

5. CURRENT TRENDS IN NATURAL PRESERVATIVES FOR FRESH SAUSAGE PRODUCTS

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Natural preservatives from bacteria, plants and animal currently in use in fresh sausage manufacture were investigated. Plant-derived antimicrobials could increase the shelf-life of fresh sausages and in some cases also decrease lipid oxidation and decrease colour loss. The quality of fresh sausages is of major importance since the shelf-life of the products depends on this aspect. Spoilage of food involves a complex process and excessive amounts of food may be lost, which results in high economic losses or even pose health hazards. Spoilage of fresh sausages may result in changes in the sensory (colour, odour, flavour, texture) characteristics of the product which may be unacceptable for consumers.

These changes may be brought about by proteolysis, lipolysis and lipid oxidation in the absence of micro-organisms. Lipid oxidation therefore depends on light and oxygen access, the chemical composition of the meat, storage temperature and technological processes. This will have a negative effect on the quality of the meat leading to changes in sensory (colour, texture and flavour) and nutritional quality. Fresh meat cuts and meat products owe their bright red colour to the presence of oxymyoglobin. During chilled storage, this red colour is lost due to exposure to high levels of oxygen. The red oxymyoglobin is then transformed to the brown-coloured metmyoglobin. The most commonly used preservative in fresh sausages, is currently still sulphur dioxide (SO₂). It is usually added in the sulphite salt form as sodium metabisulphite and expressed as part per million (ppm) or mg/kg SO₂. The antimicrobial effect of the sulphite salts is exerted through the undissociated SO₂ molecule.

The degree of dissociation is dependant on the pH value and is reduced under acidic conditions. Even though the pH of meat has a negative effect on the

antimicrobial activity of the sulphite salts, it is still sufficiently powerful to act as an antimicrobial. Another factor that may have an influence on the effectiveness of SO₂ is the presence of carbonyl compounds (keto- or aldehyde-groups) that bind with it. Thus for SO₂ to be effective, not only must the substrate be acidic, but fairly free of oxygen and sulphite binding compounds. Bacteria are much more sensitive to SO₂ than yeasts and moulds.

The bisulphites have lower activity than SO₂ against yeasts, and sulphites have none. Metabisulphite is more effective against Gram-negative bacteria, especially *Pseudomonas*. However, activity against fermentative Gram-negative bacteria, e.g. the Enterobacteriaceae (*Enterobacter*, *Citrobacter*, *Klebsiella*), is less marked possibly due to adaptation amongst members of this family to this preservative. *Brochothrix thermosphacta*, the dominating spoilage bacteria in British fresh sausages, is also relatively resistant to sulphite.

The results suggested that sausages containing a sulphite concentration greater or equal to 450 mg/kg had a lower aerobic count. the growth of pathogenic organisms such as *Staph. aureus* and Therefore, most fresh sausages are by law preserved by these concentrations of SO₂. Microbial-, plant- and animal-derived natural compounds were investigated for their antimicrobial, antioxidant and antibrowning properties in fresh sausages.

The plant-derived compounds have been investigated extensively since a vast range of these compounds show excellent antimicrobial, antioxidant and anti-browning activities in meat products and fresh sausages.

List of references

1.Galvez, A., Abriouel, H., Lucas, R., Jose, M., & Burgos, G. (2011). Bacteriocins for bioprotection of foods. In M. Rai, & M. Chikindas (Eds.), *Natural antimicrobials in food safety and quality* (pp. 39e61). Oxfordshire, UK: CAB International. G

2.Jayasena, D. D., & Jo, C. (2013). Essential oils as potential antimicrobial agents in meat and meat products: a review. *Trends in Food Science and Technology*, 34, 96e108.