



A Rapid Method for On-Farm Quality Evaluation of Macadamia Nuts

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Macadamia nut processors routinely sample nuts received from a grower to determine the moisture content and quality of a lot. Commonly, the price paid to the grower is based on this quality evaluation. Growers can conduct a preliminary on-farm quality evaluation of their crop with the following simple, rapid drying method. This method identifies the harvest percentage of mature, good quality kernels. Wet-in-shell (WIS) macadamia nuts are dried to 1.5% kernel moisture content, cracked, shelled, and floated in a water bath to separate mature from immature kernels. Fully mature macadamia kernels will float in water because they have higher oil content than immature kernels. The immature kernels will sink. This simple and inexpensive method allows growers to assess the quality of their macadamia nuts before they are processed.

Sampling harvested nuts

A representative sample of the harvested nuts is necessary to obtain a reliable quality evaluation. Collect nuts randomly from the field or harvest bins and place them into a 5-gallon bucket. Be sure to take nuts from each area or bin randomly. Mix the nuts in the 5-gallon bucket and remove a subsample for dehusking. Remove 2 kg (= 2000 g = 4.4 lb, or about 4 lb, 6½ oz) of dehusked nuts from the subsample for dehydration. For easiest calculation, we recommend using metric measure.

Materials for quality evaluations

- 2 kg wet-in-shell (WIS) macadamia nuts (dehusked)
- Food dehydrator with four stacked trays
- Scale (gram scale recommended)
- Macadamia nut cracker
- Water container (bucket)

The equipment can be purchased locally for about \$110. A hand-held macadamia cracker costs about \$50. The food dehydrator costs about \$40, and the scale (about \$20) can be a simple, home food-preparation model. The dehydrator should be able to reach a temperature of 63°C (145°F).

Steps

1. Add dehusked WIS macadamia nuts to every other tray in the dehydrator. Each tray will hold about 1 kg ± 25 g (2 kg [2000 g] total).
2. Set dehydrator temperature to 63°C (145°F).
3. Remove the dried macadamia nuts from the dehydrator after 84 hours. Their shells will crack slightly.
4. Reweigh the dried in-shell macadamia nuts and record the weight (wt. dried nuts). Use the macadamia quality worksheet on page 4; the weight should be around 1570 ± 6 g, but it will vary depending on the initial moisture content of the nuts.
5. Crack the macadamia nuts. The kernels may appear brown because the rapid drying method does not

simulate the commercial drying conditions that produce white kernels.

6. Separate the kernels from the shells and reweigh the kernels (enter wt. total kernels in the worksheet).
7. Calculate the percent kernel recovery and enter it in the worksheet.
8. Float macadamia kernels in a container of water. The water needs to be at least 7.5 cm (3 inches) deep.
9. Separate the kernels into mature and immature kernel quality. Floating kernels are mature kernels. Sinking kernels are immature kernels and should be placed into the culls.
10. Examine the mature kernels for other quality defects, and place any poor-quality kernels into the culls. Insect-damaged kernels and gray, moldy, shriveled, or germinated kernels are considered poor quality and should be placed into the culls. Cull kernel defects are pictured on page 3.
11. Dry excess water from kernels and culls.
12. Weigh the mature, good-quality kernels (enter wt. quality kernels in the worksheet).
13. Weigh the culled kernels (enter wt. culls in the worksheet).
14. Calculate the percent culls and enter it in the worksheet.
15. Calculate the percent good quality kernels and enter it in the worksheet.
16. Repeat the process (optional) with a second subsample (2 kg) from the 5-gallon composite sample.

Equations

$$\% \text{ kernel recovery} = \frac{\text{wt. total kernels}}{\text{wt. dried nuts}} \times 100$$

$$\% \text{ culls} = \frac{\text{wt. culls}}{\text{wt. total kernels}} \times 100$$

$$\% \text{ quality kernels} = \frac{\text{wt. quality kernels}}{\text{wt. total kernels}} \times 100$$

Conversions

$$1 \text{ lb} = 454 \text{ g}$$

$$2000 \text{ g} \times \frac{1 \text{ lb}}{454 \text{ g}} = 4.41 \text{ lb}$$

$$\frac{\text{weight in grams}}{454} = \text{pounds}$$

Macadamia kernel disorders



