

#4: Looking at Odd and Branched-Chain Fatty Acids in Cow's Milk

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Milk fat depression (MFD) is a condition observed on dairy farms and is a decrease in milk fat yield and is commonly caused by feeding high grain and high unsaturated fat diets. Changes in milk fatty acid (FA) profile during MFD are well described, including increases in specific trans intermediates from ruminal microbial biohydrogenation of unsaturated FA. Odd- and branched chain FA (OBFA) found in milk fat originate predominantly from absorption of microbially synthesized FA and previous work has established correlations between OBFA and changes in the rumen microbial population. The objective of the current experiment was to characterize the modification of OBFA during induction and recovery of diet-induced MFD. Samples were used from a study where nine Holstein cows were fed either a high fiber, low oil diet (control), or a low fiber, high oil diet (induction). The control diet always followed the induction diet. Milk samples were taken every other day during both induction and recovery from MFD. Milk FA were extracted and methylated. Milk FA profile was determined by gas chromatography and the OBFA were identified using bacterial FA standard. Overall, the induction diet resulted in a rapid decrease in i14:0, i15:0, a15:0, 15:0, i16:0, a17:0 with a maximal reduction in total OBFA occurring on d 3 of induction period. The exceptions were i14:0 and i16:0 which did not differ until day 7 of the induction period. During recovery all OBFA increased and reached control values by day 3. This demonstrated that OBFA are changed during diet-induced MFD and that the microbial population within the rumen changes rapidly during both induction and recovery. Increasing OBFA is of interest for human health and this provides insight into dietary factors that can be used to increase their production.