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Effect of barley preservation method on milk production and milk quality in organic farming

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Abstract

The demand of 100% organic feed in organic animal production (to be introduced in 2005 in Norway) may lead to an increased interest in growing and preserving cereals on the farm. Another possible strategy in organic milk production is to reduce the amount of concentrate.

The effect of dried vs. ensiled barley (cv. Arve) on feed intake, milk yield and quality in organic production was tested in two experiments in Northern Norway in 2003-04. In the first experiment, two groups, each of 16 cows (66 ±20 d.i.m.), were given either a normal (N; 5.7 kg barley DM/d) or a low (L; 1.0 kg barley DM/d) feed energy level, for 10 weeks. The two levels equalled 40% and 10% concentrated feed (barley) per cow and year, calculated on energy basis. At each feed level, half of the cows were given dried barley, and the other half ensiled, high moisture (64.0 ±1.03% DM) barley. During ensiling, the barley was rolled and molasses were added (22.4 kg/t) before portions of about 1000 kg were filled into tight plastic bags. All animals were offered roundbale grass silage (additive: Ensimax, 7-8 L/t crop; Borregaard Industries, Sarpsborg, Norway) from the first cut *ad libitum* (NIRS grass silage, per kg DM: 0.835 ±0.0252 FEm (5.76 MJ Net Energy lactation); 73.8 ±0.50 g AAT; -20.8 ±9.29 g PBV). Both drying and ensiling preserved barley properly and resulted in approximately the same feed intake and milk production. Grass silage intake was lower (12.8 vs. 15.3 kg DM/d) and milk yield higher (21.6 vs. 17.5 kg ECM/d) for cows on N, than on L. All feed rations had low protein contents (in average 11.7% CP in DM), which lead to extremely low values of NH₃ in rumen fluid (in average 0.33 mM) and low contents of milk urea (in average 1.17 mM). Cows in group L had lower milk protein concentration (2.91 vs. 3.20%) than cows in group N, possibly due to the lower feed energy level. The palatability of barley was in general low, and several cows refused parts of their allowances throughout the experiment. In the beginning, 9 cows in group N and 2 cows in group L were treated with a glucogenic feed supplement (Energy Balance, Felleskjøpet, Norway) and 3 cows in group N and 1 cow in group L were treated by a veterinary against ketosis.

The second experiment involved 12 cows in a cross over design with three treatments and three one-week periods. The trial was designed to evaluate the effect of preservation method for barley on sensoric milk quality. The cows were fed well-preserved grass silage *ad lib.* and supplemented with 5.8 kg DM of either dried barley, barley ensiled with molasses, or barley ensiled with a propionic acid-containing additive (additive: Eng-silage 2000, 2.5 L/t crop; Agil Ltd. Hercules; Freyasdal Norsk Kjemi AS, Kristiansand, Norway). Only one sample of evening milk from one cow that got barley ensiled with molasses had a reduced sensoric quality. Thus, no negative effect of ensiled barley was observed.

Organic farmers in marginal climate may choose to ensile barley due to the advantage of earlier harvesting time and lower energy cost for post harvest drying. A disadvantage is that ensiling of cereals is time consuming, and, due to its consistency, the end product may be difficult to handle by automatic feeding equipment.