

Feed as a risk factor for raw milk contamination with *Listeria monocytogenes*



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OBJECTIVES

The objective of this study was to clarify incidence of bacteria from the genus *Listeria* (*L.*) int.al. foodborne pathogen *L. monocytogenes* in the feed and raw milk from one organic and three conventional dairy farms in Latvia.

INTRODUCTION

The origin of food borne pathogens in milk may be contamination on the farm during milking process from cows' environment or itself. Feed is the main risk factor for poisoning the farm environment thus also raw milk with pathogenic microorganisms of *Listeria* genus species.

MATERIALS AND METHODS

In total, 167 feed samples and 244 bulk tank milk samples were bacteriologically analyzed at the Scientific Laboratory of Biochemistry and Microbiology of the Research Institute “Sigrā”. *L. monocytogenes* from samples were isolated in accordance with standard LVS EN ISO 11290-1+A1. Presumptive *L. monocytogenes* isolates were purified and confirmed by Fourier transform infrared spectroscopy technique. Feed and milk samples were collected randomly in all seasons of year.

RESULTS

Acquired results showed that *L. ivanovii*, *L. innocua* and *L. seeligeri* were isolated from 12.0%, but *L. monocytogenes* from 19.8% of feed samples. Most often different feed concentrates (7.8 %) and silage

(6.0 %) were contaminated with *L. monocytogenes*. (Table 1). *Listeria* genus species were isolated more often from feed prepared and used in organic dairy farm than from that used in conventional dairy farm, correspondingly 44.4 % and 18.3 % (Table 2.).

Table 1. Incidence of *Listeria* species in feed of dairy cows

Type of feed	<i>Listeria</i> spp., n,(%)	<i>L. monocytogenes</i> , n,(%)
Grass (n =14)	Not detected	Not detected
Silage (n = 65)	6 (3.6)	10 (6.0)
Haylage (n = 21)	4 (2.4)	2 (1.2)
Hay (n = 13)	1 (0.6)	2 (1.2)
Feed concentrates (n = 40)	2 (1.2)	13 (7.8)
Mixed fodder prepared in the farm (n = 4)	2 (1.2)	2 (1.2)
Straw (n = 10)	5 (3.0)	4 (2.4)
Total (n = 167)	20 (12.0)	33 (19.8)

Table 2. Share of *Listeria* spp. and *Listeria monocytogenes* in feed depending of type of farm and season (n = 130)

Season	Organic farming			Conventional farming		
	N	<i>Listeria</i> spp. N (%)	<i>Listeria monocyt.</i> , N (%)	N	<i>Listeria</i> spp. N (%)	<i>Listeria monocyt.</i> , N (%)
Winter	19	4 (7.4)	10 (18.5)	30	2 (2.6)	8 (10.5)
Spring	14	2 (3.7)	2 (3.7)	14	0	0
Summer	6	0	0	14	0	0
Autumn	15	2 (3.7)	4 (7.4)	18	2 (2.6)	2 (2.6)
Total	54	8 (14.8)	16 (29.6)	76	4 (5.2)	10 (13.1)

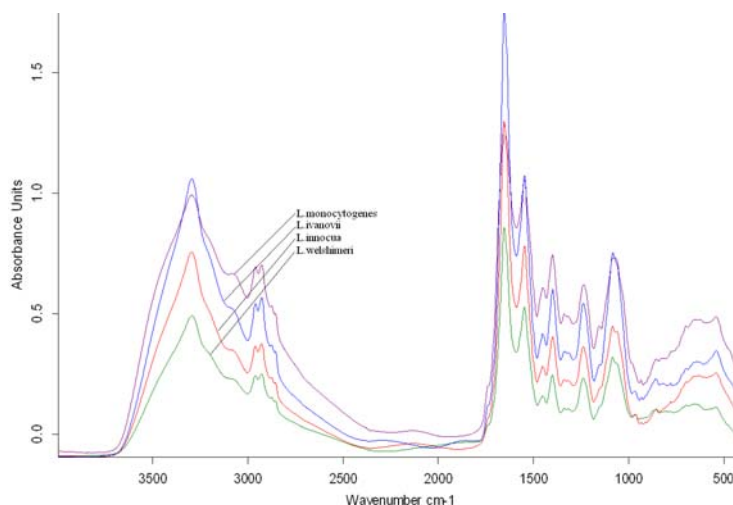


Fig.1. Spectrum of isolated *Listeria* genus bacteria

CONCLUSIONS

✓ *Listeria* spp. and *L. monocytogenes* are found more often in feed prepared in organic farm (correspondingly 14.8 % and 29.6 %) than in feed used in conventional farms (correspondingly 5.2 % and 13.1 %).

✓ No *L. monocytogenes* was found in samples of bulk milk from organic farm (n = 33), but in samples of bulk milk from conventional farm *L. monocytogenes* found three times or in 1.4 % of all cases (n = 211).