



REFRACTOMETERS IN AGRICULTURE

A refractometer is a precision device used to measure the mineral sugar content of saps and liquids. The relevance of this in agriculture is that the farmer can easily measure the mineral sugar level of a crop or product. The mineral sugar levels in a plant can more than double during the course of a day. With timing of harvest often so critical to the success of the final product and often translating into a price premium, a refractometer is invaluable for farmers wanting to achieve the best quality in crops including hay and silage, fruit and vegetables and even milk and meat.

Using a refractometer

The point at which harvest takes place can be decided upon easily and quickly in the field with the use of a hand held refractometer. Winemakers use refractometers as a matter of course to determine the optimum picking time of fruit as determined by sugar levels. You can see them in the vineyard holding the device to their eye and looking towards a source of light.

A crushing device such as a garlic crush or similar is used to extract the sap from the plant material. A thin film of sap or juice is placed on the lens of the refractometer and a reading taken when viewed through the eyepiece toward a source of light. The most commonly used hand held refractometer has a scale of 0 to 30 brix (or % sugar).

Benefits of using a refractometer

1. Refractometers can be used to measure the progress of a crop as it grows to maturity. It is said that if the brix can be kept above 12 at all stages of growth of the plant, no pest or disease problems will ensue.
2. When applying fertiliser, especially liquid fertiliser, a mineral sugar level should be taken before fertiliser application and then an hour after application. If the sugar has increased by clearly 2 percentage points, the fertiliser is likely to be of considerable benefit to the plant. If not, the application of the fertiliser at that particular time in the plants growth stage needs to be reassessed.
3. When viewing the measurement of sugar level in a refractometer and a clear line defines the measure, the calcium level is considered low in the plant. This may also be the case for plant phosphorus level. The fuzzier the line, the more calcium is in the plant.
4. Milk quality can be simply assessed by sampling from the vat after milking. If the measure is above 12, the milk is said to be of good quality. As a management tool, the refractometer can be used to measure and confirm the performance of different paddocks. As any dairy farmer will tell you, some paddocks will do better than others. And comparing the cost of 'day' and 'night' paddocks can now be measured! Here is another way of confirming this knowledge or 'gut feel' apart from measuring litres in the vat.

5. Delaying the time of harvest can double the quality of produce. For example, hay or silage cut first thing in the morning may only offer a sugar level of 10-12% in the finished product (3-4% in the growing plant). If deferred until the sun triggers higher sugar levels (10-12% in the same plants), the harvest has the potential to increase to 25-28% sugar. Is it any wonder that stock often prefer to use their feed as bedding material rather than eat the conserved grass on offer?
6. If the farmer takes the time to measure the sugar in his plants, why not use it to measure the quality of the farm input? Measuring the mineral sugar level of foliar fertilisers such as kelp and fish can be of benefit when comparing products and predicting effectiveness prior to purchase and application.

Summary

As with all measurements, it is important that the data is recorded and interpreted with an understanding of the process to which the measurement is applied. Taking a single measure can be just as misleading as not taking a measure at all.

If brazen enough, a refractometer could be used when buying fruit and vegetables from the local shop or supermarket. That way the best value purchase can be made based on mineral sugar rather than appearance. But beware – it could upset the greengrocer!

A refractometer is a simple precision instrument every farmer interested in maximising production and quality should carry whenever in the paddock. This tool can often be the difference between financial success or failure.

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