

The Why and How of Testing the Density of Maple Syrup

Today many of the maple producing states, including Wisconsin, as well as the Federal Government recognize the importance of certain minimum standards for maple syrup. They have established standards which require that the syrup must not only be free from foreign substances, cloudiness, and scorched or burned flavor, but must also have a density of not less than 65.5 degrees Brix or 35.46 degrees Baumé at 68 degrees F. Syrup that is of this density will tend to remain sterile since very few micro-organisms can grow (vegetate) in a sugar solution of this concentration. This may appear contradictory to observed facts since every one has seen mold growing on maple syrup. However, if this syrup is closely inspected it will be noted that the mold is growing on the surface and not down in the syrup. This, then, is not a contradiction since water of condensation has formed on the surface which dilutes the surface syrup to a low enough concentration (density) to permit mold spores, which may be present, to vegetate.

Another and even more important reason for making syrup with a minimum density of 65.5 degrees Brix is to insure that the syrup will have sufficient viscosity (body) to have a pleasing taste. Syrup has an unpleasant watery taste if it is as little as 1 degree Brix below standard density. This thin or watery effect becomes more noticeable as the density of the syrup is lowered. Perhaps nothing else has a more adverse effect on consumer attitudes toward maple syrup than the sale of thin or watery syrup. Not recognizing the fault, most customers will think that such syrup has an off-flavor and will complain that it does not measure up to syrup made in "the good old days." This situation is needless. It could be eliminated easily if producers would (1) remove just a little more water in the evaporation, and (2) check the density of their syrup before it is released for sale. Syrup actually has the best taste and feel to the tongue when it has a density between 68 degrees and 67 degrees Brix at 68 degrees F.

It is not difficult to make sure that finished syrup meets standard density requirements. The only equipment needed are a thermometer, a precision hydrometer that can be read to 0.1 degree Brix and that has

a range from 59 degrees to 71 degrees Brix calibrated at 68 degrees F., and a hydrometer cup (metal or glass) as deep as the hydrometer is long. To make the measurement, fill the hydrometer cup with the syrup to be tested and measure the temperature of this syrup accurately to within ± 1 degree F. Next, float the hydrometer in the syrup, taking care that the exposed part of the stem is kept free of syrup. Incorrect (low) readings will be obtained if the hydrometer is weighted down by syrup adhering to the exposed part of the stem. Note the exact point where the floating hydrometer stem contacts the surface of the syrup. This point gives the observed or apparent density of the syrup. Unless the syrup is exactly at 68 degrees F. (the temperature at which the hydrometer is calibrated), this *observed* density must be corrected by the application of a temperature factor to obtain the *true* density. This factor, for any syrup temperature from 50 degrees to 90 degrees F., is 0.05 for each Fahrenheit degree the test syrup is above or below 68 degrees F. If the syrup is *warmer* than this, it will appear thin, and the observed reading will be *low*; hence the correction must be *added*:

Observed Brix \div [(temperature of test syrup—68) \times 0.05] = true Brix. If the syrup is *cooler* than 68 degrees F., the temperature correction is *subtracted*:

Observed Brix $-$ [(68 = temperature of test syrup) \times 0.05] = true Brix.

Syrup whose density is below the standard (65.5 degrees Brix at 68 degrees F.) must be concentrated to this density by reboiling.

* A laboratory of the Eastern Utilization Research and Development Division, Agricultural Research Service, U. S. Department of Agriculture.

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State Inspected
Pure Maple Sap Syrup

Gallons, Half-Gallons, Quarts,
 Pints, Half Pints

SATISFACTION GUARANTEED