



Potential of press cake as a fodder source for dairy cows

Press cake from grass biorefinery

Biorefinery Glas has been demonstrating the potential of a small-scale biorefinery in Ireland. Press cake is the fibrous product obtained through biorefinery process of fresh grass and has the potential to be used as feed source for dairy cows.



QUICK FACTS

- Press cake is produced through green biorefinery from fresh grass and fed to dairy cows after being ensiled
- Effect of direct replacement of 2/3 of grass silage with press cake silage in the diet of early lactation Holstein Friesian dairy cows were evaluated:
 - on daily intakes, milk production, milk composition, nitrogen and phosphorus excretion with an animal feeding study in UCD Lyons Farm
 - on methane production with an *in vitro* study in UCD Lyons Farm

Evaluation of press cake as feed source for dairy cows

To evaluate the potential of press cake as feed source for dairy cows, an animal feeding study and an *in vitro* study were undertaken in University College Dublin Lyons Farm with the direct replacement of 2/3 of the grass silage with press cake silage in the diet of early lactation dairy cows.

The press cake silage was harvested and processed between July 1st to August 7th 2019 on five farms in West Cork as part of the Biorefinery Glas project. During the biorefinery process, the harvested grass was squeezed to separate the juice fraction from the fibre fraction which was then baled into round bales for ensiling (without additives) at the end of each day. At the end of the harvest, the press cake silage bales were transported to University College Dublin (UCD) Lyons Farm, stored and later used for the animal feeding study.

The grass silage was produced at UCD Lyons Farm. Grass was mowed on the 14th of May 2019 and wilted for 24 hours in the field before being ensiled in a pit on the 15th of May (without additives).

Animal feeding study

Thirty early lactation Holstein Friesian dairy cows were selected from the autumn-calving dairy herd at UCD Lyons Farm. The study ran for a total of 70 days. The two dietary treatments used in this study were as follows: Grass silage (**GS**): consisted of 14 kg DM of grass silage plus 7.2 kg DM of concentrate and 0.44 kg DM of soya bean meal; Press cake (**PC**): consisted of 5 kg DM of grass silage, 9 kg DM of press cake silage, 7.2 kg DM of concentrate and 0.44 kg DM of soya bean meal. Samples of feed, milk, rumen fluid, blood, faeces and urine were collected to evaluate the effect of direct replacement of grass silage with press cake silage on daily intake, milk production, milk composition, rumen fermentation, metabolic status, nitrogen and phosphorus excretion of the cows. The results of this study show that press cake silage has the potential of partially replace grass silage in the diet of early lactation dairy cows as milk yield and milk quality were not affected, although milk fat (kg/d) was lower and milk solids (kg/d) tended to be lower when cows were fed the press cake diet compare to those fed the grass silage diet. Cows fed the press cake diet had also lower nitrogen and phosphorus excretions compare to those fed grass silage diet.

Findings

- Press cake silage can partially replace grass silage in dairy cows' diet
- Milk yield and milk quality were not affected by replacing grass silage with press cake silage in the diet of dairy cows
- Reduction in nitrogen and phosphorus excretion by dairy cows was observed by replacing grass silage with press cake silage compared to grass silage only.
- Reduction in *in vitro* methane production was observed by replacing grass silage with press cake silage compared to grass silage only.



In vitro study using the rumen simulation technique (RUSITEC)

An *in vitro* study using the rumen simulation technique (RUSITEC) investigated the effect of direct replacement of grass silage with press cake silage in the diet of dairy cows on *in vitro* methane production using the same diets as the animal study (GS and PC). The RUSITEC system is used to simulate the rumen environment *in vitro* for 18 days of incubation. An additional RUSITEC study was conducted simultaneously comparing four different inclusion levels of press cake silage in the diet (0%, 25%, 50% and 75% of the silage component of the diet).

Results from the first *in vitro* study show a reduction in methane production from the press cake diet compare to the grass silage diet. In the second study, the 25% and 50% press cake silage diet had a lower methane production compare to the 0% diet, while the 75% press cake silage diet had higher methane production compare to the 0% diet. This indicates that press cake silage as the potential to partially replace grass silage in the diet of dairy cows with beneficial effects on the environment.



Partners

