

NIR or Wet Chemistry?

The standard methods of feed analysis described here are primarily based on assays requiring the use of chemical reagents—they are 'wet chemistry' methods. Over the past 20 years, an increasing number of analyses have been performed by *Near Infrared Reflectance Spectroscopy* (NIR or NIRS) which is an indirect method of estimating feed composition.

In NIR, a finely ground sample of feed is exposed to a range of wavelengths in the near infrared range of the visible light spectrum. Characteristics of the organic components of the feed sample cause some of that light to be reflected. For example, the unique bond between carbon and nitrogen in proteins reflects light at very specific wavelengths. By detecting the amount of light reflected at a large number of wavelengths, the NIR spectrometer can determine the sample's chemical composition.

To produce analysis results that have meaning for animal nutrition, the NIR method has to be calibrated using samples whose composition has been determined by wet chemistry. For example, to determine Neutral Detergent Fibre (NDF) levels in alfalfa haylages, NIR has to be calibrated against a set of alfalfa haylage samples with predetermined and widely varying NDF levels. This makes it possible to associate a particular NIR reflectance spectrum with a specific NDF concentration in that type of forage.

When properly used, NIR can be an accurate and economical method for analysing feeds. Improperly used, NIR can yield erroneous results having no value. For example, the analysis of red clover silage using an alfalfa calibration is likely to yield incorrect results. And, since NIR measures characteristics of the organic constituents in feed, it is a stretch to assume that mineral levels measured by NIR are reliable.