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Adapted from C.O. Willits and C.H. Hill 1976. Maple Syrup Producers Manual. USDA Agriculture Handbook No. 134 and North American Maple Syrup Producers Manual, 2nd ed, 2006

Background

Granulated Maple Sugar is the most versatile product that is made from maple syrup. Because it has no available water, this product is totally shelf stable, it will not separate or mold. It can be stored indefinitely at room temperature and with proper packaging and moisture control will not lose its granular nature. It can be used in recipes as a replacement for brown or white sugar on one for one exchange by volume or by weight. It can be reconstituted into maple syrup of any density and from there converted into any of the other maple confections. It can be an easier product for chefs or restaurants to use because of its storability and versatility. It can also be used as a topping on cereal, placed in sugar straws or used anywhere other sugar would be used to add flavor or sweetness. The flavor of many products is enhanced by using maple sugar in place of white sugar and is especially valued by many consumers for its natural and sustainable origin.

A quart (one liter) of syrup will yield about 2 pounds (one Kg) of granulated sugar.

Temperature and Glucose Level

Temperature and Invert Sugar Level

Granulated maple sugar is prepared by heating maple syrup until the temperature is 45° to 50° F (25° to 28° C) above the boiling point of water. When selecting syrups to be made into granulated sugar, select or blend the syrup to be less than 2% invert sugar. Use the higher finishing temperature for syrups closer to the 2% invert sugar while the lower

temperature can be used with syrups with low invert sugar content. Syrups with invert sugar levels above 2% are likely to make partially granulated batches that will not finish properly. For details on measuring and adjusting the invert sugar levels in syrup see the section titled "Measuring and Adjusting Invert Sugar in Maple Syrup". A chart of the glucose meter readings preferred when making granulated maple sugar is given below.

» Glucose Meter Readings

Reading	1 - 10 invert
mg/dL	invert %
20	0.4
30	0.6
40	0.8
50	1
60	1.2
70	1.4
80	1.6
90	1.8
100	2
110	2.2
120	2.4
130	2.6
140	2.8
150	3

The gray area indicates acceptable readings or maple syrup to be made into granulated maple sugar



Cooling and Safety

Cooling and Stirring

Following cooking the syrup can then be stirred immediately or allowed to cool to about 200° F (93°C), and stirred either in the cooking vessel or in an appropriately sized container until granulation is achieved. Due to the high temperature of the syrup when it is being handled and stirred several precautions should be observed. The producer should have protective gloves, protective apron, long pants, closed shoes and eye protection. For further suggestions for protecting producers and workers working with hot maple products see the section titled “Exercise Caution when Making Maple Confections”.

Stirring

Stirring can be done by hand or by using a mechanical stirring machine. There are a couple of mechanical stirring machines used by maple producers. The most common is a commercial mixer. The mixer must have a slow speed and a beater with few cross bars will generally work best. Using a home quality mixer is not recommended as the pressure on the engine and drive is high after crystallization begins and often burns out a kitchen quality machine with just a few uses. Some producers make maple sugar on the turntable and paddle machine commonly used to make maple cream. Unlike maple cream where the turntable machine stirs the chilled syrup, with granulated sugar the syrup is removed directly from cooking and poured into the turntable pan and stirring started immediately. Over-filling some turntable machines can cause them to stall when the sugar begins to crystallize and becomes very thick. Some producers have created a mixing impeller that they place into an electric drill and use this to stir the syrup with good success. Granulated sugar will pile up high around the edge the pan as it is stirred. A pause in stirring will cause it to drop back down again; after which stirring can be resumed. Your mixing bowl should have sufficient depth to contain the granulated sugar. The depth of most commercial cream machine pans limit the amount of sugar that can be made at one time.

As the syrup crystallizes, the heat of crystallization given off can be significant, releasing a burst of hot steam that can catch the person stirring the mix by surprise and cause burns if protective equipment is not being used. Stirring continues until all moisture is essentially removed from the cooked syrup and crumbly, granulated sugar remains. Stirring aggressively tends to make a finer more powdery sugar while slow even stirring tends to make a grainier sugar that is very similar to common brown sugar. Granulated maple sugar made with syrup higher in invert sugar tends to make a finer powdery sugar while syrup low in invert sugar tends to make a grainier sugar. Light low invert syrup tends to make a “drier” finished product than if darker higher invert syrup is used.

Screening

Screening

At this point the sugar is sifted through a coarse screen (1/8-inch or 3mm hardware cloth is commonly used though stainless steel is recommended for cleanability and durability) to make a uniformly sized product. Stainless steel sieves with handles are available at restaurant supply stores. Various sizes of commercial sifters are available. Allowing the sugar to stand exposed to air in a humidity controlled room and sifting a second time before packaging can reduce the chances of the sugar clumping after placed in packaging. Some producers save out the pebble sized clumps that do not go through the sieve and sell them as a specialty sugar to be used in hot drinks such as coffee or hot chocolate.



Packaging

Packaging and Moisture Content

Granular sugar absorbs moisture and should be stored in dry, air-tight containers. Glass or see-through packaging is ideal in that the consumer can see the product being purchased.

Creep Test

The moisture content of the sugar as it is packaged can be important. One way to check for the proper moisture content is to use the creep test. To conduct the creep test you simply make a small pile of granulated sugar on a clean dry surface, and then pour additional sugar on the top with a spoon. Sugar that is still too wet will not creep but will cling together and sugar that is too dry also does not creep but just slides down. Good creeping begins to occur about the time the pile is an inch high you will see the sugar begin to move down the slope. It creeps or moves with a thick fluid motion and the crystals make it appear as though it is crawling. It looks like the movement of a mass of larvae almost like something is alive there.

Packaging maple sugar when the moisture content is still too high is the primary reason for the sugar to harden later. Maple granulated sugar also hardens when water content is too low, usually when water evaporates from the sugar when the packaging is not properly closed or has allowed moisture to escape. Storing maple sugar in a way that allows the product to retain its natural moisture—in its original airtight container—helps maple sugar stay moist. If maple sugar hardens, let it stand overnight in a sealed jar with a damp paper towel. For a quick fix, heat the needed amount in a 250° F oven for a few minutes or in a microwave oven on low for 1-2 minutes per cup. The softened maple sugar should be used immediately. The clumps of sugar can also be broken up in a blender.

