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Linking amino acids to milk fat synthesis.

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Most milk is priced based on its end use. Milk fat is one of the most important milk components considered in the establishment of the final milk price. Increased milk fat yield has been observed when dairy cows are supplemented with essential amino acids (EAA). This effect has been related to the role that EAA play in regulating mTORC1, which is associated with SREBP-1, an essential factor involved in the regulation of the de novo fatty acid synthesis. Thus, this study aims to evaluate the effects of each EAA, at physiological levels, in de novo milk fat synthesis in bovine mammary epithelial cells. Primary cells from bovine mammary gland were submitted to 12 treatments, varying EAA profile. The positive control simulate the physiological EAA concentration, in the negative control all EAA were omitted, and for the other treatments one EAA was omitted at time. For measuring the de novo milk fat synthesis, we used, as a tracer, isotopically labeled acetate. Least Squares Means (LS Means) was used for the analysis of the linear model-based data using the package 'lsmeans' version 2.30–0. Omission of L-methionine (Met), L-leucine (Leu), and L-isoleucine (Ile) decreased ($P < 0.05$) the isotopic enrichment of lauric and myristic acids. Removal of these EAA were associated with reductions in de novo synthesis of both fatty acids. Synthesis of palmitic acid seemed to be more responsive with removal of Leu, L-lysine (Lys), and L-histidine (His) resulting in a significant reduction in the isotope enrichment. Omission of Met, Leu, Ile, His, and Lys influenced milk fat synthesis in the primary mammary epithelial cells subjected to physiological levels of EAA. It is important to understand the relationship between EAA and milk fat synthesis in the mammary gland to make it possible to formulate diets that can increase milk fat synthesis.

Keywords: amino acid, de novo fat synthesis, milk fat.

Biography: I'm undergraduate, third year in veterinarian school and I came to Virginia Tech from Brazil to do a research about the effects of EAA in the de novo milk fatty synthesis. This is my second time presenting on ADSA and my third time at the event, but it's the first time I can go in person so I'm really excited to enjoy this days learning a lot.