

## Steam Bioprocessing Philosophy of Cereals for Ruminants: Time for a New History

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### Editorial

This editorial concisely and elaborately describes and criticizes historical misuses of cereal grains in managing food-producing ruminants. The article also presents clear-cut philosophies for optimal utilization of cereal starch and protein by high-producing modern dairy and beef ruminants. Securing this knowledge is very crucial since mismanagement in feeding differently dry- and steam-processed cereal grains causes prolonged Subacute Rumen Acidosis (SARA), challenges immunity, reduces nutrient intake, and ruins farm economy [1].

Starch is the core storage carbohydrate in cereals. Starch is made of amylose and amylopectin. Amylose is a linear polymer of 1-4, D-glucose units, while amylopectin is a branched polymer with linear chains of D-glucose with a branch point in every 20-25 glucose units. Harder grains include corn and sorghum and softer grains usually refer to wheat, barley and oats. Harder grains typically have lower degradation rate and extent than softer grains, especially shortly after feed presentation. An optimal global processing philosophy for harder grains (e.g., corn and sorghum and some varieties of wheat and barley) is that steam-treatment should help starch granules timely swallow under moist heat to be fermented more effectively and synchronously in the rumen [2-4]. Thus, steam-processing is to increase rumen fermentation rate and extent to degrees within which nitrogen and energy supplies become optimally rapid and synchronous to augment microbial biomass. In softer grains such as barley and wheat, however, the processing philosophy is totally different. Despite increasing rumen fermentation rate and extent of corn and sorghum grains, steam-processing aims to reduce and control starch degradation rate in too-rapidly degradable barley and wheat grains [5].

For limited small intestinal capacity of starch assimilation, it has been aimed to optimize starch and energy use by shifting digestion site from the small intestine to the rumen [3]. Undoubtedly, in barley and wheat grains that are already overly rapidly fermentable, the goal must be to moderate rumen degradation rate to shorten periods of SARA (e.g., <3 h/d). Such different philosophies ought to be optimally appreciated by ruminant specialists and farm managers for rumen health, microbial efficiency and food production to be improved.

To state simply and globally, causing problems and searching for solutions is by all means unwise. With improved management, problems must be prevented or at the very least be maintained under timely control. Vainness in overfeeding cereal grains (i.e., 40-50% barley in dairy diet DM) will mean ingesting a minimum of 24-30%

starch just coming from grains with ineffective fibers for rumen health [6,7]. Elongated SARA would, as a result, occur. Such an over modernization must be avoided in today's farm management [5].

It should be remembered that except for unique conditions, in standard nutrition programs, it is not feed or starch that pushes animal to produce, but it is rather ruminant physiology that drives responses to feeding management strategies. Continual contemplations are required for optimal cereal bioprocessing philosophies and techniques to be suitably acknowledged and practiced by modern and postmodern ruminant farmers. Of utmost importance is to cease ongoing through a mistaken history or overfeeding cereals blindly regardless of bioprocessing techniques aiming to maximize profits. The paramount is generating a new history that necessitates feeding optimal amount of cereal grains with right bioprocessing philosophy. This is the future in helping boost economy.

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