Analysis of the accuracy of a method for estimating 24-hour fat (percentage and yields) with robots protocols and one single sample

INTRODUCTION

The objective of this study is to propose an evolution of the robots protocols to meet the expectations of the Milk Recording Organizations, the breeders, the required quality for cow management and genetic evaluation.

The current study was conducted in 2016-2017 and consisted to:

- test an ICAR method for estimating 24-hour for fat percentage and yields from a single sample on robots protocols (ICAR Guidelines, 2017),
- evaluate the accuracy of the method on test day record and on lactation.

MATERIAL AND METHODS

The method is based on a multiple regression model that includes fat percentage, protein percentage, milking interval and milk weight of the sampled milking, milking interval and milk weight of the previous milking (Table 1).

Data collected by Milk Recording Organizations were selected in order to constitute relevant datasets for the different steps of the study (Table 2).

The statistical analysis was carried out by comparing the reference 24-hour fat percentage with fat percentage (from the first milking sampled) unadjusted and adjusted.

RESULTS

On test day record

Table 4: Bias and correlations between reference 24-hour fat (% and yields) and unadjusted / adjusted single sample (N= 332,698 first milking sampled)

<table>
<thead>
<tr>
<th>Traits</th>
<th>Mean bias</th>
<th>Std bias</th>
<th>Correlations (R²)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Unadjusted</td>
<td>Adjusted</td>
<td>Unadjusted</td>
</tr>
<tr>
<td>Fat %</td>
<td>0.0315</td>
<td>-0.0350</td>
<td>0.4150</td>
</tr>
<tr>
<td>Fat yields - kg</td>
<td>0.0100</td>
<td>0</td>
<td>0.1350</td>
</tr>
</tbody>
</table>

On lactation records

Table 5: Bias and correlations on lactation (N= 10,981 lactations)

<table>
<thead>
<tr>
<th>Traits</th>
<th>Mean bias</th>
<th>Std bias</th>
<th>Correlations (R²)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Unadjusted</td>
<td>Adjusted</td>
<td>Unadjusted</td>
</tr>
<tr>
<td>Fat - %</td>
<td>0.0382</td>
<td>-0.0290</td>
<td>0.2045</td>
</tr>
<tr>
<td>Fat yields - kg</td>
<td>3.8380</td>
<td>-0.3770</td>
<td>20.81</td>
</tr>
</tbody>
</table>

CONCLUSION

This study shows that the Peeters and Galesloot method’s of estimating 24-hour for fat (percentage and yields) with robots based on a single sample improves the accuracy of the data compared with one single sample unadjusted. The regression formula defined from a first relevant dataset has been validated from a second independent dataset and confirms the reliability of the model.

On test day record, the gain of accuracy is 8% for fat percentage and 6% for fat yields. On lactation data, the gain of correlations is 5% for fat percentage and 3% for fat yields.

The use of this method by the Milk Recording Organizations is an answer to the expectations of the breeders to simplify the protocol and to reduce the cost of milk recording with robots while maintaining a sufficient accuracy for cow management and genetic evaluation purpose.

Authors:

S. Minéry1, X. Bourrigan2, D. Saunier2, G. Augier2

1 Institut de l’Élevage, 149, rue de Bercy, 75595 Paris, France
2 France Conseil Élevage, 42, rue de Châteaudun, 75009 Paris,

Contact: xavier.bourrigan@idele.fr