

# Chloride by NIR Now Available for Forages

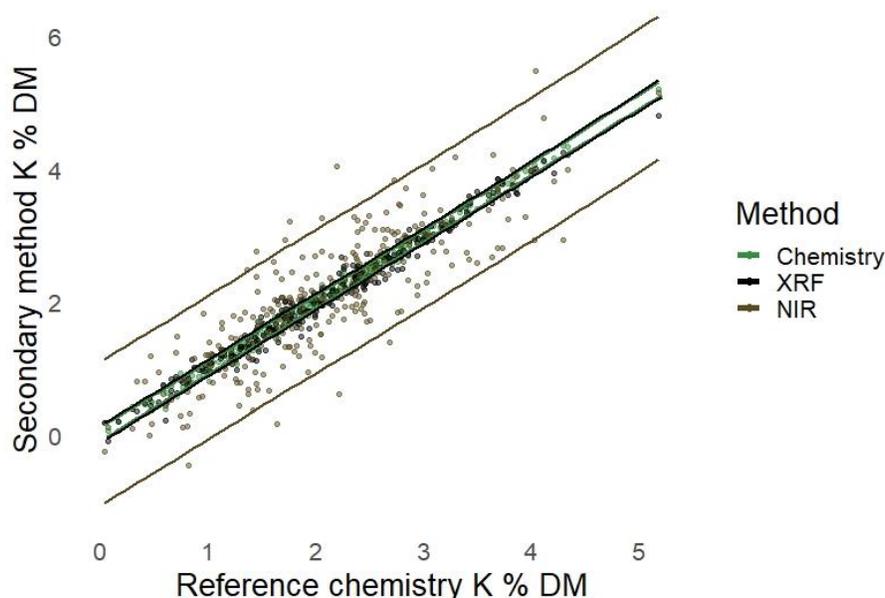


## Why have we added chloride by NIR? When is this beneficial? When is it not?

For more than 30 years, Dairyland has avoided including chloride in NIR packages because mineral accuracy by NIR is poor and we felt DCAD balancing should be done using chemistry or XRF analyses.

Those facts haven't changed. Mineral analysis by NIR is always going to be risky because minerals do not produce NIR signal. The best an NIR model can do is make a rough estimation based on the feed type and organic components like protein and fiber. For minerals, chemistry and XRF provide much more accurate options.

## Potassium accuracy by method (273 mixed hay)



We've decided to add chloride by NIR to forage reports anyways because:

- 1) NIR analysis has expanded into new geographies that chemistry and NIR haven't reached. For customers in these geographies, withholding chloride values removes the only source of information they have about its variation. To give some perspective on how many customers this impacts, less than 6% of all samples submitted to Dairyland for NIR in 2021 included a request for chemistry minerals, leaving 94% that had little to no information about chloride variation.
- 2) Potassium is a larger driver of DCAD variation in forages and its already in the NIR packages, so the logic for withholding chloride is weak.

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## Who does this change help?

Formulators that do not have access to timely chemistry or XRF minerals analyses. For these customers, NIR's ability to account for 50-80% of the variation in chloride is an improvement over using book values for their feeds.

## Who does this change hurt?

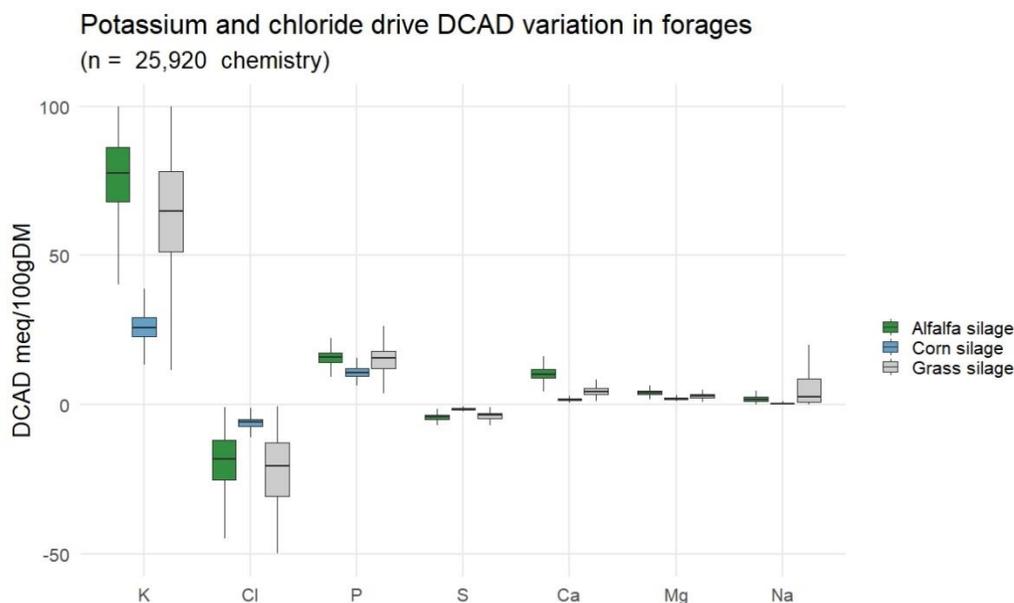
Formulators that have extreme samples, unusual growing conditions, or avoid the better options of chemistry or XRF because they assume that NIR "works" for minerals. While NIR explains 50-80% of the variation of chloride in forages, it can be wildly inaccurate on extreme samples produced by unusual growing conditions. For more than 5% of samples, NIR chloride values are wrong by more than 1 percent of dry matter.

## Conclusion

Dairyland's NIR packages for forages now include chloride. This means the values appear on PDF reports and they are being automatically imported into any formulation programs utilizing XML imports. For most customers, this represents a marginal improvement over using book values, but Dairyland's recommended analyses for DCAD balancing are still either chemistry or XRF methods.

## P.S. But what about sodium?

Basically, all the statements above about chloride are true for sodium. Of all the common DCAD minerals, sodium contributes the least amount of variation within alfalfa and corn silage and is far behind potassium and chloride for importance in grasses. In addition, NIR predictions of sodium are much worse than the other minerals, with less than 30% of its variation explained by NIR. If chemistry or XRF are not an option, formulators are further ahead to use book values for sodium in forages, rather than take the risk of getting a significantly wrong value by NIR.



Data source: Dairyland Laboratories Inc.  
\*DCAD calculation Goff, 2000

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