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MAIN COMPOSITIONAL DIFFERENCES AMONG THE PRIMARY FORAGES ANALYZED IN THE PO VALLEY OVER THE PAST CROP YEAR

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In the Po Valley, forages represent the basis of dairy cattle diets. Ration formulation begins with the nutrients supplied by forages, while additional ingredients are added to achieve proper balance. Typically, diets for milk production consist of 40–60% forage. The main challenge in formulating these diets lies in accurately assessing forage quality and understanding its impact on feed intake, digestion, and milk yield. This system is currently experiencing significant variability in forage composition and quality, due to extreme weather conditions and management choices. Therefore, our study aims to evaluate the main compositional and nutritional differences in hay and silages analyzed in the Po Valley over the past year. The data analyzed in this work derive from the analyses carried out by the Regional Association of Livestock Breeders of Lombardy (ARAL) for farmers during the last crop season (11/2024–11/2025), that included 4250 feed samples, of which more than 40% were silages and hays. Specifically, 1202 samples of corn silage, 163 samples of sorghum silages, 292 samples of meadow hay and 140 samples of alfalfa hay were taken into consideration. Forages compositional and nutritional features were determined by using the Near-Infrared Reflectance Spectroscopy (NIRs) while dry matter was determined by oven drying. Results are presented as mean standard deviation, from which the coefficient of variation (CV) was deducted and expressed as a percentage. The results showed very different

compositional and nutritional profile between the two conservation methods and within each category. Corn silage had a high-energy profile, mostly due to the starch content that was $30.1\% \pm 6.3$ (mean $\pm$ DS), with a neutral detergent fiber (NDF) content of $41.4\% \pm 5.3$, both on a dry matter (DM) basis. Sorghum silage revealed a starch content that was $7.2\% \pm 6.1$ (mean $\pm$ DS), with a NDF content of $54.8\% \pm 5.6$, expressed on DM basis. The distribution of the data was relatively concentrated around the mean, indicating moderate variability for most of the variables considered in the silage group, with the exception for starch in the case of sorghum (high CV above 40%). In contrast, dried forages showed different profiles: alfalfa hay was high in protein ($18.1\% \pm 2.8$) with moderate NDF ($51.6\% \pm 7.7$), while mixed meadow hay had lower protein ($7.9\% \pm 3.5$) but the highest NDF ($62.6\% \pm 7.0$). We also noticed some variability even within the hay categories, especially for protein in meadow hays (CV 44%). In conclusion, this study confirms substantial differences in nutrient composition between fermented and dried forages, along with notable variability within each category for specific parameters, such as starch in silages and protein in hays. These characteristics highlight the need for regular analytical monitoring that are essential for precise diet formulation and consistent dairy cow performance across production systems.