



Photo by Fudof/istock

Understanding Impacts of Invert Sugar on Maple Products

The sugar in maple sap is nearly all sucrose, a naturally occurring sugar typically derived from plants like sugarcane and beets, as well as maple trees. A sucrose molecule, with 12 carbon atoms, is made up of equal parts of two simple sugars, fructose and glucose, with six carbon atoms each.

As sap is stored, handled and processed into syrup, microbes cause fermentation in the syrup, and this metabolic process breaks some of the sucrose down into its two parts, leaving behind separate fructose and glucose molecules. This process creates invert sugars, so-called because these smaller sugar crystals bend polarized light in the opposite direction that pure sucrose does.

The amount of invert sugar doesn't affect the taste of syrup. Fructose does tend to be significantly sweeter than sucrose or glucose, but the amount of invert in a batch of syrup is typically too small to notice by taste.

Invert sugar level precision

But the invert sugar level is critical when it comes to using syrup to make candy or cream, since invert sugar retains more moisture. Too much invert sugar can result in maple cream that doesn't set, for example, or maple candy that hardens very slowly. And not enough invert sugar can cause large crystals to form and result in maple candy with a gritty texture, or can even cause the heated syrup to crystalize while cooling, before stirring.

Maple cream is the most forgiving of the confections, with an ideal invert level of 1.5 percent but an acceptable range between 0.5 percent and 3 percent. The best maple candy is made from syrup with an invert sugar level of 1 percent, but can be made with any between 0.5 percent and 1.5 percent, and syrup used for crystal coating candy to prolong shelf life should have as low an invert sugar level as possible. For granulated maple sugar, an invert sugar level of 0.4 percent to 2 percent is ideal.

It was long assumed that darker grades and late-season syrups were more prone to higher invert sugar levels, since warmer weather promotes microbial activity that facilitates the process, but research conducted by the Proctor Maple Research Center at the University of Vermont found that this is not necessarily the case, finding similar amounts of sucrose, fructose and glucose in a range of samples. In short, there's no way to tell a batch of syrup's invert sugar level by taste or color. It should be tested properly before being used to make confections, to improve chances for success.

While the Center's research also found that invert sugars did not necessarily mean equal amounts of fructose and glucose, using a glucose tester remains the most reliable way to determine invert sugar levels in syrup. There are a range of such devices available for reasonable prices at pharmacies and online, usually with simple instructions. One important thing to note is that syrup is often too thick to be tested directly with the devices that use test strips, and so will need to be diluted.

Syrup with too-high or -low invert sugar levels can be adjusted for confection making by blending with another batch with known invert sugar levels. For a formula on how to determine the ratio for such a mixture, see this publication from Cornell University at <http://goo.gl/5sZKi9>.

In some cases, maple syrup can be treated with an enzyme called invertase, a yeast derivative, that can entirely invert the batch of syrup. In this state, the syrup can be used in place of corn syrup in a number of value-added products, allowing the producer to market the product as 100 percent maple. A few considerations, such as moisture content of the inverted syrup, need to be taken into account, but generally the substitution can be very simple. More details are available in Cornell Maple's Confection Notebook, at <http://goo.gl/T6YI9u>. **F**

Winton Pitcoff is a freelance writer and coordinator of the Massachusetts Maple Producers Association.



Photo by fcw5/istock



We Have it all for your tubing and supplies needs.

Call today for a Quote! Toll-Free 800-762-5587

WWW.CDLUSA.NET



CDL, the reference in maple