GENERATION OF MEATY FLAVOURS DURING THE PROCESSING OF DRY FERMENTED SAUSAGES

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Keywords: aroma, curing, dry fermented sausage, meaty flavour

Introduction

Hundreds of flavour compounds have been identified in dry fermented sausages using different techniques (Berdagué *et al.*, 1993; Stahnke, 1994), but many of them do not have an important aromatic impact due to their high detection thresholds. Very few attempts have been made to apply olfactometric techniques to asses the aromatic impact of these volatile compounds (Blank *et al.*, 2001). Of the aromatic compounds which have been identified, esters are often found which provide fruity notes, and aldehydes providing herbal aromas (Stahnke, 1994). There are no compounds identified as meaty or cured flavours. Some authors, such as Wirth (1991), suggest that fermented sausages made with the addition of nitrate, rather than nitrite, have a better taste. In a previous work, Marco *et al.*, (2006) confirmed that the different use of nitrite or nitrate affects the volatile compound profiles of dry fermented sausages.
The aim of this study was to determine the generation of meaty aroma compounds in a fermentative process under the addition of different curing agents.

Materials and Methods

Preparation of dry fermented sausages and sampling. Two different batches containing nitrate (NO_2^-) or nitrite (NO_3^-) were manufactured as described by Marco *et al.*, (2006). Four sausages were collected at days 0, 14, 31, 45 (finished sausage) and 105 (vacuum stored) for the different analyses.
Volatile compounds GC-MS analyses. Volatile compounds were extracted, analyzed and quantified as described by Marco *et al.*, (2004).
Volatile compounds GC-O analyses. Volatile compounds were extracted using solid phase micro-extraction (SPME) using the same procedure cited for GC-MS analyses. The compounds adsorbed by the fibre were desorbed in a gas chromatograph (GC 8000 Top, CE Instruments, Milan, Italy) injection port for 6 min at 240ºC in split-less mode, the split valve was opened after 1 min. The compounds were separated using a DB-624 capillary column (J&W Scientific, 60 m, 0.32 mm i.d., film thickness 1.8 μm). Helium was used as carrier gas with a linear velocity of 35.14 cm/s. The capillary column was split (2:1) into deactivated and uncoated capillaries connected with the sniffing port and FID, respectively. Six trained assessors evaluated the odours from the GC-effluent by smelling and recording the odour descriptors. For each assessment, evaluation of the odour took place over two different time intervals (0-35 and 35-70 min) in order to avoid olfactory fatigue for the assessors.

Results and Discussion

Among the 105 volatile compounds identified in the headspace of dry fermented sausages in this work, sixty different aromatic notes were described. Nine of these were described by the assessors as meat related flavours (fig. 1).

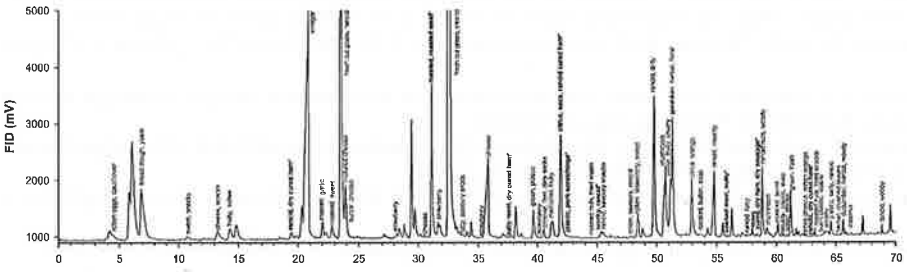

Figure 1: Aromatic regions within the GC-FID chromatogram of dry fermented sausages.

In order of elution, the volatile compounds responsible for these aromas were: 3-methyl-butanal (rancid, dry-cured ham), 1-pentanol (roasted, roasted meat), 2-hexenal (salty meat, dry-cured ham), heptanal (citrus, soap, rancid cured ham), 2-heptanol (plastic, pork scratchings), methional (brothy, rancid), 2,4-heptadienal (cooked meat, nutty), unknown (cured, dry ham, dry sausage), and heptanoic acid (rancid, dry-cured ham). Of these, 2-heptanol, the unknown

compound and heptanoic acid were found only in trace amounts. 1-pentanol, 2-hexenal, heptanal and methional showed an increase during the drying stage but their amounts began to decrease during the vacuum storage. By contrast, 3-methyl-butanal and 2,4-heptadienal increased during storage (Figure 2). Only two compounds, methional and 2-hexanal were detected in significantly higher amounts in the samples with added nitrates, whilst no differences were found in the rest. All the meaty aroma compounds identified are derived from the lipid oxidation process except 3-methyl-butanal which comes from amino acid degradation (Marco *et al.*, 2006).

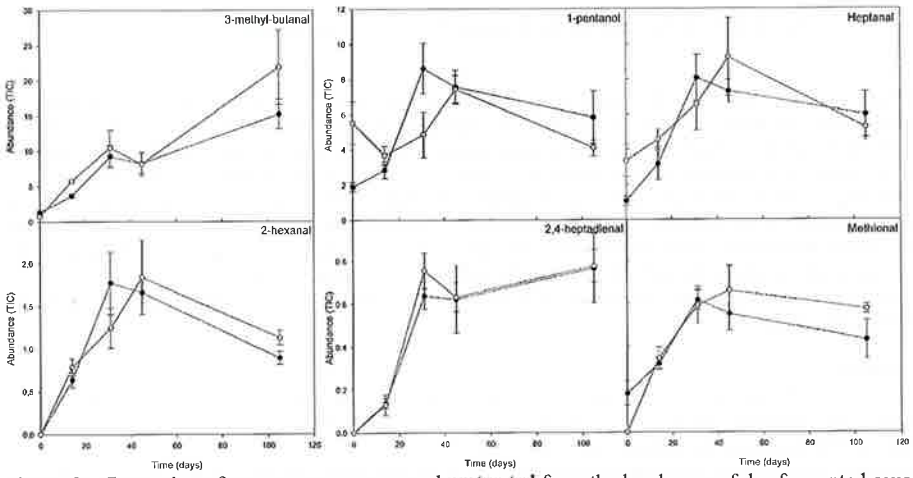

Figure 2: Generation of meaty aroma compounds extracted from the headspace of dry fermented sausages, quantified as AU×10^{-6} per g of dry matter. NO_2^- (●) and NO_3^- (○) batches.

Conclusions

Meaty aromas in dry fermented sausages are primarily generated during the drying process. However, during vacuum storage these compounds mainly decrease as they are derived from the lipid oxidation process. It is interesting to note the effect of vacuum storage on the generation of the volatile compounds responsible for the meaty aroma in dry fermented sausages.

Acknowledgements

The scholarship from CSIC/MEC to A. Marco and financial support from grants AGL2005-00713 (MEC, Madrid, Spain) and GV05/067 (Generalitat Valenciana, Spain) are fully acknowledged.

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