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61. Which model feeds best? Predicting metabolizable energy from herbages for ruminants

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Introduction: In Switzerland, nutritional requirements for dairy cows will align with the recommendations of the German Society of Nutrition Physiology (GfE, 2023) over the next years. The feed evaluation system for ruminants will need to be updated accordingly. Currently, the metabolizable energy (ME) of herbages is predicted based on the organic matter digestibility (OMD), crude ash (CA), and crude protein (CP), according to Agroscope (2017). In GfE (2023), ME is predicted using a three-step procedure based on gross energy (GE), OMD, CP and CA. Our aim was to compare these two approaches to predict the ME in herbages, based on the *in vivo* apparent total-tract OMD and the chemical composition of dried, ensiled and frozen herbages.

Material and methods: Data from 164 determinations of the apparent total-tract OMD of dried, ensiled and frozen herbages were used. These OMD determinations were conducted *in vivo* from 1996 to 2023, with wethers fed around their estimated ME requirements for maintenance. The chemical composition, GE, and *in vivo* OMD values of all the herbages were compiled and the ME values were calculated in R with equations outlined in Agroscope (2017) and GfE (2023).

Results and discussion: The GfE procedure estimated ME to increase by 0.15 MJ/kg DM per 1 % increase in OMD, while the Agroscope model predicted a slightly but significantly ($P < 0.01$) lower increase of 0.13 MJ/kg DM per 1 % increase in OMD (Fig. 1). GfE (2023) overestimated the ME of herbages by 0.60 MJ/kg DM on average [95 % confidence interval: 0.50–0.70 MJ/kg DM] compared to Agroscope (2017).

Conclusion and implications: The GfE (2023) recommendations overestimate the ME of herbages compared to Agroscope (2017), in particular at higher OMD levels, such as the early growth stages of herbage. The regular determination of GE by calorimetry and OMD (via enzymatic or *in vitro* methods) will be required to precisely evaluate the energy value of herbages according to GfE (2023).
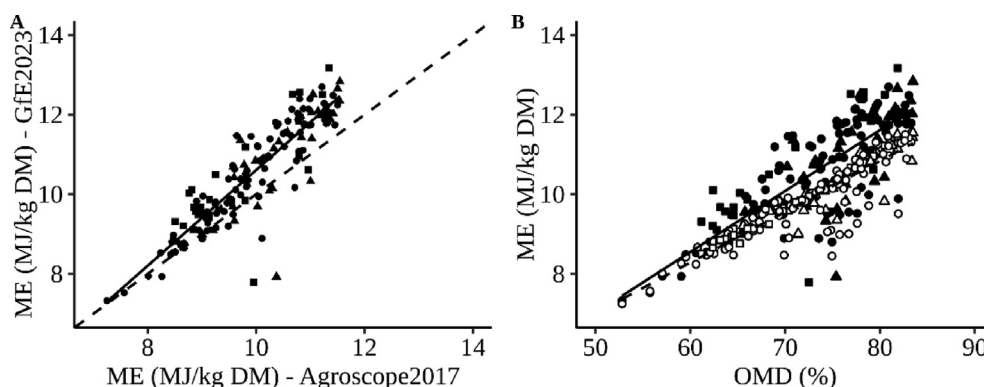

Fig. 1. A) Relationship between predictions of the metabolizable energy of hay (●), silage (■), frozen () herbages (*n*=164) according to Agroscope (2017) or GfE (2023); B) Metabolizable energy predicted according to Agroscope (2017) (hollow; - - -; Slope: +0.15(±0.009), R^2=0.64, RSE=0.78) and GfE 2023 (full; —; Slope: +0.13(±0.005), R^2=0.83, RSE=0.40) as a function of OMD (%).

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