

Seasonal variation of fatty acids in milk of intensive and extensive dairy systems in Northern Italy

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INTRODUCTION

EGF 2010, Kiel

Most of the milk produced in both intensive and extensive dairy systems in Northern Italy is transformed into traditional PDO cheeses. Farm production systems affect the chemical quality of dairy products, such as fatty acid (FA) composition. The diet composition having the most influence.

OBJECTIVE: to evaluate the effects of diet management in intensive and extensive dairy farming systems on the FA profile of milk destined to 'Raschera' PDO cheese

MATERIAL AND METHODS

Two intensive and two extensive dairy farms have been studied over different seasons and over two years. The management and production parameters, including the diet of milking cows were recorded for each farm. During both winter and summer seasons the diet components and milk were sampled three times on the same sampling dates and analyzed by gas chromatography for their FA content.



RESULTS & DISCUSSION

1. Winter and summer intensive diets contained high amounts linoleic and oleic acids, whereas summer extensive diets contained the highest value of α -linolenic acid, which is one of the main precursor of the wide range of unsaturated FA isomers present in the milk (Figure 1).
2. The FA profile of the milk was affected by the production systems adopted on the farms and by seasons (Table 1).
3. Milk from extensive farms produced in summer presented the highest CLA, α -linolenic acid, MUFA and PUFA contents.
4. The elevated proportion of forages utilised in cow diet of extensive farms seemed to have a direct influence on the milk content of several odd- and branched-chain FA (C14:0i+C16:0i, C15:0+C17:0)

Figure 1. Diet composition of cows during winter and summer in intensive and extensive production systems.

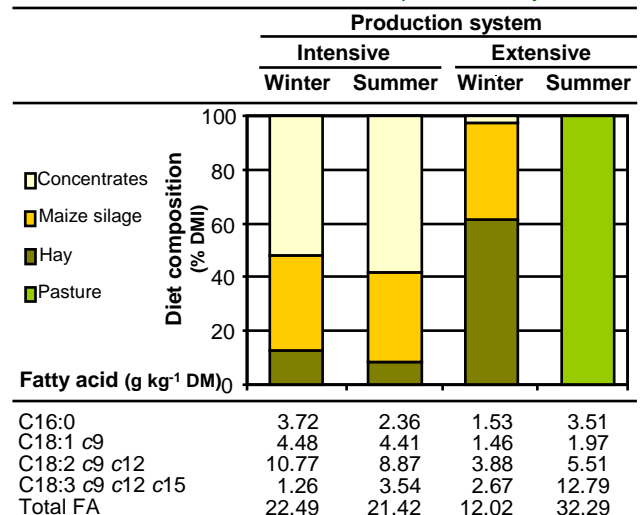


Table 1. Partial fatty acid profile of milk (g 100 g⁻¹ fatty acids) produced in intensive and extensive farms during winter and summer seasons.

Fatty acid	Production system				Effect		
	Intensive		Extensive		P	S	PxS
	Winter	Summer	Winter	Summer			
C16:0	27.26	28.33	26.8	22.09	***	**	**
C18:0	10.30	10.62	10.54	12.27	ns	ns	ns
C18:1 c9	25.56	24.89	23.13	25.95	ns	ns	ns
C18:1 t11	1.70	1.56	0.66	3.41	ns	ns	***
C18:2 c9 c12	3.36	2.77	1.59	2.21	***	ns	**
C18:2 c9 t11 CLA	0.82	0.63	0.85	1.87	***	**	***
C18:3 c9 c12 c15	0.30	0.39	0.67	1.56	***	***	***
C14:0i+C16:0i	0.20	0.27	0.77	0.64	***	ns	**
C15:0+C17:0	1.60	1.57	2.66	2.80	***	ns	ns
SFA	64.18	64.75	68.69	59.76	ns	**	**
MUFA	31.19	31.29	27.94	33.98	ns	*	*
PUFA	4.63	3.96	3.36	6.26	ns	***	***

CONCLUSIONS

Extensive production systems, with high forage contribution from meadows and pastures, offers the opportunity of producing milk destined for typical PDO cheese with high content of beneficial FA for human health. The different odd- and branched-chain FA contents, linked to forage utilised in dairy cow diets, could be used to trace the different origins of milk and confer an added value to dairy products from extensive production systems.