IMPROVEMENT OF FOOD QUALITY AND SAFETY IN MEAT TRADITIONAL WORKSHOPS

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France, with an annual dry sausage production of approximately 98 000 tons, is the 4th producer in Europe. Rhônes Alpes and Auvergne regions insure more than 70% of this production which is largely traditional. Traditional dry sausages rely on natural contamination by environmental flora. This contamination occurs during slaughtering and the bacterial count increases during fermentation which is hardly controlled. Each workshop has a specific house flora composed of useful microorganisms for the fermentation and flavour of sausages, as well as of spoilage and pathogenic flora. The control of typical house flora is crucial since the hygienic quality (spoilage and pathogen flora) and the sensorial quality (technological flora) of traditional dry sausages depend totally on it. Considering that the typicality of traditional dry sausages is related to specific house flora, its control in a workshop and finally in the product can be achieved by the introduction of sanitizing procedures targeted towards spoilage and pathogenic bacteria, but preserving technological flora.

In this context, a study was carried out in order to control the safety by directed microbial ecology in a traditional workshop producing dry sausage. In a first step identification of hazards and assessment of risks according to the Hazard Analysis Critical Control Point (HACCP) was considered (Calvin and Giey, 2000). Then, the workshop house flora has been isolated and identified (Chevallier et al., 2001). The last step aimed to develop targeting disinfectant solution bactericide for pathogenic and spoilage bacteria, while preserving technological bacteria.

A broad range of decontaminating solutions consisting of acidic, alkaline, osmotic, biocide solutions and/or their combination were tested on seven bacterial species, frequently isolated from the workshop and belonging to spoilage (Enterococcus faecium, Hafnia alvei, Pseudomonas fluorescens and Pseudomonas putida), pathogenic (Listeria monocytogenes) and technological (Lactobacillus spp. and Staphylococcus carnosus) flora. Bacteria in meat environment are

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found on surfaces (cutting tables, hatching machine) within a structured biofilm ecosystem, i.e., a community of pathogenic, spoilage and technological flora. For these reasons, targeting disinfectants were tested for 30 min. on mixed cultures of the isolates grown in biofilm for 5 days.

On the one hand, the results obtained demonstrated that alkaline solutions were deleterious for all studied bacteria (Figure 1) and were not selective. Similar results were reported by Vasseur et al. (2001). On the other hand, acidic solutions appeared selective, it was especially the case for the combination of monolaurin (monoester of lauric acid) with acetic acid which exhibited a synergistic action. It inactivated about 4 log of spoilage and pathogenic initial counts of approximately $10^6$ c.f.u / ml, but it had a weak effect on the technological flora (Less than 0.3 log). These results agreed with Wang and Johnson (1997) who observed that bactericidal activity of monolaurin was higher in acidic medium. Osmotic and biocide decontaminating solutions had however a less inhibitory activity for all studied bacteria and as consequence were less selective.

![Figure 1](image-url)

**Bacterial species**

- CH$_3$COOH (pH 5.4)
- NaOH (pH 12)
- Na$_2$SO$_4$ (12%)
- monolaurin (0.075%)
- CH$_3$COOH + monolaurin (0.075%) (pH 5.4)
- CH$_3$COOH + Na$_2$SO$_4$ (12%) (pH 5.4)

Setting-up a selective decontamination approach will enhance the improvement of organoleptic quality and safety of food manufactured in meat traditional workshops. In addition, it is the only way to insure the survival of local economies with their positive effects on employment and environmental protection in rural regions.
REFERENCES


