

Antibiotic Resistance of Contaminants of the Smear Cheese Surface Flora

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Smear cheeses such as Limburg, Tilsit and Gruyère are surface ripened cheeses which are covered by a layer of various yeasts and bacteria. The smear microflora is difficult to control: traditionally, by “old-young” smearing, the smear is transferred from mature to green cheeses, with the obvious risk that undesirable contaminants (enterobacteria, enterococci, pseudomonads, moulds or pathogens) are disseminated in the whole factory. Today, a broad spectrum of specialised bacterial surface cultures can be used to minimize concentrations of these contaminants and thus improve food safety. Up to date, culture research was clearly focussed on surface flora optimisation in order to obtain Listeria-free cheeses. However, early studies performed at the ETH Zurich (Burri, 1999; Gianotti, 1999) showed that drug resistant enterobacteria and enterococci, present on the surface of practically all smear cheeses, could be an important factor for the observed emergence and spread of antibiotic resistant microorganisms - the food chain could serve as a reservoir and disseminator. In 2 PhD theses, Burri (1999) and Gianotti (1999) showed that multiple antibiotic resistance was common among strains of enterococci and enterobacteria isolated from Swiss and French smear cheeses, a rather dramatic finding. This stimulated the interest of our institute to initiate a survey of smear cheeses produced in 4 European countries. Enterobacteria and enterococci were isolated from the smear cheese surface and analysed for antibiotic resistance with an annual repetition between years 2000 and 2005. In these studies, results described by Burri and Gianotti were essentially confirmed. In the presentation, most common antibiotic resistance markers, differences between countries, changes of resistance profiles over the 5-year time period and stability of multiple antibiotic resistance properties in gram-negative and gram-positive strains during subculturing are discussed.