RESEARCH

"The impact of prepartum energy intake on colostrum quality and calf performance"

HOW DOES DAM ENERGY INTAKE AFFECT COLOSTRUM QUALITY AND CALF PERFORMANCE?

PROJECT NO.: ANH.17.19
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Background: It is becoming well-recognized that dam nutritional status during gestation, particularly in the second the third trimesters, can have a significant impact on not only reproductive efficiency, but also calf health and performance. A previous ABP supported project discovered that oversupplying protein to beef cows in late gestation improved nitrogen retention, total tract digestibility, rumen fermentation, but also decreased colostrum fat concentration and altered expression for some muscle and growth related genes in the calves.

However, energy is often the most limiting nutrient in beef cow diets when nutrient requirements are significantly increased due to gestation and lactation. Previous research has noted that fat stores are broken down by beef cattle in early lactation, which means current nutritional models may be underestimating nutritional requirements in this phase. In addition, dam nutrition in late gestation contributes to the nutritional and biologically active compounds that are available to create colostrum. In dairy cattle, some of these biologically active compounds have been shown to impact calf metabolism, stimulate calf intestinal development, and act as local antimicrobials within the digestive tract, but very little work has examined these aspects of colostrum in beef cattle. Lastly, colostrum macronutrient composition may be affected by the dam diet during gestation, which could impact calf health and performance.

This project builds on a larger initiative exploring the role of colostrum in early-life nutritional programming in dairy cattle.

Objectives: The objectives of this study are to:

1. Determine how dietary energy intake from starch during gestation impacts cow colostrum yield, composition, and passive transfer of immunoglobulins to the calf
2. Relate the metabolic state of the dam, as affected by energy intake, to colostrum and transition milk composition and yield
3. Characterize the macronutrient and bioactive compound profiles of beef cow colostrum and transition milk
4. Investigate the long-term impacts of maternal nutrition on calf health and performance

Implications of the Research: If current nutritional models are underestimating nutritional requirements during specific events such as early lactation, results from this project could inform updates to these models to more accurately reflect actual nutritional requirements. In addition, this project may provide a nutritional strategy to improve colostrum quality and passive immunity transfer to calves in order to improve calf health and performance.

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