Hay production in North Europa

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Hay feeding might have some advantaged in relation to herd health and reduces the risk for contamination of the milk with spores. Hay production compared to silage is more resource intensive – like use of energy for drying.
Hay from two types of herb enriched grass swards and the traditional grassland showed no difference in intake or milk production when compared at three organic farms. Feed efficiency tended to be lower than standards based on silage feeding.

Hay feeding compared to silage can reduce the risk for contamination of the milk with spores, which is a risk for malformation in cheese production. Hay is also associated with a higher animal welfare. Hay might on the other hand compared to silage reduce the digestible energy intake due to a lower digestibility if cutting frequency is reduced. Feed ration high in hay, compared to maize, will therefore increase the proportion of grassland in the crop production related to dairy farming and might, compared to use of grassland for silage, affect the milk quality positive when used for cheese. A disadvantage for hay compared to silage is the longer period needed for wilting before ready for cutting. At North European climatic condition large scale hay production is only realistic in combination with indoor drying, which add additional cost, and, from an environmental point of view, also emission of GHG from energy used in the drying process.

This paper gives data about production of hay and feeding, while the overall objective of the experiment was to study the effect of different type of hay on cheese quality and the impact on GHG emission from production of cheese in a life cycle approach at the consumer disk.

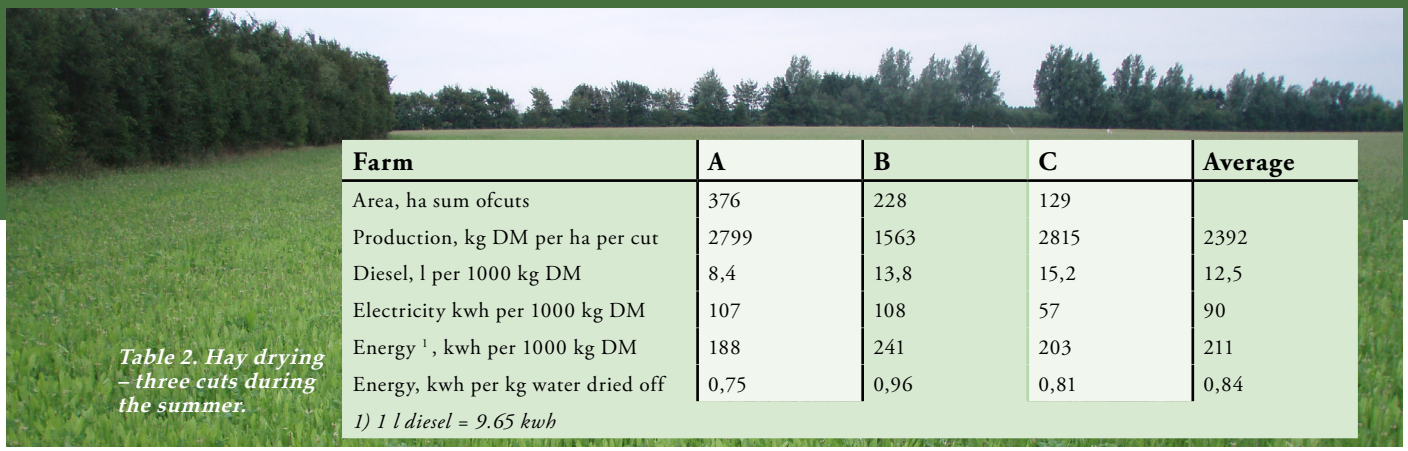
Hay production

At three organic dairy farms, two fields with herb enriched grass sward, together with the traditional grassland at the farm, was used for hay production.

Data for hay production (table 1 and 2) at each farm is from the total area and amount of hay made during 2012, as the aim was to collect data of large scale production. The three farms are working together using the same equipment in the field. Therefore, data in table 1 is an average for the three farms and three cuts at each farm. In average there were 73 hours from mowing to collecting and during this period the herbage was inverted 3.5 times before raking immediately before cutting. During this period the dry matter content increased from 21 to 65% and

Operation	Hour	Time per ha, min	Times per operation	Machinery	Diesel, l/ha	% DM	DM, kg per ha
Mowing	0	9	1	Tractor 200 HP - 9 m cut	3,3	21	3268
Inverting	3	9	3,5	tractor 130 HP - 10.5 m 13 km/hour	2,3		
Raking	70	12	1	Tractor 130 HP - 12-5 m 8 km/hour	11,7		
Cutting	73	16	1	Tractor 200 HP - 500 m to barn	25,4	65	
Total fiels		68					
Loading box		18	1				
To storage		12	1			90	2418
Total barn		30					

Table 1. Haymaking timescedule and energy use per cut – average of three farms and three cuts during the summer



Farm	A	B	C	Average
Area, ha sum ofcuts	376	228	129	
Production, kg DM per ha per cut	2799	1563	2815	2392
Diesel, l per 1000 kg DM	8,4	13,8	15,2	12,5
Electricity kwh per 1000 kg DM	107	108	57	90
Energy [1], kwh per 1000 kg DM	188	241	203	211
Energy, kwh per kg water dried off	0,75	0,96	0,81	0,84

1) 1 l diesel = 9.65 kwh

Table 2. Hay drying – three cuts during the summer.

there was an estimated loss of dry matter of 26 %.
Table 1
At each farm the hay was dried in a box system to about 90% drymatter. The use of energy for drying was diesel used to the generator to run the combined dehumidifier and heather, while electricity was used to run the blower. In order to reduce the need for use of diesel the storage building was with double roof. The air in between the two roofs was heated by the sun shine and used for drying. The use of energy was therefore affected by hours with sunshine, air temperature and moisture, besides to dry matter content of the roughage.

Feeding

In November-December, three weeks after end of the grazing season, hay were fed ad libitum to all lactating cows (for two weeks each per type of hay) starting with different types of hay on each farm.

Intake of hay, of all types, was high with up to 75% of total dry matter intake at both farm A and C representing two cattle breeds, Holstein Frisian and Jersey.

There was no effect of proportion of herbs on intake of hay or milk yield and composition.

Compared to standard, feed efficiency was low, especially in herd A and B with around 1 kg ECM per kg DMI, while the efficiency was higher 1.25 kg ECM per kg DMI in herd C.

More information

Read more about the Organic RDD project EcoServe at: http://www.icrofs.org/Pages/Research/organi-crdd_ecoserve.html

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Farm	A			B			C		
Breed	Holstein Frisian			Holstein Frisian			Jersey		
Type of hay	Normal	Low	High	Normal	Low	High	Normal	Low	High
- herbs, % of DM [1]		20	29		23	37		15	16
Feeding, kg DM									
- hay (ad libitum)	18,3	18,5	18,3	12,8	13,6	13,2	15,6	14,5	14,3
- cereals	4,9	4,9	4,8	4,6	4,6	4,6			
- concentrates	0,7	0,7	0,7	2,2	2,2	2,3	5,1	4,8	5,0
- straw				0,1	0,1	0,2			
- refusal	1,0	1,1	0,8	0,4	0,3	0,1	0,7	0,8	0,3
19,0Intale, kg DM	22,8	23,0	23,0	19,3	20,2	20,2	20,2	20,0	18,5
- NEL, MJ	162	150	161	141	143	143	143	132	134
Production									
- Milk, kg	21,4	21,1	21,8	18,9	19,0	17,8	16,4	15,5	15,7
- Fat, %	3,97	3,94	3,99	4,01	4,05	4,03	6,48	6,52	6,39
- Protein, %	3,44	3,38	3,38	3,46	3,45	3,51	4,30	4,30	4,22
- Energy corrected milk, kg	21,4	21,1	21,7	18,0	19,2	18,1	22,5	21,3	21,3

1) Botanical composition at harvest

Table 3. Daily feeding of hay and other feedstuffs, intake and production of milk.