Fatty acid composition of organic goat kid meat from dairy goat and crossbred meat goat kids

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Abstract

In contrast to the increasing demand for dairy goat products in Germany, a market for goat kid meat as a related product does not exist. Thus, the objective of this study was to develop a concept for organic goat kid meat production for dairy goat farms. In collaboration with a wholesaler, organic dairy goat farmers and marketing research the experimental part of this study was to find out if cross-breeding of meat-goats could improve meat quality and performance of fattening goat kids together with other factors like concentrate ratio of the diet, genotype, sex, housing vs. pasture as well as raising strategy during milk feeding period. Our results indicate that even a low input level of concentrates (10 % of total dry matter intake per goat kid and year) is sufficient to achieve the requested carcass weight of 12 kg at slaughter when goat kids are kept on pasture. Dressing percentage in both experimental years was affected by concentrate level, the more concentrates (40 %) the higher dressing percentage. Comparing years 2011 and 2012, dressing percentage was 4 % higher in 2012 for both concentrate levels. Daily weight gain per kid ranged from 122 to 133 g/d significantly influenced by concentrate level and sex, in 2011 as well by genotype. A low concentrate level (KF10) resulted in higher contents of Omega 3 fatty acids, male KF10-goat kids had highest omega 3 content of 1.19 g/100 fatty acid. The raising of "Capretto" type kids for slaughter indicated, that artificial rearing of kids using cow milk is beneficial compared to mother bonded rearing.
Results indicated, that rearing and fattening of goat kids even under low input production levels on pasture can be realized und will produce higher meat qualities regarding fatty acid composition.

Introduction

Scientific literature of the production of goat meat focuses predominantly on fattening performance and meat quality of goat kids from the intensive fattening or the meat goat keeping specialized. There aren't examinations which take into account the criteria of the organic farming especially the conditions of professional dairy goat farms.

A study of the structure of dairy goat farms in southern Germany shows, however, the great importance of the organic farming in the goat milk production sector. Almost 77 % of dairy goat farms in Bavaria and Baden-Wurttemberg were managed according to the guidelines of the organic farming (Herold et al., 2007). Most of the dairy goat farms kept goats in herd sizes between 50 and 100 animals only a few farms raised more than 100 dairy goats (Hesse, 2002). Unlike from the increasing demand for goat milk products, the market for goat kid meat in Germany does not exist. Goat kid meat and goat kid meat quality is unknown to (german) consumers. Dairy goat farmers try to sell or even give away goat kids when they are 14 days old, often to obscure and unethical destinations. Thus, new concepts and knowledge is needed to raise goat kids under the premises of welfare and sustainability of organic livestock farming.

Animals, Materials and Methods

The experiment was carried out at the experimental farm of the Thünen-Institute of Organic Farming in Trenthorst/Germany from February 2011 until September 2012. The dairy goat herd consisted of 50 goats of the dairy breed German Improved Fawn (BDE). For the two-year fattening experiment half of the goat herd were bred using a BDE buck, whereas the other half was crossbred with Boer bucks as meat breed. After kidding, kids were raised by their dams for 45 days and selected by sex, genotype and weight to form groups of 9 – 10 goat kids each. As an additional treatment, concentrates from pure pelleted wheat coarse meal were fed either 10 % of total dry matter intake per goat kid and year (KF10) or 40 % of total dry matter intake per goat kid and year (KF40). Concentrates were increased from 80 g/lamb/day (KF 10) to 320 g/lamb/day (KF 10) or from 160 g/lamb/day (KF 40) to 640 g/lamb/day (KF 40) during the grazing season (see Table 1). The concentrates were dispensed twice a day individually, all residuals were weighed in 2011. At the end of the grazing season (3 weeks before slaughter) goat kids were housed indoors for a final fattening period with ad libitum hay and concentrates fed according to Table 1.

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Table 1: Concentrate feeding regime

				Wheat coarse meal per animal and day [g]		
Genotype	**Sex**	**Concentrate feeding group**	**n**	till 7/21/2011	7/21/2011 - 9/13/.2011	Final fattening period 13.9. - slaugther
BDE	femal	KF10	10	80	120	160
		KF40	10	320	480	640
	male	KF10	9	80	120	160
		KF40	10	320	480	640
Boer	female	KF10	9	80	120	160
		KF40	10	320	480	640
	male	KF10	10	80	120	160
		KF40	10	320	480	640

Goat kids were weighed every two weeks, parasites were controlled according to www.weide-parasiten.de. Animals were slaughtered at a commercial slaughter plant under scientific supervision and evaluation of the carcasses. Measures of pH 24, conductivity etc. were taken at the slaughter house, a sample of *longissimus dorsi* was taken and frozen for further analysis of tenderness and fatty acid profile.
Experimental data was recorded in the field using Excel sheets. Statistical analysis was conducted by using SAS statistical package version 9.3 and proc GLM.

Results

Daily weight gain per kid ranged from 122 to 133 g/d significantly influenced by concentrate level and sex, in 2011 as well by genotype. As an example of fatty acids, a low concentrate level (KF10) resulted in higher contents of Omega 3 fatty acids, where male KF10-goat kids had highest omega 3 content of 1.19 g/100 fatty acid (Figure 1 and Figure 2.)

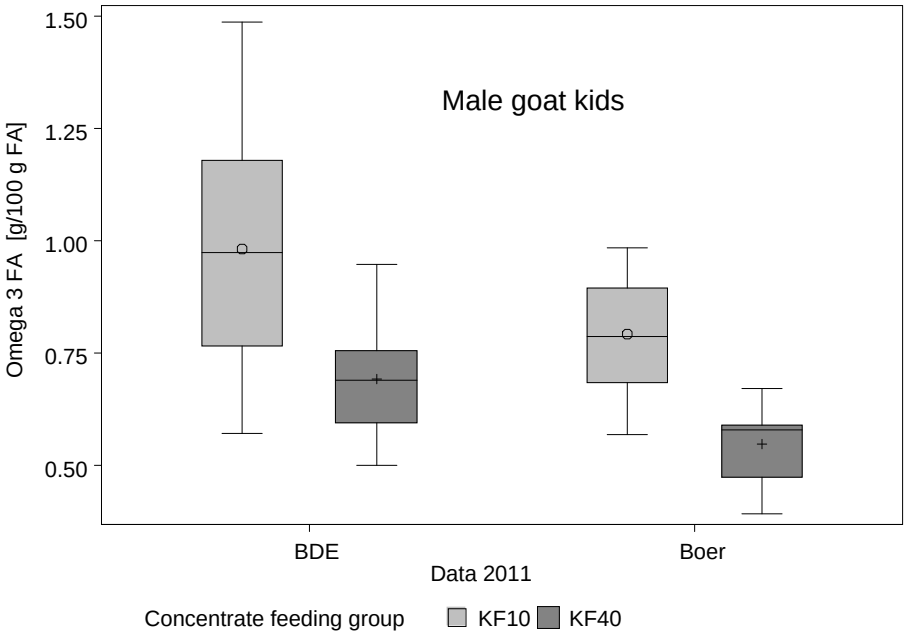

Figure 1 : Omega 3 fatty acid contentof male goat kid meat depending on breed and concencrate feeding level (Data 2011)

An analysis of variances (Table 2) shows that genotype, concentrate feeding level and sex are significant factors for the Omega 3 fatty acid content of *the longissimus dorsi* of the studied goat kids. In contrast to that, interactions between the factors mentioned above where not significant.

Table 2 : Analysis of variance of Omega 3 fatty acid content in *longissimus dorsi* depending on genotype, concentrate feeding level and sex (data2011)

Source	DF	LSMeans	F-Statistic	Pr > F	Sign. (α=0.05)
Genotype	1	1,01	10,06	0,0023	***
Concentrate feeding level	1	4,20	41,80	<,0001	***
Sex	1	3,01	29,96	<,0001	***
Concentrate feeding * Sex	1	0,07	0,75	0,3909	n.s.
Genotype * concentrates * Sex	3	0,17	1,65	0,1867	n.s.

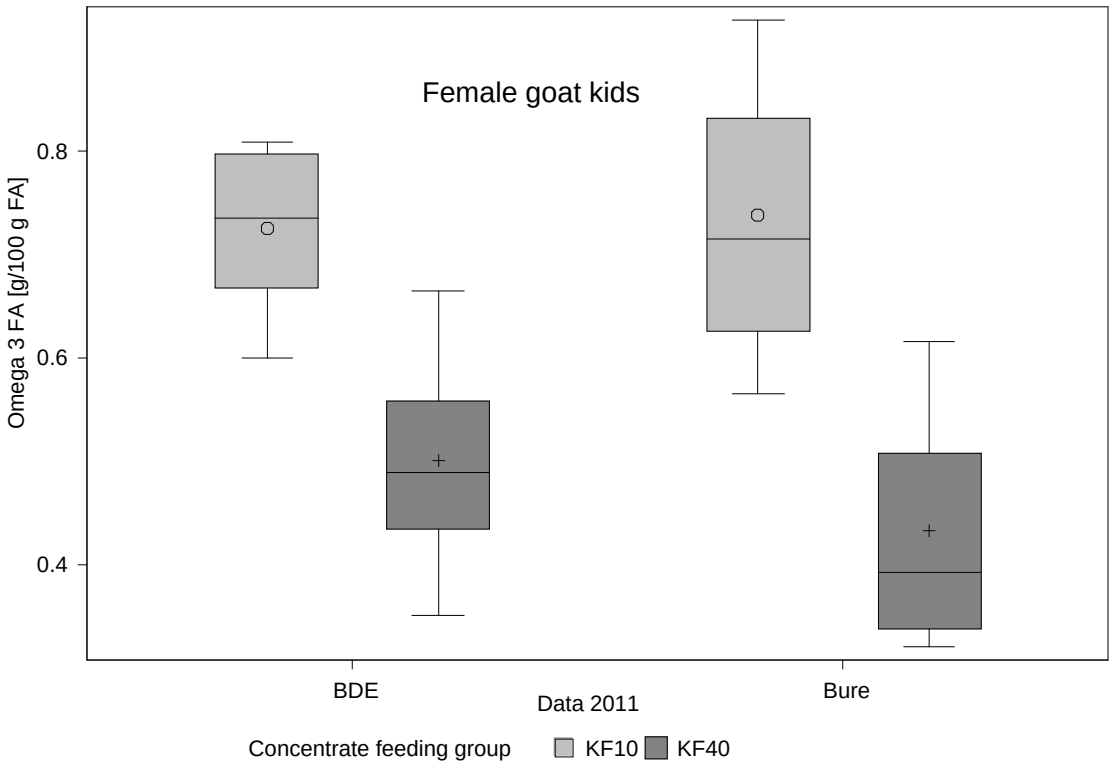

Figure 2 : Omega 3 fatty acid content of female goat kid meat depending on breed and concentrate feeding level (Data 2011)

Conclusions

It can be concluded, that fattening of organic goat kids is feasible even with dairy breeds. The high quality of the meat (e. g. Omega 3 fatty acid) should be paid more attention when marketing products to the consumer.

References

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