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Perspectives in meat processing

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Abstract: Meat technology includes all steps from animal handling and slaughtering to production of different meat products. During animal handling, special attention is paid to animal welfare, not only to protect animals from suffering but also because of animal welfare's importance for meat quality. The oldest processing methods (chilling, freezing, salting, smoking and drying) are being readjusted with respect to equipment and consumer's health issues. Special attention is given to preservation of meat's nutritive value (milder heat treatment) and health promoting properties of the products (functional foods). Novel methods (irradiation, high pressure, pulsed electric field, pulsed light and cold plasma) struggle with some issues such as acceptance by consumers, expensive equipment and effects on food's sensory properties. Along with novel products, demand for traditional meat products is still increasing which requires the uniqueness and quality of these products to be preserved, along with increased production capacity.

• Introduction

Meat and meat products are a very important source of nutrients in human diets. The whole process of obtaining meat reaches back to the farms and includes animal handling, transport to the slaughterhouse and slaughtering process, followed by preservation techniques aiming to extend the shelf life of fresh meat or to convert it into meat products. From the oldest techniques to preserve meat such as salting, smoking and drying, the development of the meat industry led to new techniques that include contemporary equipment and machines on the one hand, and chemicals and non-meat ingredients on the other hand. Along with preservation techniques, the concept of animal welfare has also flourished, not only to protect animals from suffering but also because of animal welfare's influence on meat quality. The awareness of consumers about the influence of food on their health has led to the rise of the concept of functional food, which also inspired research in functional meat product development as well as in preserving the nutritive value of products. Apart from conventional meat processing techniques, there are novel approaches, including high pressure or irradiation, that have their advantages and disadvantages. However, traditional meat product manufacture still retains its significance and certainly commands attention thanks to increasing demand for these products by consumers. The aim of this paper is to discuss contemporary meat processing concepts and approaches and to review their current status and future perspectives.

• Material and method

Conventional meat processing methods

- Chilling and freezing From meat chilling in natural caves followed by building cellars cooled by natural ice
- Salting and Curing
- Smoking of foods
- Drying Along with salting and smoking
- Heat treatment
- Packaging

Novel meat processing methods

- Irradiation
- High pressure
- Pulsed electric field
- Pulsed light
- Cold plasma
- Functional meat products
- Traditional meat products

• Results and discussions

Although traditional production is, in general, considered as "safe", there can be some safety issues concerning some parasites (*Trichinella* spp.), bacteria (*C. botulinum*), moulds and PAHs etc. Therefore, there is a need for food safety management systems for small producers, based on good hygiene practice and good manufacturing practice or some sort of generic hazard analysis and critical control points plan. Small producers are not often capable of increasing production in order to meet growing market demands, whereas industrial companies try to take advantage of market desires. Industrial production, though, often leads to changes including lower quality of raw materials, use of starters, additives, artificial casings etc. Because of that, traditional principles should be implemented in industrial production of such products in order to achieve the expected product quality demanded by consumers.

• Conclusions

Meat processing techniques continuously change following contemporary scientific and technological achievements. The oldest processing methods such as chilling, freezing, salting, smoking and drying still remain irreplaceable but have, nowadays, been modified with respect to equipment and consumers' demands about health issues. Novel methods, such as irradiation, high pressure, pulsed electric field, pulsed light and cold plasma still present some obstacles, including consumer acceptance, equipment costs and preservation of sensory properties of the meats. The functional food concept in meat processing struggles with oxidation issues and maintaining the required sensory properties of PUFA-enriched products, with promising results obtained by improving emulsification processes or utilising microencapsulation. Traditional meat products are evergreen in the area of meat processing, with growing demand for these products from consumers requiring introduction of flexible safety management principles, although the production principles and quality should be unchanged.

