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Guest Editorial

Optimizing Oilseeds and Cereal Grains Feeding for Healthier Dairy Cows: An Emphasis on Whole Cottonseeds

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Abstract

High-producing lactating dairy cows are prone to multiple metabolic complexities. To reduce negative nutrient balance of early lactation, dairy cows are in many scenarios fed high-starch high-concentrate diets. This strategy, however, may exacerbate the situation and lead to elongated subacute ruminal acidosis and depressed immunity and milk production. Wise choices of oilseeds, especially whole cottonseeds, can help overcome the above-mentioned challenges. Whole cottonseeds are rich in physically effective fibre, protein, fat, and critical vitamins and minerals. As a result, feeding whole cottonseeds in early and peak lactation will decrease dietary needs for concentrate items of mainly human-edible cereal grains and expensive protein meals. The physically effective nature of whole cottonseeds' NDF will help stimulate ruminating and chewing activities and will also help prevent milk fat depression due to excessive starch feeding. In other words, whole cottonseeds will complement high-quality forage feeding in stabilizing rumen conditions. Overfeeding untreated whole cottonseeds should be avoided, as it could reduce milk fat and fertility in the long-term. Future research need to shed light on optimal inclusion rates of whole cottonseeds in relation to dietary cereal and forage choices and feeding rates, especially at high environmental temperatures. .

Keywords: *Cereal; Starch; Oilseed; Whole Cottonseed; Early Lactation; Dairy Cow*

Philosophy

Dairy farmers tend to overfeed concentrate and cereal starch to help minimize negative nutrient balance of early lactation. This strategy, however, often leads to elongated subacute ruminal acidosis and depressed immunity and milk production. Excessive starch feeding will reduce rumen pH and increase dietary requirements for physically effective NDF that cannot be successfully met in early lactation diets [1]. As such, this editorial seeks to underline the commercial significance of oilseeds and especially whole cottonseeds in helping to partially substitute for cereal starch in providing energy and other crucial nutrients to lactating dairy cows for healthier rumen conditions and more economical dairy production.

Whole cottonseeds are rich in physically effective fibre, protein, fat, and many vitamins and minerals [2]. As such, feeding whole cottonseeds enables dairy managers to considerably reduce dietary needs for high-quality forage NDF, human-edible cereal starch, costly fat supplements and expensive protein meals and vitamin-mineral supplements [3]. In addition, whole cottonseeds can help create a batter balance between glycogenic and ketogenic dietary ingredients in support of optimal milk production and body condition score changes. Moreover, the physically effective nature of whole cottonseeds' NDF will help stimulate ruminating and chewing activities and will also aid

in preventing milk fat depression often experienced because of excessive starch feeding. In other words, whole cottonseeds will complement high-quality forage feeding in stabilizing rumen conditions. Overfeeding untreated whole cottonseeds (> 15% of diet DM), however, should be avoided because it can cause milk fat depression and reduced fertility likely due to relatively toxic compounds (i.e. gossypol) [2,3].

Future research, particularly long-term, is needed to determine optimal inclusion rates of whole cottonseeds in relation to dietary forage and cereal choices and feeding rates. It is also warranted to study how combined feeding of whole cottonseeds and other oilseeds (soybeans, flaxseeds, etc.) can affect dairy cow responses to oilseeds and cereal grains under varying forage feeding conditions. Such findings would be of special practical use at high environmental temperatures.

Conclusion

Overfeeding high-starch concentrate often leads to disturbed rumen conditions and health, as a result, to depressed milk production and dairy cow immunity. Whole cottonseeds are concurrently rich in physically effective NDF, protein, fat, and a variety of critical highly-needed vitamins and minerals. As such, optimal feeding of whole cottonseeds to early and peak lactation cows can considerably reduce dietary needs for high-quality forages, human-edible cereal grains, and expensive protein meals as well as fat and vitamin-mineral supplements. Consequently, it will be easier to meet nutrient requirements of high-producing dairy cows and minimize negative nutrient balance during this crucial period of dairy production cycle.

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