



## **FROM aNDF TO aNDF ASH-FREE (aNDFom)**

*Nelmy Narvaez, PhD*

Neutral Detergent Fibre determined on an organic matter basis or “ash-free” has been added to the updated versions of CNCPS 6.5 and AMTS 3.6 programs for a better characterization of feeds used in diet formulation.

Ash does not solubilizes in hot neutral detergent and can be included in NDF values. Therefore, NDF values in samples with significant soil contamination (>11-12% in hay and silages and >4.5% in corn silage) may not be accurate because soil minerals remain in the residue, leading to an overestimation of the fibre content and consequent underestimation of energy. To correct for soil contamination, it has been proposed that neutral detergent fibre in forages be analyzed on an organic matter basis.

Soil contamination in forages generally occurs by incorporation of soil during harvesting, by rain splashing soil on wilting forage, or by irrigation or flooding. However, it seems that contrary to American Labs where a high percentage of hay (6%) and small grain silage samples (15%) received report high ash contents (>14%), soil contamination is not a recurrent problem in Canadian forages and not at all in those from Ontario. At SGS AgriFood laboratories using only local Canadian samples, a low percentage of submitted samples of hay (3.7%), haylage (4%), or small grain silage (7%) have ash content >12% DM. For corn silage, only 1.5% of samples reported ash values >4% DM.

To monitor the difference between aNDF and aNDFom, SGS AgriFood Laboratories, randomly selected 30 samples of haylage and hay and 50 samples of corn silage with variable ash content but within the allowed average values (<11% DM). Likewise, 30 different forages including hay, haylage and small grain silage with high soil contamination (ash values >12% DM) were also analyzed. A linear relationship between aNDF and aNDFom for each feed type was developed and applied to the aNDF values to establish the predicted aNDFom value from aNDF. The difference between aNDF and the predicted aNDFom was taken as the factor of correction or adjustment required to predict aNDFom from aNDF values.

Figure 1 shows the relationship between both aNDF and aNDFom for haylage (a), hay (b), and corn silage (c), respectively. For haylage and hay containing average amounts of ash (8-11% DM), the average difference between aNDF and aNDFom is 1.6 percent units, whereas the

average difference in corn silage with average ash content (3.18% DM) was not significant (0.8% DM).

Figure 2, shows the same aNDF versus aNDFom relationship but in forages with high soil contamination, containing >12% DM ash. For these samples, soil contamination caused significant overestimation of aNDF when values were analyzed inclusive of ash, as compared to aNDFom. Based on the regression, a corrected difference between 2.7 and 7.2 percent units should be applied to aNDF values for hay, haylage and small grain silage when ash values >12% DM. The extent of this adjustment will depend on the degree of soil contamination reported in the sample.

Figure 1. Relationship between aNDF and aNDFom in haylage (a), hay (b) and corn silage (c) at average values of ash.

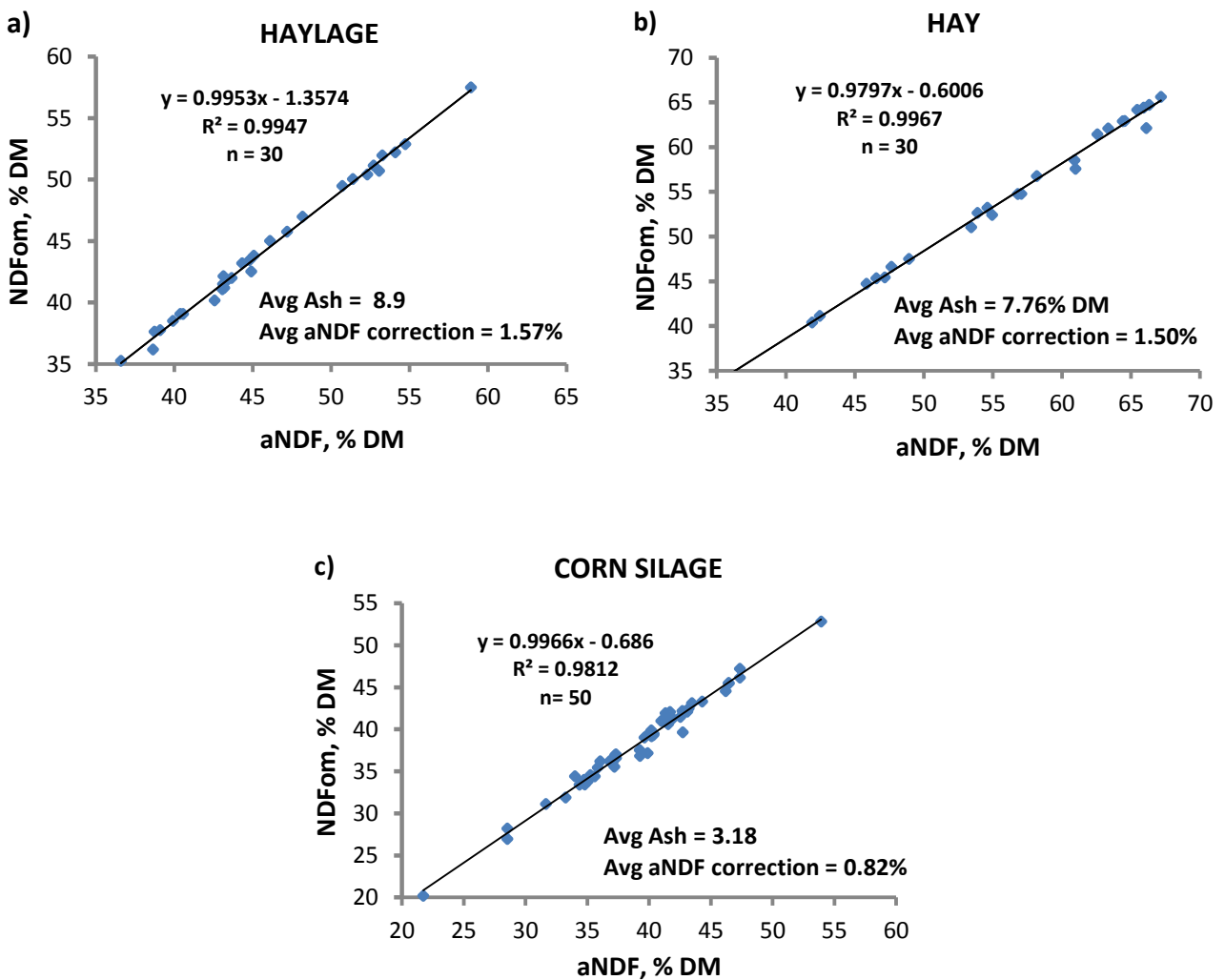
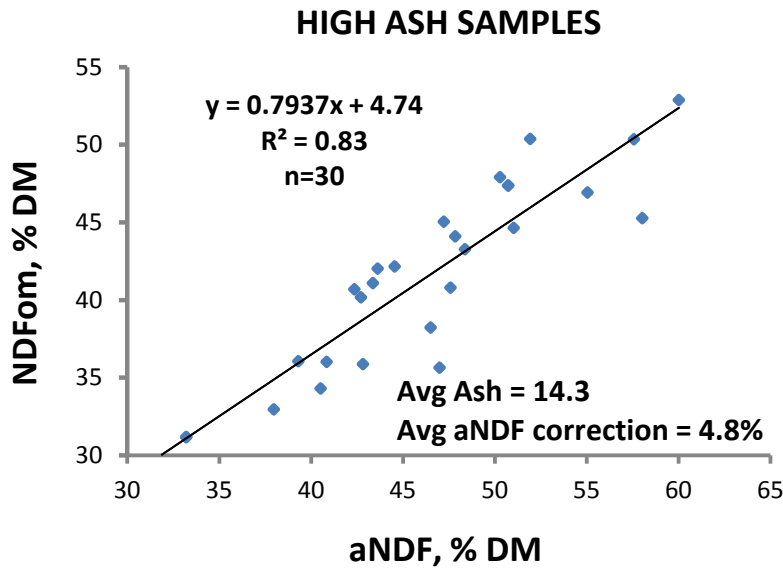


Figure 2. Relationship between aNDF and aNDFom in forages with high soil contamination and ash values >12% DM.



#### TAKE HOME MESSAGE

- Overestimation of NDF when reported inclusive of ash is not a common concern for most forages submitted at SGS AgriFood Laboratories.
- Overestimation in aNDF when reported inclusive of ash is only significant in hay, haylage and small grain silage samples with high soil contamination and ash values >12% DM and in corn silage containing >4.5% DM.
- Currently aNDFom is not included in SGS AgriFood Laboratories reports and while NIR calibrations for this component are ongoing, SGS AgriFood Laboratories recommend adjusting the aNDF value by applying a correction factor for hay, haylage, and small grain silage samples with ash contents >12% DM and for corn silage with ash contents >4.5% DM as an indicator for high soil contamination.
- The extent of this adjustment will depend on the degree of soil contamination reported in the sample. Thus, from 2.7 and 7.2 percent units should be deducted from aNDF values reported for hay, haylage and small grain silage when ash values range between 12-20% DM.
- Adjustments to aNDF values for those cases where ash content is <12% (i.e. hay, haylage, and small grain silage) or <4.5% (corn silage) are unnecessary. In these cases, the acceptable standard variability or standard deviation (2%) when duplicate samples are analyzed for NDF in two different runs is greater than the average correction factor (1.6%).