MedCrave
Step into the World of Research
Journal of Nutritional Health & Food Engineering

Editorial

Smoking of dairy products

Volume 4 Issue 1 - 2016

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Received: January 11, 2016 | **Published:** January 29, 2016

Editorial

Food is a group of basic nutrients element which consists of proteins, fats, carbohydrates, minerals, salts, vitamins, fiber and enzymes, in addition to water. Most of these elements present in groups complement each other. Complementarity of these elements forms proper food.

Food preservation goes back to the last Ice Age, about 15,000BC, when humans discovered for the first time a way of preserving food by smoking it. The evidence for this lies in the caves at Les Eyzies in the Dordogne in France, where this way of life is well portrayed in carvings, engravings and paintings.[1]

Smoking of food is one of the oldest methods used from 10,000years. Sensory active components such as phenol derivatives, carbonyls, organic acids and their esters, lactones, pyrazines, pyrols and furan derivatives are responsible for many of the aromatic properties of meat products.[2] Khamis[3] reported that smoking of food and food products is a common and old process, and one of the best ways to keep food from spoiling where wood smoke contains substances that inhibit the growth of spoilage organisms and thus improves the keeping quality of the product, and also imparts an agreeable taste and appearance of food. The smoking process of cheese is well known and wide spread in some European countries and the United States of America long ago. On the other hand, the smoked cheese is recently known in Egypt as a product that covers the needs of foreigners and tourists.

Traditional methods of smoking foods involve fairly simple equipment based upon easily obtainable sensory properties. The traditional equipment used for smoking foods usually consisted of a smoker where pyrolysis of wood was induced. The smoker was loaded with wood that was burned and the resulting smoke was channelled in a direction so that direct contact with the food could be obtained. These traditional goals of smoking foods were to impart and develop desirable sensory (flavor, aroma, and appearance) properties as well as rendering the food product safe to eat. The same author illustrated that additional application technology allows for alternative means for smoking such as glimmer smoke, liquid smoke, friction smoke, wet smoke, and smoke chambers which can accommodate both batch and (semi) continuous flow systems in conjunction with computerized controls. Also, new smoke generation systems are mandated to employ equipment or scrubbers to aid in the cleaning of smoke, which strengthens its case for an environmentally friendly processing technology.[4]

Council of Europe[5] showed that smoked food is food produced either by the use of a traditional smoking process or by use of smoke flavourings or by a combination of the two methods. In principle, 4 different ways can be used to produce smoked food:

a. Smoking with freshly generated smoke from wood,

b. Smoking with smoke regenerated from smoke condensates,

c. Flavouring with smoke flavour preparations derived from smoke condensates.

d. Flavouring with smoke flavours prepared by mixing chemically-defined substances.

Smoke flavourings can be divided into two main groups:

i. Smoke flavourings made from smoke from burning wood: Condensed smoke possibly with adjuncts added and where some components of health concern may have been removed.

ii. Synthetic smoke flavourings.

Smoke flavourings can be blended directly into the food, for instance in minced meat products, or they can be sprayed on to the surface of the products. By using smoke flavourings one can prevent the drying loss which normally takes place during the smoking process and the production time can be reduced. The traditional smoking process is normally combined with drying whereby the weight of the product is reduced. By using smoke flavourings, the food product does not lose weight and this affects the quality and the price of the product. In industrialized countries a reduction of processing time is regarded as an advantage as it can often reduce the price of the product sold to the consumer or give better profits to the producer.

The use of liquid smoke flavor (LSF) has important advantages: it reduces considerably the time necessary to reach the required organoleptic profile of flavored foods and makes it possible to control more effectively the "addition" of contaminants, including polycyclic aromatic hydrocarbons (PAH), into aromatized products. Currently, LSF is used in the following forms:

i. Liquids for spraying, nebulization, immersion, or showering

ii. Emulsions incorporated into foods by injection or mixing

iii. Water-mixable emulsions for showering or curing brine

iv. Powders such as maltodextrins, salt, saccharides, starch, proteins, and seasonings

v. Solutions in vegetable oils.[6]

Preservation of food by smoking is attributed to antimicrobial properties of smoke components such as organic acids. Of the reported organic acids found in smoke condensates, acetic acid, propionic acid,

and benzoic acid are credited with possessing the most antimicrobial potential; the antimicrobial potential of organic acids is accredited to the influence on overall pH and the undissociated form of the acid. The cell membrane lipid bilayer can be easily penetrated by organic acids in their undissociated forms. Also, carbonyls in smoke materials have role as an antimicrobial. However, their efficacy when in the form of smoke condensates can be inferred based on the 133 different aldehydes and ketones present in smoke. Of these carbonyls, formaldehyde and acrolein have proven toxicity against microorganisms. Carbonyls inhibit microbial growth by penetrating the cell wall and inactivating enzymes located in the cytoplasm and the cytoplasmic membrane. It was documented from long time ago that commercial liquid smoke preparations are effective against various types of spoilage and pathogenic microorganisms.

Smoking of dairy products like cheese is one of the oldest methods used to preservation and production flavored food. Naturally smoked cheeses are considered specialty cheeses in the United States and represent an important value-added niche category.[7] Smoking is employed for some artisanal cheeses to mimic the smoky character of traditional cheeses that were produced with open wood fires in cheese making huts in former times.[8] There are reports that phenolic compounds found in smoke inhibit growth of molds on smoked Cheddar cheese.[9] Smoking of cheese is one of the ways to diversify flavors. The most common varieties of cheese that are smoked are Seretpanir (Iran), Caramakase (Germany), Bandal (India), Provolone (Italy) and processed cheese (Egypt). Traditionally, cheese is smoked by application of natural smoke; however, some manufacturers prefer liquid smoke. Natural smoke flavorings (or liquid smoke) may be applied to cheese products by various methods: 1) direct addition to milk, 2) addition to the brine, 3) surface application to finished cheeses, and 4) direct addition to cheese products.

The Palmero cheese is a fresh smoked goat' milk cheese manufactured on the Isle of Palma (The Canary Islands), which constitutes an important part of this isle's economy. This is an artisan cheese, protected recently by the Denomination of Origin, which only can be made using milk from Palmero goats, by the milk producers themselves, following traditional methods passed down from generation to generation. This is one of the few cheeses that combine the two characteristics of fresh and of smoked cheese. It is made with unpasteurized milk, recently harvested, and kid rennet or authorized enzymes for coagulation, and then smoked following traditional practices. The smoking can be done by burning almond shells (*Prunus dulcis*), dry prickly pear (*Opuntia ficus indica*), or the wood or needles of canary pine (*Pinus canariensis*). This cheese has a cylindrical shape and flat sides, with average compositional characteristics: 17.5% protein, 35.1% lipids, and 48.5% dry extract. This kind of cheese has been produced since at least the middle Ages. This cheese, due to its organoleptic properties, has great consumer acceptability; however, its volatile components have never been studied.[10]

In addition to cheese, some types of fermented milk are also smoked. Ashenafi[11] studied the manufacture of fermented milk (Ergo) in smoked or unsmoked containers, raw milk was allowed to sour naturally at ambient temperature (25°C) in smoked or unsmoked containers. Milk in smoked containers had a lower rate of pH drop and the fermented product had good flavour for a longer time after coagulation. The total count of non-lactic acid bacteria in milk in unsmoked containers reached a high count (>10^8 cfu mL^{-1}) within 12h, whereas milk in smoked containers required more than 24h to reach this level. Similarly, the growth of coliforms and lactic acid bacteria was slow in milk in smoked containers, thus assuring good and slow development of flavour components, safety of finished product and better keeping qualities. Seifu[12] produced a Pastoralists (traditional fermented camel milk in eastern Ethiopia) by placing fresh camel milk in a clean and smoked container, wrapping the container with a piece of cloth, and keeping it in a warm (ambient temperature 25ºC-30°C) place for about 12-24hrs to allow spontaneous fermentation to take place.

Whipped cream is from other dairy products which are newly smoked. The addition of liquid smoke increased whipped cream sweetness and caramel flavors, while imparting minimal off-flavors.[13]

Acknowledgements

None.

Conflict of interest

Author declares that there is no conflict of interest.

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