

# TECHNICAL BULLETIN

## FEEDLOT



## COMPARING THE USE OF HYDRATED LIME AND QLF ENERGY BALANCER 9\* FOR TREATING CORN STALKS

The use of calcium hydroxide (hydrated lime) or calcium oxide to treat corn stalks to increase its digestibility in beef and dairy diets has been making its way through the agricultural world for some time. Issues surrounding the use of hydrated lime range from the 'just annoying' to the potentially dangerous. With this in mind, QLF was approached about the possibility of comparing stalks treated with hydrated lime or QLF Energy Balancer 9 at a commercial beef operation. Stalks were treated with 50 lb/ton of hydrated lime or 50 lb/ton of Energy Balancer 9 plus water targeting a similar final DM. The material was mixed, packed in a bunker and allowed to stand for 2 weeks prior to sampling for subsequent testing. These samples were analyzed chemically and in vitro.

Chemical analysis (Table 1) of the treated material provided no conclusive answers to differentiate the two treatment methods. Energy Balancer treatment resulted in more ruminally available protein. This is presumably due to the small amount of urea added in addition to a reduction in heat damaged protein due to significant heat attributed to the use of hydrated lime. Protein availability is important to fiber utilization because limited rumen ammonia (N from protein) concentrations will depress fiber digestion.

When comparing NDF values, it is apparent that the hydrated lime is impacting the structure of the plant cell wall. However, it is not apparent how significant this impact would be to animal production. There is slightly more cell wall material that would be soluble with hydrated lime (based on NDF) treatment, but ADF is similar to slightly reduced with Energy Balancer treatment indicating little impact on the overall digestibility but any impact would be driven by the improved solubility of the NDF fraction. However, fiber digestibility and livestock utilization is more complicated than just comparing NDF and ADF.

**Table 1. Chemical analysis (DMB) of stalks treated with hydrated lime or QLF Energy Balancer.**

	Treatment Method		Difference
	Hydrated Lime	QLF Energy Balancer	
DM, %	37.22	33.55	-3.67
CP, %	5.38	6.95	1.57
Avail CP, %	2.90	4.41	1.51
NDF, %	62.88	70.72	7.84
ADF, %	48.45	47.27	-1.18
TDN, %	44.69	48.13	3.44
NEm, Mcal/lb	0.34	0.40	0.06
NEg, Mcal/lb	0.10	0.16	0.06

Fermentrics in vitro analysis (Table 2) demonstrated that apparent organic matter digestibility (aOMD) was fairly similar between treatment methods. The differences noted in protein availability were also apparent through the Fermentrics analysis of soluble protein using microbial assessment of the protein. Most significantly, elevated microbial biomass production (MBP, mg of microbial biomass produced per g of substrate fermented) with Energy Balancer treatment illustrates

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the role that sugar (energy) and nitrogen play in driving microbial production. Microbial biomass production is a function of, and can be used to calculate microbial protein production.

**Table 2. In vitro Fermentrics™\*\* analysis of stalks treated with hydrated lime or QLF Energy Balancer.**

	Treatment Method		Difference
	Hydrated Lime	QLF Energy Balancer	
aOMD, % DM	39.70	42.60	2.90
CP, %	4.70	6.50	1.80
Sol Prot, % CP	14.60	30.30	15.70
Sugar, %	0.20	2.80	2.60
Microb Biomass, mg/g	64.50	95.50	31.00

The impact of elevated sugar and nitrogen availability with Energy Balancer treated stalks probably explains the in vitro results reported, despite the Energy Balancer not having any apparent effect on the structure of the plant cell wall. Animal digestibility studies would be needed to ascertain that these effects remain constant in vivo. However, based on these results, it does appear that by increasing the energy and protein availability to the rumen microorganisms through the use of QLF Energy Balancer, similar OMD can be obtained compared to stalks that have been chemically treated to alter the cell wall. In addition to the data, on farm observations were that general smell, appearance, and animal acceptability was improved by use of the Energy Balancer to treat stalks compared to hydrated lime.

**Thoughts and Conclusions:**

- Corn stalks treated with QLF Energy Balancer appears to be at least similar in digestibility to stalks treated with hydrated lime
- Further demonstrates the value of sugar and NPN in promoting fiber digestion
- Molasses based products with urea are highly palatable and promote intake and utilization of poor quality roughage sources
- QLF Energy Balancer is not caustic or reactive and is generally safe to handle

\*Energy Balancer 9 nutrient composition (DMB): 65% DM, 14% CP, 7.1% NPN, 0.76 Mcal/lb NEm, 0.53 Mcal/lb NEg, 4% Ca, 0.25 P.

\*\*Fermentrics™ is an in vitro fermentation methodology developed and employed by Dairyland Laboratories, Inc.