DEVELOPING AND TESTING A PROCESS TO INCREASE AND SECURE THE QUALITY OF GRASS SILAGE PRODUCTION "Q2GRAS"

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Problem statement

Within the EU, Germany is the largest milk producing country[1]. In 2015, the state of Brandenburg has 738 dairy farms with a total of around 254,600 dairy cows.[2] A high feed quality of grass silage is prerequisite for high animal performance, animal health and low feed costs.

Long-term analyses of the feed laboratory in Waldsieversdorf (LKV BB e.V.)[3] show considerable quality problems with grass silage. Particularly with regard to central quality parameters such as dry matter (DM), crude protein and energy content, no significant improvement in the quality of grass silage could be achieved, despite recommendations. The analysis of the DM content shows that there are extensive deficiencies with regard to obtaining optimal ensiling conditions. Maintaining the optimum DM content required for fermentation and securing favorable ensiling conditions is one of the main problems of silage preparation. Thus, grass silage often does not reach the quality required by dairy cows.

Against this background, there is a need to make targeted adjustments in the process sequence which are based on detailed knowledge of the individual process steps.

Aim of the project

The aim of the innovation project is to provide prototypes of marketable and user-friendly software tools to improve the quality of grass silage and increase the profitability of dairy cattle farming. Based on scientific research results of earlier years, two dynamic software prognosis models are to be tested and further developed together with farms in Brandenburg. This is intended to allow a direct adaptation of the process sequences of ensiling as well as improvement of the grassland swards delivering the material to be ensiled.

The first tool will be able to predict the time for achievement of an optimal dry matter content for a defined area of the field after mowing to create conditions suitable for ensiling. The second tool will be capable of predicting the future silage quality at an early stage of conservation, thus replacing the conventional sampling from silo surface at feed-out. Both tools can be used separately but work best in the shared application.

In addition to an early evaluation of the silage quality, the applications enable precise tracking of silage production up to the grassland stock and thus, if necessary, a targeted adjustment of the process sequences.

Innovative approach

The innovative solution approach of the project is that a standardized software prognostic tool enables the farmer to exploit unused optimization potential of the grassland during the current management year, thereby reducing feed costs for dairy cattle farming and increasing the profitability of the farm.

The two prognosis models are tested in seven farms in Brandenburg, North-East Germany. The models use input variables (e.g. weather data, conditions during harvest) which are provided by the farmer or by other institutions (e.g. German Weather Service). The predicted optimal dry matter content after wilting and the predicted silage quality (contents of crude protein and energy) are compared with the observed values from four experiments which are carried out annually in each farm for each model. The balance bag method is used, which allows a direct comparison of predicted and actually observed values.

In this way, comprehensive data and findings are collected in three years of research, which together with the farmer enable an ongoing development of the tools for practical and standardized application.

References

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[3] Koch, U., Wegner, J. und Pickert, J. (2016): Entwicklung ausgewählter Qualitätsparameter der Grassilagen im Bereich des Landeskontrollverbandes Brandenburg e.V. in den Jahren 2007 bis 2015. Jahresbericht 2015 des Landeskontrollverbands Berlin-Brandenburg e.V.