



Crimped grain passes the Acid Test

Two recent studies have shown the considerable advantages that can be gained from crimping home grown cereals and selecting the correct preservative for effective ensiling. The first trial demonstrates very clearly that choosing an effective preservative is paramount to good results.

Published in 2009 at the 15th International Silage Conference in Wisconsin by P.Stacey et al Teagasc, Grange Research Centre in Ireland, this study examined the differences between preservation with buffered, non-corrosive organic acids, and a biological additive containing *Lactobacillus buchneri* that is promoted as an effective crimped grain treatment. Grain for crimping was harvested at 55.7%DM and 64.3%DM, resulting in an average DM of 60%. Analysis of the crimped grain after 90 days ensiling showed major differences in the feed values resulting from the different treatments (see table below).

Treatment	Average DM % (Post ensiling)	Average CP%DM	Average OMD g/kg	Average Starch %DM	Average Sugar %DM	pH	Average Lactic Acid g/kgDM	Average Acetic Acid g/kgDM	Average Ethanol g/kgDM
Buffered acids	59.7 DM loss 0.5%	10.5	811	56.35	6.53	3.95	19.85	4.85	4.7
<i>Lactobacillus buchneri</i>	50.95 DM loss 15%	11	774	58.15	1.555	4.1	12.8	32	11

What is clear is the considerable DM loss during fermentation that results from the activity of *Lactobacillus buchneri*. This bacterium uses sugar to produce acetic acid, but because this type of fermentation also results in the production of CO₂, considerable amounts of energy are lost, and a reduction in organic matter digestibility also occurs.

To put this in perspective, a few simple calculations can demonstrate the potential financial impact of these losses. From the OMD the ME of the two samples of barley can be calculated. The buffered acid treated grain has a calculated ME of 12.98Mj/kg DM compared to *L.buchneri* treated grain with an ME of 12.38Mj/kg DM. If the ensiling losses are taken into account the difference is the energy equivalent of more than 270 litres of milk per tonne of grain ensiled. With a milk price of 21p/litre the buffered acid treated grain has the potential to produce milk worth an extra £56.70 per tonne of crimped grain fed.

The Authors point out that caution is required if extrapolating these results to farm scale where there are even greater challenges in achieving and maintaining good ensiling conditions than in a controlled study situation.

The second study, presented at the 14th International Symposium of Forage Conservation, in Brno by Drs. Vrotniakiene and Jatkauskas of the Department of Animal Nutrition and Feeds, Institute of Animal Science of the Lithuanian Veterinary Academy, compared the effect of feeding buffered acid treated crimped barley, as opposed to dry barley, as part of the ration of dairy cows. Levels of mycotoxins were examined in both grain treatments, and DM intakes, milk yield and milk composition were measured.

Levels of field mycotoxins (Deoxynivalenol, Zearalenone and Aflatoxin) were lower in the crimped barley than the dry. It is likely that the earlier harvesting of grain for crimping, before fungal disease levels had had a chance to cause grain damage, was responsible for the low mycotoxin burden, while effective preservation and ensiling resulted in significantly lower yeast and mould counts in the crimped grain than in the dry grain.

Analysis of the barley showed that the crimped barley had a significantly higher basic nutrient content and also significantly higher digestible energy concentration. The cows were fed equal quantities of grain DM with equal amounts of rapeseed meal and mineral, and allowed good quality silage ad lib. Cows fed the crimped barley ration ate 0.3kg silage DM more per day, and produced 1.3ltrs more milk per day with higher milk quality (see table below).

Treatment	Silage KgDM/cow/day	Concentrate KgDM/cow/day	Milk Ltrs/cow	Fat %	Protein %	Lactose %
Dry Barley	11.8	6.7	19.8	4.31	3.31	4.81
Crimped Barley	12.1	6.7	21.1	4.39	3.3	4.98

When all the other benefits of crimped grain; higher grain DM yield per acre, lower processing and storage costs, complete lack of dust and better land use are taken into account, this trial demonstrates, yet again, the economic advantages that effectively treated crimped grain can bring to livestock farmers.

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