

Identification of treacle type by analysis of volatile components using head space-solid phase micro extraction - gas chromatography-mass spectrometry (HS-SPME-GC-MS)

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Treacle is prepared by concentrating the respective sap or juice obtained from inflorescence or stoke, using heat. As a result of this treatment, the non-enzymatic heat-induced browning reactions, namely maillard and caramelisation reactions, take place leading to the formation of volatile aldehydes, ketones and heterocyclic compounds. These volatiles contribute to the characteristic caramel-like, slightly burnt-sugar aroma and flavour of treacle. However, the complete identification of these volatile aroma compounds of the kithul treacle has not yet been reported.

The present Sri Lanka Standard for treacle (SLS 772:1987) is a common standard that covers treacle made from kithul, coconut, palmyrah, and sugar cane. The parameter available for identification of the type of treacle in this standard is organoleptic assessment (specific taste and the aroma) of the different treacle, which is subjective. This is one of the major drawbacks in promoting these unique products in the international market requiring to develop an instrumental technique for identification and development of quality standards.

The headspace volatiles for the four types of treacle aroma was subjected to solid phase micro extraction with a 50/30 μm divinylbenzene / Carboxen / polydimethylsiloxane coated 2 cm stable-flex fibre, and subjected to gas chromatography mass spectrometry for the identification of the aroma constituents with a Carbowax column.

Aroma volatile components were different for the four types of treacles and can be used as a fingerprint of the respective treacle type. Volatile component of kithul treacle was rich in ethanol (70.66%), ammonia (10.60%), isoamyl alcohol (4.95%), bis- (2-ethylhexyl) hexane dioic acid ester (4.10%), 2-methyl -1-propanol (3.94%), benzeneethanol (1.78%), ethyl acetate (1.06%), 3-methyl-1-butanol (0.55%), phenol (0.35%), 3,5-dimethyl pyrazine (0.34%), 2,6-dimethyl pyrazine (0.28%), methyl pyrazine (0.24%), pyrazine (0.06%), as the major constituents. Several furanone derivatives, furan derivatives and phenolic esters were also present as minor constituents. This is the first report of the volatile aroma profile of the kithul treacle.

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