

Mango dry matter assessment – Destructive method

The dry matter content of a fruit is what is left once the water content is removed; this includes a variable amount of starch and sugars. As the fruit matures, the starch and sugar content increase. When the fruit ripens, the starch will be converted into sugar. Sufficient sugar content has been correlated to the eating quality of a mango.

Most retailers require a minimum dry matter content for mangoes in their quality specifications, established as a minimum of 15% dry matter for the KP, Calypso and Honey Gold varieties, and a minimum of 13% for the R2E2 variety.

Dry matter is traditionally measured by drying a sample of fruit in an oven and weighing the sample before and after water removal.

Note: While it is also possible to use a microwave instead of an oven, microwaves are not designed for analytical procedures and carry the risk of either “cooking” the sample by changing its composition, or not removing all the water contained, resulting in incorrect dry matter results. The procedure below describes how to measure dry matter content in mangoes with a drying oven (or a dehydrator), which is recommended.

Equipment:

- Cutting board
- Large knife
- Apple corer (optional)
- Drying oven or a dehydrator
- Patty papers or small tin foil trays (2 per piece of fruit)
- Scale (0.01g accuracy recommended)
- Notebook or spreadsheet to record the results (spreadsheet template available on the AMIA resource page)

Method:

- 1) Number each patty paper/tin foil tray. Weigh each patty paper and record the weight into a notebook or the spreadsheet (as ‘pp’). Two patty papers are needed per mango for the two cheeks. The weight of each patty paper will vary, hence the importance to record all weights.
- 2) Cut both cheeks of the mango and take a sample from each cheek, using an apple corer or a knife. The sample should be taken from the centre of the round part of the cheek. Peel each sample so only the flesh remains and cut to be around 1cm thick. For best results, samples should have a weight of around 7 to 10 grams. Samples taken with a corer are usually cut in four (see Figure 1 below) to optimise the drying process. Place into the patty papers.



Figure 1. For best results, samples should have a weight of 7 to 10 grams. Samples taken with a corer are usually cut in four.

- 3) Weigh each tray containing the fresh (wet) sample and record the weight (as 'wet').
- 4) Place all patty papers/trays into a drying oven or dehydrator pre-set at 65°C for 48 hours. Higher temperatures will cause burning, lower temperatures might not remove all the water contained. It is also important to respect the drying time.
- 5) After drying, weigh the patty papers with the dried samples and record the weight (as 'dry').



Figure 2. Dried samples after 48 hours at 65°C.

- 6) Dry matter is calculated as follows:

$$\text{Dry matter (\%)} = \frac{\text{Dry weight}}{\text{Wet weight}} \times 100\% = \frac{\text{'dry' - 'pp'}}{\text{'wet' - 'pp'}} \times 100\%$$

This calculation is included in the spreadsheet template provided.