

Temporal stability and biodiversity of two complex, anti-listerial cheese ripening microbial consortia

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The composition of red smear cheese surface floras is exceedingly complex. Traditionally, the green cheeses are inoculated with the surface ripening flora of mature cheeses by the “old-young smearing” method. Alongside this process, pathogenic contaminants like *Listeria monocytogenes* may also be transferred to the young cheeses. To improve or maintain food safety, there is a need for protective ripening cultures, which exhibit anti-listerial activity.

In our study, the temporal stability of the composition and the anti-listerial activity of two different undefined bacterial surface floras from two dairies (AD and KS) were investigated. The floras were derived from matured smear soft cheeses two times each with six months apart. A total of 400 bacterial isolates (100 isolates of each surface flora at every time point of sampling (A) and (B)) were identified by Fourier-transform infrared (FT-IR) spectroscopy and 16S rDNA sequence analysis. Coryneform bacteria represented 94.5% of the isolates with certain species being predominant. In addition, *Marinolactobacillus psychrotolerans*, *Halomonas venusta*, *H. variabilis*, *Halomonas* sp. (between 10^6 and 10^7 cfu per gram smear) and unknown Gram-positive bacteria (between 10^7 and 10^8 cfu per gram smear) are described for the first time in this environment. The species composition of surface flora AD was quite stable over a period of six months, but surface flora KS revealed less diversity of coryneform species as well as less stability. While surface flora AD had a stable extraordinary high anti-listerial potential *in situ*, the anti-listerial activity of surface flora KS was lower and it decreased with time. The cause for the anti-listerial activity of the two surface floras remained unknown, but is not due to the secretion of soluble, inhibitory substances.

Our data indicate that the stability over time, and a potential anti-listerial activity, are individual characteristics of the ripening consortia, which can be monitored and used for a safe food production without artificial preservatives.

Maoz, A., R. Mayr and S. Scherer. 2003. Temporal stability and biodiversity of two complex antilisterial cheese-ripening microbial consortia. *Appl. Environ. Microbiol.* **69**:4012-8.