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Real-time dry matter content of corn silage by a microwave sensor

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Abstract

Dry matter (DM) intake in dairy cow is a central point to meet nutritional requirements and optimal performance, reducing the incidence of metabolic diseases (Ingvarsen, 2006). DM content of some forages, such as silages, can undergo huge variations during storing, affecting the total daily DM consumed. Reference laboratory method for DM assessment is time-consuming and cannot be applied to daily changes in diet composition. Currently, new promising real-time technologies are available to monitor the DM content of feeds (Nelson and Trabelsi, 2004). The aim of the study was to test and calibrate a portable microwave sensor (MS) for DM content in corn silage samples. Twenty-two samples were collected from the whole front of a corn silage trench, including the top and near the side walls, in order to collect as much as DM content variability as possible within the samples. MS readings were performed with 3 different methods for each samples: 1) directly on the silage front, 2) with the MS over the collected sample and 3) with MS placed under the sample. After the first MS reading, a correspondent silage sample was obtained by a silage corer for readings 2 and 3 and for the laboratory DM content assessment by drying in a 60°C forced air-oven to a constant weight. A linear regression analysis was performed (JMP, SAS Institute, Cary, NC, 2015) on data obtained from a plot of MS readings against DM content. Results evidence as the best MS reading method is represented by the probe burdening on the sample ($R^2=0.75$) with respect to the other methods. The obtained results outlined as, with a correct reading method, MS could be valuable tool to determine DM content of corn silage directly at farm level.

References

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