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## An Improved Estimation Method of Milk Yield and Fat Percent for Alternate Test Method

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### Summary

In the alternate testing method, milk yield and constituents are measured alternately, either in the morning or the evening of the test day. Daily milk yield and constituents are then estimated from either the morning or evening value. In this study, current milk yield and fat percent were estimated from data for another milking event on the test day, and the daily milk yield and fat percent were also predicted. We used a model that includes current milking yield or fat percent as objective variables to analyze 354,320 test records. Month, parity, days in milking, single milking yield, fat percent in another milking event on the test day, and milking interval preceding the current milking were incorporated as independent variables. R<sup>2</sup> for the models for morning and evening milk yield, and for morning and evening fat percent was 0.864, 0.862, 0.439, and 0.454, respectively. In order to formulate the relationship between factors estimated in the discrete model and the single milking yield or fat percent, multiple regression analyses were performed. The estimation error (root MSE) for daily milk yield from morning or evening milking and for daily fat percent from morning or evening milking was 1.51kg, 1.64kg, 0.276%, and 0.313%, respectively. The 305 days milk yield and average fat percent by the two incomplete and two complete AT methods, all PM, all AM, PM-AM, AM-PM and the standard test interval method were compared for each parity. The difference (bias) of actual and estimated 305 days milk yield by the complete AT method was 22.4kg or less, and the SD of the difference was 161.5kg to 210.2kg. The bias of estimated 305 days average fat percent was 0.03% or less, and the SD of the difference was 0.154% to 0.187%. The estimate error of 305 days milk yield fully reduced. Moreover, the estimate error of average fat percent of 305 days had also been admitted.

**Key words:** AT method, Lactation, Cow, Milk fat, Estimation by regression equation