimethyl disulphide frequently give chocolate-like odours. These in conjunction with the pyrazines, furans and aromatic phenolic compounds are the chief constituents of basic chocolate flavour. The aldehydes arise from the Strecker degradation of amino acids and reducing compounds and the organo-sulphurs by the breakdown of sulphur-containing amino acids, peptides and proteins. A methyl-S-methionine sulphonium compound has now been found in cacao.

Other compounds that contribute to flavour are the $C_3 - C_5$ volatile free fatty acids, probably formed by microbial deamination and decarboxylation of amino acids. In excess however, they introduce off-flavours often associated with improper fermentations. Their production and that of acetic acid is dependent on aeration. Excessive acetic acid results in "acid beans" which are undesirable in chocolate manufacture. High acetic acid concentrations are associated with a particular aeration regime which is within the range of normal fermentation practice.