Jack O'Day
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Advisor: Dr. Jana Kraft

Quantitative determination of fatty acid composition in milk of the University of Vermont's CREAM Herd followed over a course of four months

Abstract
Milk fat is characterized as one of the most complex of natural fats, with more than 400 fatty acids identified. In bovine milk, fatty acids come from two different sources, the ration (diet) in which the cattle are fed, as well as microbial metabolism of feed components in the rumen. Many different cow, environmental and management factors can influence the fatty acid profile of a dairy herd, but the University of Vermont has a unique husbandry style, in that two very different breeds of cows, Holsteins and Jerseys, are kept under the same management conditions. The main goal of this study is to quantitatively determine which breed of cow has the better fatty acid profile when managed in the same way, as well as taking into account differences in season and stage of lactation of the animal. Milk was collected at the same time as the monthly D.H.I.A. (Dairy Herd Improvement Association) test to ensure for accurate fat and protein percentages. Once obtained, milk from both morning and afternoon samplings were combined to ensure accurate lipid distribution, and centrifuged to isolate the cream. Lipids were then extracted from the cream and fatty acid methyl esters (FAME) were prepared for analysis using a GC 2010 gas chromatograph (Shimadzu, Kyoto, Japan) equipped with a split injector (1:100 split ratio) and a flame ionization detector (FID) using a CP Sil 88 WCOT fused silica column. Integration and quantitation is achieved with GCsolution software (version 2.30.00) and based on FID response. FAME will identified by comparison with retention times with known FAME standards.