

## Overview

A quality maple candy is identified by its smoothness, hardness, shelf-life, and lack of blemishes, particularly white spots (Childs, 2015). To extend the shelf-life of this traditional maple treat, a protective layer of sugar crystals is formed on the



outside of the candy by *Image 1. Sugar panned maple candies. Photo by Ailis Clyne.* submerging it in heated, supersaturated maple syrup. This process is known as crystal coating or sugar panning. The current **crystal coating** method used by maple producers involves submerging candies for a minimum of 6 hours, which allows the sugar to precipitate out of the supersaturated syrup and crystallize on the surface of the candy. This crystal coat protects the candy from moisture uptake in humid environments or dehydration in arid environments. It is effective, but also time consuming and requires excess moisture to be wiped from each candy by hand.

An alternative method to crystal coating is **sugar panning**. This method is common in the confectionery industry and uses the same supersaturated syrup solution as traditional crystal coating. However, rather than submerging for a long period of time, the candies undergo a repeated dipping and drying cycle for 1.5 – 2 hours. The cycle allows multiple thin layers of sugar crystals to develop on the candy's surface, which creates a firm shell less prone to moisture accumulation during drying. Crystal coated or sugar panned candies have an estimated 9- to 12-month shelf-life. This bulletin details the procedure for sugar panning maple candies.

## Sugar Panning Procedure

### Step 1: Prepare the maple candy

Maple candy that will undergo sugar panning needs to dry in a 60 – 70 °F and 20 – 65% relative humidity (RH) (45% RH is ideal) environment for at least 24 hours. This allows any excess moisture and heat to dissipate. At the same time, the candy continues to crystallize and solidify as it cools (Hartel et al., 2018). Candies that have dried for longer can be panned but may have lost or gained moisture if stored in suboptimal conditions. Maple candy production details can be found in the Traditional Maple Candy chapter of the [New York State Maple Confections Notebook](#) published by the Cornell Maple Program.

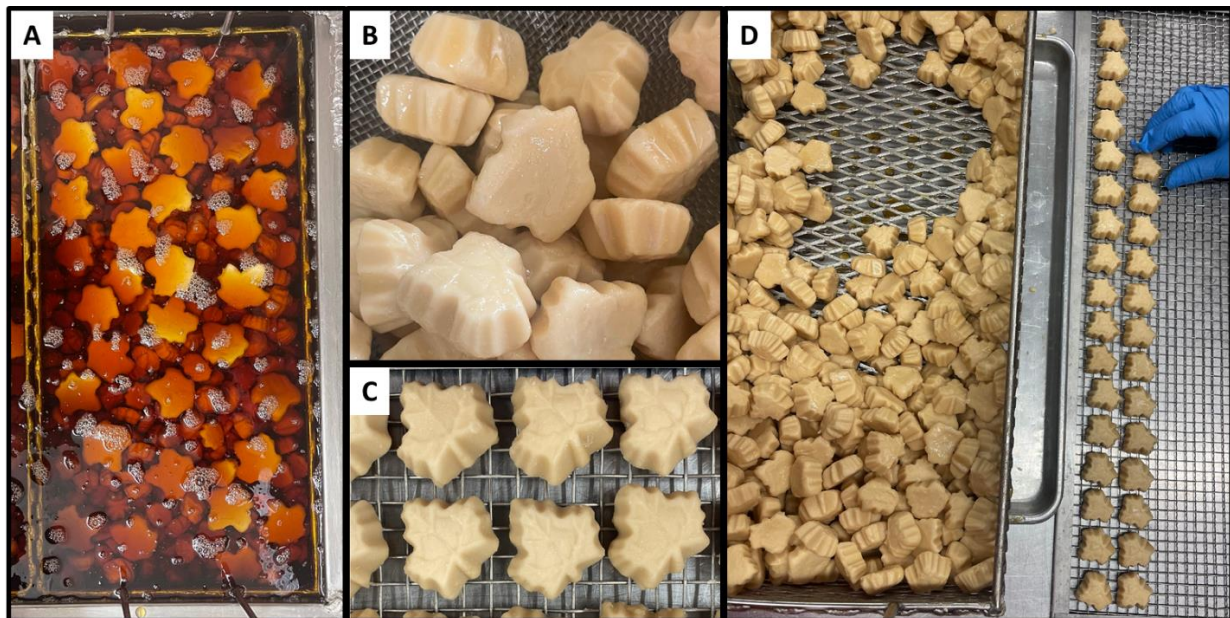
## Step 2: Prepare the syrup solution

Concentrate a low invert (<1%) syrup to 70 – 73 °Brix by boiling the syrup to 9.5 – 11 °F above the boiling point of water (ABPW). Immediately after reaching the finishing temperature, place a cheese cloth on the surface of the syrup solution and allow the syrup to cool to 90 °F (Belisle, 2022). In development of this procedure, the low invert syrups were concentrated to 71 °Brix by boiling the syrup to 10 °F ABPW.

Check the °Brix of a sample at room temperature. If the °Brix is too low (i.e. too much water is present), the sugar panning procedure will be slowed or uneven. If the °Brix is too high or invert levels are too high, a sticky coating will develop on the candy. Adjust the °Brix prior to panning candies. The [Density Blending Calculator](#) on the Cornell Maple Program website is a helpful tool for making °Brix adjustments.

## Step 3: Sugar pan the candies

The ideal environment for sugar panning is in a room at 60 – 70 °F and 20 – 65% RH. Sugar panning consists of repeatedly submersing candies into the syrup solution followed by a drying and crystalizing step. Place the candies in a wire basket (Fig. 1a), submerge the candies in the syrup solution maintained between 70 – 90 °F until fully covered (<10 seconds), remove the basket from the syrup solution, and allow candies to dry in the basket for 5 – 10 minutes. Repeat the process 20 – 40 times, or until a shell of desired thickness forms on the candy. Candies will touch during drying cycles; this was not shown to impact the final product appearance or shelf-life.



*Figure 1. Sugar panning procedure for maple candies. Candies were immersed in a supersaturated syrup solution (a), dried and allowed to crystallize (b), and then stored on wire trays after immersion and drying cycles were complete (c and d).*

In the development of this procedure, a drying time of 5 minutes and repetition of 20 times was sufficient. In a humid environment or in production of large batches, a drying time of up to 10 minutes may be necessary. During drying, sugars crystallize on the candy and develop a glassy appearance once drying is sufficient (Fig 1b). If excess moisture remains on the candy, an uneven or mottled color can develop. To reduce mottling, concentrate the syrup solution 1 – 2 °Brix higher and maintain a syrup temperature of 70 – 90 °F during panning via reheating or water bath. Mottled coloring was not shown to reduce shelf-life of the final product.

#### **Step 4: Dry the sugar panned candies**

Place the candies in shallow trays or on a wire rack immediately following the final sugar panning cycle (Fig. 1c and d). A grooved wire rack, commonly used in dehydrator units, will reduce the candy from adhering to the drying surface (Fig. 1c and d). Dry the sugar panned candies in 60 – 70 °F and 20 – 65% RH (45% RH is ideal) environment for 24 hours to allow the sugar panned shell to dry and crystallize. Drying candies in warmer temperatures, lower or higher humidity, or with high air flow can lead to uneven drying and crystallization, resulting in a reduced shelf-life (Hartel et al., 2018).

#### **Step 5: Package the candies**

To extend the shelf-life, store unpackaged candies in a 50 – 70 °F and 25 – 45% RH environment and packaged candies in 20 – 65% RH environment (Hartel et al., 2018). Packaging protects candies from moisture uptake or loss driven by high or low humidity, respectively.

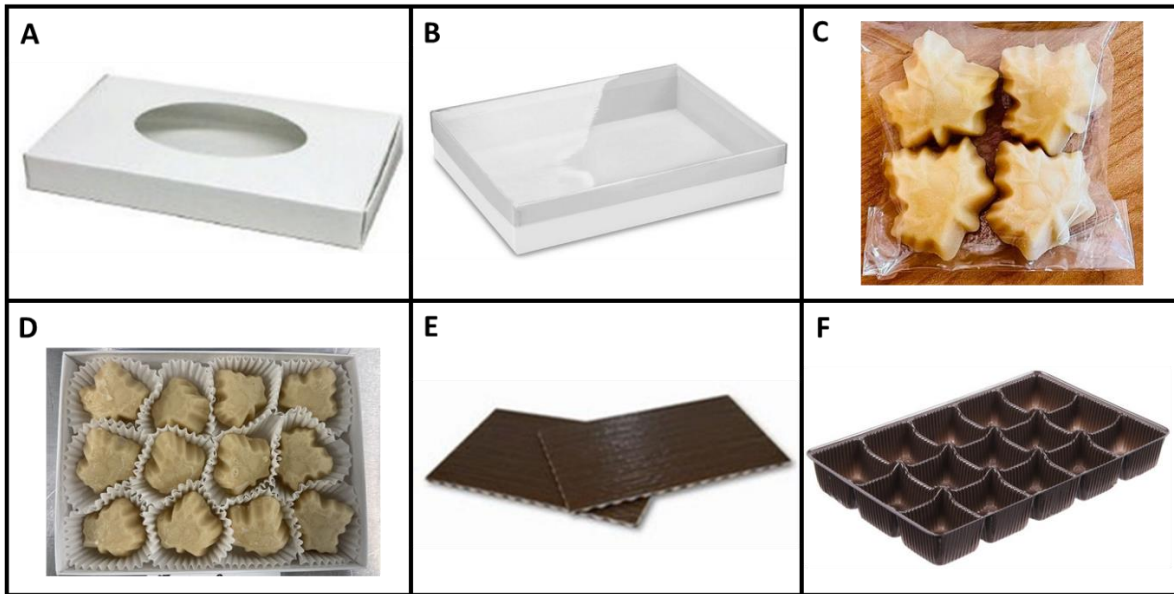
A shelf-life of 9- to 12-months is expected under proper storage conditions. The product is no longer marketable once the candy center dries and hardens. This is due to moisture loss within the candy that inevitably occurs over time. Since the candy core has higher moisture than the shell, the moisture will migrate out of the candy and shell over time, resulting in a dryer candy and a softened shell.

In general, coated or panned maple candies can withstand moderate RH changes (shown above) without absorbing a detrimental amount of moisture. Therefore, packaging that allows some breathability is ideal. Examples of low moisture barrier packaging are



*Image 2. Biodegradable cellophane packaging manually punctured with a perforator tool. (Image courtesy of Eileen Downs at Merle Maple)*

shown in Fig. 2. If candies are transported or exposed to higher than ideal RH and temperatures, allow additional air and moisture exchange through packaging by sealing the box lids with tape or glue on two of the four sides or puncture cellophane bags with a perforator (Image 2). If candies are placed in high moisture barrier packaging used for sugars or cotton candy, the moisture present in the product will slowly migrate out, leading to a softened candy coat. High moisture barrier packages include high-density polyethylene (HPDE), low-density polyethylene (LDPE or LLDPE), polyethylene terephthalate (PETE or PET), or glass and should not be used.



*Figure 2. Breathable (a–c) and protective (d–f) packaging options for maple candy. Coated cardboard candy box with a cellophane window (a) or PET lid (b), or cellophane bags (c). Mini baking cups (d), candy pads (e), and candy trays (f) protect maple candy from damage.*

## **Consumer Evaluations**

In preliminary evaluations, the sugar panned shell was more firm, crunchy, and thick than the traditional crystal coating. Therefore, a consumer preference test was conducted to evaluate overall liking of the sugar panned candy and acceptance for the level of firmness, crunchiness, and thickness of the sugar panned coating. Data was collected from 76 participants at the Mobile Maple Experience Booth during the NY State Fair. The appearance of the product was liked by 95% of consumers (Fig. 3a). Consumers reported “just about right” for firmness (88%), crunchiness (77%), and thickness (81%) of the coating (Fig. 3b). A number of panelists reported not quite enough or not nearly enough firmness (8%), crunchiness (16%), or thickness (12%). As previously mentioned, the maple candies underwent 20 dipping and drying cycles. Increasing the cycles will result in a thicker coating, which would likely be perceived as crunchier and thicker. Shelf-life reduction is not expected if the number of dipping and drying cycles is increased.

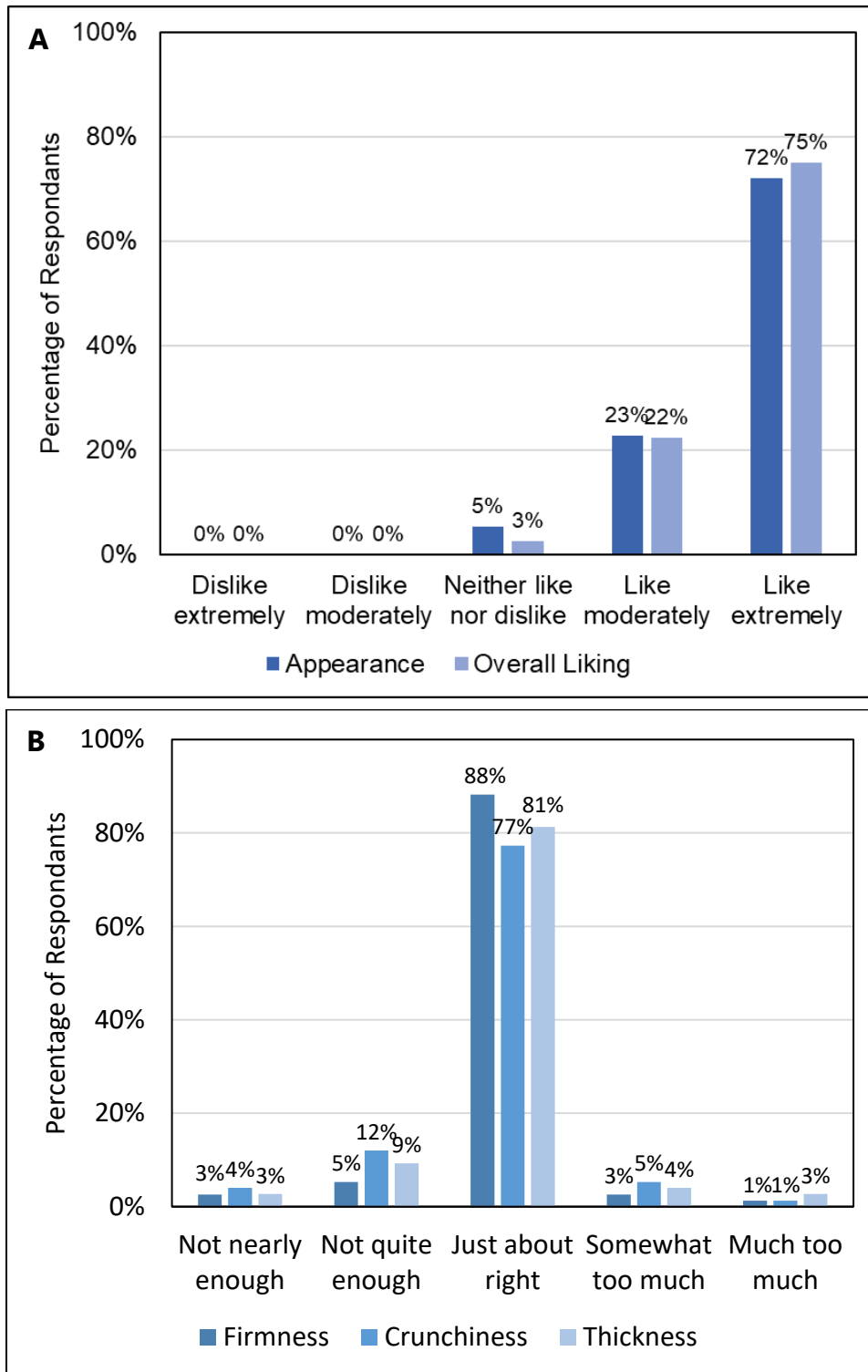


Figure 3. Appearance and overall liking (a) and acceptance of texture attributes (b) of the outer shell of sugar panned maple candies evaluated by consumers (n=76).

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## Citations

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