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Microbiological safety of raw milk yoghurt

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Yoghurt:
Left: Mild
Right: Acidic

Introduction

Raw milk protects against allergies and asthma. However, its consumption is discouraged for food safety reasons. Research is looking for ways to preserve the benefits of raw milk and ensure food safety.

Methods

Raw milk was fermented into yoghurt: mild yoghurt with pH 4.4-4.5, and secondly acidic yoghurt with pH 3.9-4.0 (n=10). After fermentation and after 14 days, the yoghurt was tested for *Escherichia coli, Staphylococcus aureus*, *Salmonella* spp., STEC and *Listeria monocytogenes*.
In a second experiment, challenge tests with an STEC model and with a mixture of four *Listeria innocua* strains were performed 3-fold with 10^4-10^5 cfu/ml each.

Results

E. coli and *S. aureus* could be detected in the mild fresh yoghurt, but not in the acidic fresh and neither in all 14-day yoghurt (Table 1). *Salmonella* spp. and *L. monocytogenes* were not detectable in fresh or 14-day yoghurt. STEC genes were detected in one out of ten fresh milk and one out of ten acidic 14-day yoghurts (Table 2). However, no STEC could be isolated from the positive samples. In the challenge tests, the bacterial count of both the STEC model germ and *L. innocua* was reduced over 14 days, in mild yoghurt by 10^1-10^2, in acidic by 10^6 to below the detection limit (Figure).

Conclusions

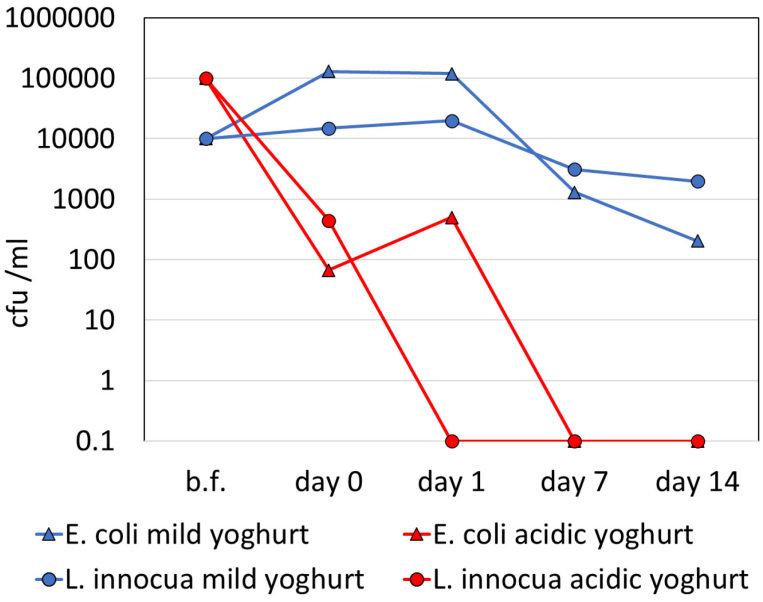
Acidic raw milk yoghurt produced in this way are safe. However, the results show that monitoring of raw milk for STEC is useful in addition to the other parameters.

Table 1: Count of Escherichia coli and Staphylococ-cus aureus in mild and acidic raw milk yoghurt (number of samples: 10 yoghurt productions each)

cfu /ml	Mild, pH 4.4 – 4.5		Acidic, pH 3.9 – 4.0	
	E. coli	*S. aureus*	*E. coli*	*S. aureus*
Day 0	$1.8 * 10^2$	$1.3 * 10^2$	< 10	< 10
Day 14	< 10	< 10	< 10	< 10

Table 2: Proportion of positive samples in mild and acidic yoghurt from raw milk, qualitative analysis of Salmonella spp., STEC and Listeria monocytogenes (number of samples: 10 yoghurt productions each)

%	Mild, pH 4.4 – 4.5			Acidic, pH 3.9 – 4.0		
	Salm. spp.	*STEC*	*L. mono.*	*Salm. spp.*	*STEC*	*L. mono.*
Day 0	0%	10%	0%	0%	0%	0%
Day 14	0%	0%	0%	0%	10%	0%



Cell count of inoculated E. coli model for STEC and Listeria innocua in mild and acidic raw milk yoghurt before fermentation (b.f.), and on days 0, 1, 7 and 14. Three yoghurt productions each.

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