

Review of Coffee Aroma Chemistry

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SUMMARY

The state-of-the art in coffee aroma chemistry will be reviewed. This includes the discussion of publications and patents in the area of aroma analytics, character impact flavour compounds and other key ingredients that relate to product quality as well as of flavour formation and chemical reactivity of odorants during processing and shelf-life. Coffee aroma is a complex mixture of more than 1000 volatile compounds (e.g. Nijssen et al., 1996; Vitzthum, 1999). The application of the 'Odor Activity Value' concept resulted in 23 character impact compounds, for which a contribution to the overall coffee aroma has been shown using reconstitution and omission experiments (Grosch, 1999). Coffee aroma reconstitutes have been established exhibiting a good base coffee character (Mayer et al., 2000). However, they cannot mimic the character of various coffee types nor describe the whole coffee aroma sensation. Recently, a predictive mathematic model was developed showing a good correlation between sensory profiling and analytical differences in chemical composition by means of PTR-MS (Lindinger et al., 2005). This novel approach has been proven capable in differentiating the aroma profiles of various espresso coffees. Other approaches considered the identification of new aroma and taste ingredients as well as certain physico-chemical phenomena to better understand cup quality (Kerler et al., 2004; Navarini et al., 2004; Frank et al., 2006). Sulfur compounds are known to be responsible for the fresh, roasted character of coffee. Their formation upon roasting (Milo et al., 2001) and degradation during processing and shelf life will be covered. The latter aspect relates to thiol binding sites in coffee solids (Müller and Hofmann, 2005), aroma-aroma reactions and ways how to preserve them in coffee products. Sulfur compounds are also excellent markers that can be used to monitor the freshness of coffee products as a function of the presence of oxygen during processing and/or shelf life as well as the quality of the packaging material.