Raw milk cheeses

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What's the value of raw milk cheeses?

Cheese making is a major industry worldwide, with a rich diversity of cheeses available. Many cheese varieties throughout the world are typically made from raw (unpasteurized) milk. Most of the famous cheeses with the protected designation of origin, such as Comté, Camembert and Roquefort, are made with raw milk, with 350,000 tons manufactured in France and approximately 500,000 tons elsewhere in Europe. Microorganisms, as well as natural enzymes, are considered to be responsible for enhancing desirable flavor characteristics. Consumers appreciate the diverse and distinctive sensory properties of raw milk cheese. The flavors of cheese are nuanced and vary throughout the seasons. These cheeses represent many years of tradition, are usually produced in a specific territory and frequently emphasise a particular rural setting (Montel et al. 2014). In addition, some potential human health benefits associated with the consumption of raw milk cheeses have been described. The benefits include a positive impact on the enteric microbiota of the gut and possible protection against allergy following the consumption of raw milk cheeses (Bertrand et al., 2007; Von Mutius, 2012).

Food safety of raw milk cheeses

Raw milk has the potential to carry harmful bacteria and in this regard, control and prevention of contamination with pathogens are of primary importance to ensure public health (Farrokh et al., 2013).

The food safety risk of raw milk cheeses can be controlled by having in place a high standard of hygiene during milk production, coupled with the implementation of good hygienic practices at processing and as necessary, supported by relevant microbiological controls based on risk analysis, such as aging, throughout the production chain.

Strict hygiene measures need to be implemented along the entire production chain in order to supply high quality, safe and healthy products.

Interventions to assure the safety of raw milk cheeses

An integrated approach for the production of raw milk cheeses should be used from farm to fork in order to control contamination from foodborne pathogens. Production starts at the farm and continues through transport of the raw milk to cheese manufacturing plants, storage and transport of the final product to retail, and to storage, handling and display at the retail premises.

Interventions at the dairy farm

Control of the microbiological quality of raw milk is very important (Collins and Wall, 2004). Only milk with consistently satisfactory quality and safety must be used to manufacture cheeses with unpasteurized milk.

As reliance on measurement of microbiological quality has limitations, food safety relies highly on preventative measures related to animal health, farm hygiene, feed quality, hygienic feeding practices and an increased level of hygiene at milking.

Raw milk must come from animals that are in a good general state of health and present no sign of disease that might result in the contamination of milk. Sick animals should be isolated from the herd and their milk not collected. Healthy carriers of zoonotic pathogens (shedders) should also be managed. Access of new animals to the herd should be subject to specified control.

The general hygiene level and tidiness of the farm environment should be high. Feed should be hygienically produced and handled. Feed that is deteriorated should not be used. In addition, the water quality should be monitored regularly.

Milking should be carried out hygienically (washing teats, cleaning and disinfection of the milking equipment, cleaning the milking platform etc.). Immediately after milking, milk should be cooled and the cold chain maintained during transport. A maximum time between milking and fermentation should be considered and specified by the hazard analysis.

Milk used for the manufacture of products made with raw milk should be provided by producers with a satisfactory history of supplying milk that is free of pathogenic bacteria. The system of payment of milk by quality, based on a reference price plus a bonus and penalty system, applied in some countries, encourages farmers to produce milk that is safe and of the highest quality. Manufacturers of raw milk cheese may benefit from sourcing their supplies from different farms to enable continued production in case of temporary stop of supplies from individual farms.

Interventions at raw milk cheese processing plants

Cheese producers should be aware that the technologies they use carry some risks. A Hazard Analysis Critical Control Point (HACCP) system and systematic microbiological quality control throughout the supply chain have been developed to reduce the risk associated with the production of raw milk cheese. For instance, milk and cheeses can be monitored and/or tested at different steps of the chain for different pathogens, e.g. at the farm, in the tank, fresh cheeses just manufactured, cheeses during ripening, and end product. Predictive modelling is an effective tool to assist in identifying the most vulnerable steps and in effectively allocating resources to intervention, monitoring and testing. These monitoring and test results enable an evaluation of all the risks along the production chain so that corrective actions and control measures can be set up and reinforced, if needed. Regarding the cheese process, several processing steps can limit, slow down, or prevent growth of pathogens and/or reduce the microbial load that could potentially initially be present in raw milk (Codex Alimentarius, 2004).

- competitive microflora (this microbiological control measure is applied by choice of starter cultures), or can be natural as in non-starter lactic acid bacteria (NSLAB)
- cooking of cheese curd
- pH reduction rate (micro-organisms become more sensitive at low pH)
- ripening: in general, pathogenic bacteria, if accidently present in raw milk, may grow during the transformation of milk into fresh cheese, but may decrease or stagnate, rarely grow during the ripening phase.
- by the lactoperoxidase system: an enzyme naturally present in milk which has a bacteriostatic effect in the presence of hydrogen peroxide and thiocyanate (FAO, 2005).

The application of good hygiene practices, the HACCP plan, regular analysis, traceability and procedures for withdrawal or recall of product, are necessary tools to minimize risk to consumers. The training of the employees is of critical importance in achieving this.

How to protect consumers?

To assist consumers in making informed choices, it is important that they can easily find information regarding whether or not a product contains unpasteurized milk. A clear labeling *made from raw milk* should allow vulnerable people (young children, pregnant women, elderly or immunocompromised people) to make an informed decision.

Consumer education on hygienic handling of food can play a role in reducing the incidence of infections: appropriate food storage, cleaning of utensils and general hygiene in the kitchen can prevent cross-contamination of bacteria from environment or from one food to another.

As a general observation, it is important to note that the cheese making process reduces the risk of foodborne diseases, compared to the consumption of raw milk which preferably needs heating before consumption to ensure safety.

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