

Determining the Dry-Weight Goal

DRYING A TEST SAMPLE:

Carefully weigh a small dish or saucer as accurately as possible (to a tenth of a gram or ounce) and record the weight as “Empty Dish”. A small hand-made aluminum-foil tray with shallow upturned edges works very well.

If you are working in ounces, replace “grams” with “ounces” wherever you see “grams”. The same mathematical relationship works with grams, ounces, pounds, etc. (Just be consistent and use the same measurement system in all calculations.)

Add about 5-10 grams of the hop cones to be tested to the dish and carefully weigh the sample and dish as before. Record the weight as “Dish + Un-dried Cones”.

The difference will be the weight of the “Un-dried Cones”:

$$(\text{“Dish + Un-dried Cones”}) - (\text{“Empty Dish”}) = (\text{“Un-dried Cones”})$$

Place the dish and cones in an oven on the lowest setting possible (usually around 170 deg. F) and leave in the oven for about 1 hour.

Remove the dish from the oven (careful not to spill any of the fragile dry cones) and allow it to cool to room temperature.

Carefully weigh the dish with the dried cones, as before, and record the weight. As “Dish + Dried Cones”.

Place the dish with the cones back into the warm oven and dry for another hour.

Repeat the cooling and weighing operation as before. If the weight is more than 0.1 gram different than the previous dried weight, place the sample back into the oven for another hour. Repeat this step until there is agreement with the previous weight at the 0.1 gram level.

The difference between the weights of the empty dish and the last weighing of the dish with the dried cones will be the weight of the “Dried Cones”:

$$(\text{“Dish + Dried Cones”}) - (\text{“Empty Dish”}) = (\text{“Dried Cones”})$$

DRY MATTER:

The “Dry Matter” value will be the weight of the totally dried cones divided by the weight of the un-dried cones. Multiply that by 100 and slap a percent sign on the end to convert it to percent dry matter.

$$\frac{(\text{"Dried Cones"})}{(\text{"Un-dried Cones"})} \times (100\%) = (\text{"Percent Dry Matter"})$$

MOISTURE:

The weight "lost" during the process is the weight of the moisture driven off/out-of the cones.

$$(\text{"Un-dried Cones"}) - (\text{"Dried Cones"}) = (\text{"Moisture"})$$

The moisture content (in percent of the starting weight) is;

$$\frac{(\text{"Moisture"})}{(\text{"Un-dried Cones"})} \times (100\%) = (\text{"Percent Moisture"})$$

It can also be found by knowing that:

$$(\text{"Percent Moisture"}) + (\text{"Percent Dry Matter"}) = 100\%$$

so...

$$(\text{"Percent Moisture"}) = 100\% - (\text{"Percent Dry Matter"})$$

GOAL WEIGHT:

Finding Dry Weight: To find the "Goal Weight" for a large sample of cones dried to a goal moisture percent we first need to determine what portion of the large sample that is due to just the dry matter. This is just the dry matter percent equation, rearranged:

$$\frac{(\text{"Dried Cones"})}{(\text{"Un-dried Cones"})} \times (100\%) = (\text{"Percent Dry Matter"})$$

$$(\text{"Dried Cones"}) \times (100\%) = (\text{"Percent Dry Matter"}) \times (\text{"Un-dried Cones"})$$

$$(\text{"Dried Cones"}) = \frac{(\text{"Percent Dry Matter"}) \times (\text{"Un-dried Cones"})}{(100\%)}$$

Finding the Goal Weight: The final step in finding the "Goal Weight" is to increase the weight due to the appropriate amount of moisture. Since 8% moisture would add 8 grams to a 100 gram sample, we can use a proportion to find the correct increase in mass:

$$(\text{"Goal"}) = (\text{"Total Dried Cones"}) \times \frac{(100\% + \text{"Desired \% Moisture"})}{100\%}$$

$$\text{("Total Dried Cones")} = \frac{\text{("Percent Dry Matter")} \times \text{("Total Un-dried Cones")}}{(100\%)}$$

Finally:

$$\text{GOAL} = (\text{Un-dried Cones}) \times \frac{(\% \text{ Dry Matter})}{(100\%)} \times \frac{(100\% + \text{Desired \% Moisture})}{(100\%)}$$

EXAMPLE:

You have a **76 g** sample of un-dried of cones with a percent moisture value of 84.4% (a percent dry matter value of 15.6%). You want to know the goal weight when your sample reaches the desired moisture content of 9.5%.

$$\text{GOAL} = (\text{Un-dried Cones}) \times \frac{(\% \text{ Dry Matter})}{(100\%)} \times \frac{(100\% + \text{Desired \% Moisture})}{(100\%)}$$

$$\text{GOAL} = (76 \text{ g}) \times \frac{(15.6\%)}{(100\%)} \times \frac{(100\% + 9.5\%)}{(100\%)}$$

$$\text{GOAL} = (76 \text{ g}) \times (0.156) \times (1.095) = 12.98 \text{ g} =$$

13.0 g