



# QWCRC Quality wheat facts

## WHY DO NIR RESULTS VARY?

### If I take my sample to another machine, why is the reading different?

Near infrared spectroscopy (NIR) measurement is used at silos and flour mills throughout Australia to measure the protein and moisture content of wheat and flour. NIR spectroscopy uses the amount of “heat” energy of different “colours” (wavelengths) absorbed by a substance to measure its composition. Infrared “colours” are not visible to the human eye, but can be readily measured electronically. NIR measurements are also used at country silos to measure the protein and moisture content of barley and sorghum, the moisture content of rice and the oil and moisture content of canola.

All of the NIR machines have to be individually adjusted to give accurate readings by putting a number of samples of accurately known protein and moisture content through them. These samples are used to “teach” (or calibrate) the instrument to give accurate readings with other samples in the future, providing the grain being measured is similar to the “training samples”.

However, even with the best calibration technique, some slight differences between machines can occur so that one instrument may be reading 0.1% higher and another 0.1% lower than the standard laboratory method. In this situation, if the same sample is read on the two different instruments, a difference in reading of 0.2% will be apparent, even though neither instrument is out of adjustment. In practice, there may be some additional differences between tests performed at different sites due to sampling effects.



Sampling differences occur because of the natural variability within loads of grain. Because loads of grain are never completely uniform, there will be differences in protein or moisture readings on probe samples taken from different places in the same load. These differences can be minimised by taking a number of separate probe samples, and combining and mixing them thoroughly before analysis. However, there can still be slight differences between one composite sample and another.

All Bulk Handling Companies (BHCs) are very conscious of the difficulty in getting consistent readings, and are constantly striving to improve accuracy. The GRDC is also running a specific project to try to overcome the problem.

*Note: Some people use the term “NIR” to stand for **near infrared**, and others use it to stand for **near infrared reflectance**.*