

Caramels

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Vanilla Caramels

Materials Needed

2 cups sugar (use white granulated sugar or a mixture of 1 ½ cups white and ½ cup brown sugar)
¼ cup corn syrup (light Karo syrup or similar)
¼ cup water
5 Tablespoons unsalted butter
1 1/3 cup heavy whipping cream
1 teaspoon salt (sea salt preferred, but not necessary)
1 Teaspoon vanilla extract
stirrer: wood spoon, high temperature spatula, or high temperature plastic candy spoon
2 saucepans: one 1 quart and one 2 ½ to 3 quart (Note: The larger saucepan is needed as the mixture foams during the heating process. This will contain the mixture from overflowing the pot.)
8 x 8 inch baking pan
Candy thermometer
hot plate or kitchen stove
parchment paper
waxed paper
cooking spray
pot holders or hot mitt
Optional: sea salt

Safety

Safety glasses or goggles must be worn in the laboratory at all times.

This experiment is best performed at home or in a home economics laboratory. If this experiment is performed in a chemistry laboratory, all work surfaces must be cleaned and free from laboratory chemicals. After cleaning work surfaces, it is advised to cover all work areas with aluminum foil or a food-grade paper covering.

All glassware and apparatus must be clean and free from laboratory chemicals. Use only special glassware and equipment, stored away from all sources of laboratory chemical contamination, and reserved only for food experiments is recommended.

There are no safety hazards associated with the materials used in this experiment.

The materials prepared in this experiment will be hot. Wear a hot mitt or use pot holders when handling hot pots or any of the mixtures prepared.

Disposal

Generally, all waste materials in this experiment can be disposed in the trash or poured down the drain with running water. All disposal must conform to local regulations.

Procedure

The 8 x 8 inch baking pan will be used as a mold for the caramels.

Prepare the baking pan by lining it with parchment paper. The paper should be large enough to overhang the sides of the pan. Lightly spray the paper with cooking spray.

In the smaller saucepan, add the butter, heavy cream, and salt. Warm the mixture until the butter dissolves. (Do not boil the mixture.) Set this aside.

Measure the sugar, corn syrup, and water into the large saucepan. Stir to form a smooth paste.

Heat over medium heat until the mixture starts to boil. Insert the candy thermometer and continue heating, with stirring, until the mixture just reaches 250°F (120°C).

Remove the pot from the heat. Slowly, with stirring, add the cream mixture to the sugar mixture. CAUTION: The mixture will foam.

Return the pot to the heat and heat, with stirring, until the mixture reaches 250°F (120°C). Note: The mixture will foam during the heating. You may have to stir faster OR stop stirring for the foam to subside. Also, the mixture will maintain a temperature

between 220° to 230°F (105° to 110°C) for a while during the heating process. This allows some of the excess water to boil off.

When the mixture reaches 250°F (120°C), remove the pot from the heat and add the vanilla. Stir well.

Pour the mixture into the prepared 8 x 8 inch pan.

Optional: If you want salted caramels, allow the mixture to cool for about 15 to 30 minutes and sprinkle a small amount of sea salt onto the top of the caramels.

Once the caramels are cool, remove them from the pan and, using a sharp knife, cut them into small squares. Wrap with waxed paper.

Explanation

Caramels are a light to dark brown confection made by heating carbohydrates. The process is called caramelization. This is also the process that occurs in browning meats. Using only white granulated sugar, the caramels will be light brown in color. Addition of brown sugar will result in a darker brown caramel with a slight flavor of the molasses which is part of that type of sugar.

The addition of water to sugar, for candy making, serves two purposes. One is to keep the sugar from charring upon heating. The second is to form a sugar syrup. The final concentration of the sugar in the syrup will determine the type of candy that results. At 113°C (235°F) sugar concentration is about 85%, this is suitable for making fudge. At 132°C (270°F) the sugar concentration is about 90% and the syrup is suitable for making taffy. At 150°C (300°F), the sugar concentration is near 100% and the syrup is suitable for making hard candies and brittles.

Stages in Candy making

Boiling Point (°F)	Candy Type
230°-235°	Syrup
235°-240°	Fudge, fondant
245°-250°	Caramels
250°-265°	Marshmallows, nougat
270°-290°	Taffies
300°-310°	Hard candies, brittle

The final texture of the caramels can be controlled by the final temperature of the mixture before pouring it into the mold. At 245° to 250°F, the caramels will be soft. At 250° to 260°F, the caramels will be firmer. Above 260°F, the caramels tend to be hard.

One of the goals in making candy is to minimize or prevent the crystallization of the sugar. Fudge, for example, contains microcrystals of sugar lubricated by the sugar syrup. If the crystals are too large, then the fudge will be coarse and grainy, not creamy. For other candies, crystallization is undesirable and an amorphous, glass-like product is

desired. Generally, we are trying to obtain a supersaturated solution of sugar without any crystallization. If there are seed crystals present, or if the candy softens after it is made, crystallization of the sugar may occur. As an example, when chocolate separates from the cocoa butter, producing a visual discoloration of the candy, the sugar in the chocolate will have crystallized making the chocolate grainy in texture.

The addition of corn syrup is used in candy making to inhibit crystallization of the sugar.

References

Gehring, Abigail R., *Classic Candy*, Skyhorse Publishing, New York, NY, 2013.

McGee, Harold, *On Food and Cooking*, Charles Scribner's Sons, New York, NY, 1984.

Chocolate Caramels

Materials Needed

- 1 cup sugar
- ½ cup corn syrup (light Karo syrup or similar)
- ¼ cup water
- 2 Tablespoons unsalted butter
- 1 cup heavy whipping cream (at room temperature)
- ½ teaspoon salt (sea salt preferred, but not necessary)
- 2 ounces chocolate, 60% cacao or less, finely chopped (Note: Do not use chocolate chips. Chocolate chips have a higher melting point so they keep their shape in baking.)
- stirrer: wood spoon, high temperature spatula, or high temperature plastic candy spoon
- saucepan, 2 ½ to 3 quart (Note: The larger saucepan is needed as the mixture foams during the heating process. This will contain the mixture from overflowing the pot.)
- 8 x 8 inch baking pan
- Candy thermometer
- hot plate or kitchen stove
- parchment paper
- waxed paper
- cooking spray
- pot holders or hot mitt
- Optional: sea salt

Safety

Safety glasses or goggles must be worn in the laboratory at all times.

This experiment is best performed at home or in a home economics laboratory. If this experiment is performed in a chemistry laboratory, all work surfaces must be cleaned and free from laboratory chemicals. After cleaning work surfaces, it is advised to cover all work areas with aluminum foil or a food-grade paper covering.

All glassware and apparatus must be clean and free from laboratory chemicals. Use only special glassware and equipment, stored away from all sources of laboratory chemical contamination, and reserved only for food experiments is recommended.

There are no safety hazards associated with the materials used in this experiment.

The materials prepared in this experiment will be hot. Wear a hot mitt or use pot holders when handling hot pots or any of the mixtures prepared.

Disposal

Generally, all waste materials in this experiment can be disposed in the trash or poured down the drain with running water. All disposal must conform to local regulations.

Procedure

The 8 x 8 inch baking pan will be used as a mold for the caramels.

Prepare the baking pan by lining it with parchment paper. The paper should be large enough to overhang the sides of the pan. Lightly spray the paper with cooking spray.

Measure the sugar, corn syrup, and water into the saucepan. Stir to form a smooth paste.

Heat over medium heat until the mixture starts to boil. Insert the candy thermometer and continue heating, with stirring, until the mixture just reaches 250°F (120°C).

Remove the pot from the heat. Slowly, with stirring, add the cream and butter to the sugar mixture. CAUTION: The mixture will foam.

Return the pot to the heat and heat, with stirring, until the mixture reaches 250°F (120°C). Note: The mixture will foam during the heating. You may have to stir faster OR stop stirring for the foam to subside. Also, the mixture will maintain a temperature between 220° to 230°F (105° to 110°C) for a while during the heating process. This allows some of the excess water to boil off.

When the mixture reaches 250°F (120°C), remove the pot from the heat and add the chocolate. Stir well.

Pour the mixture into the prepared 8 x 8 inch pan.

Optional: If you want salted caramels, allow the mixture to cool for about 15 to 30 minutes and sprinkle a small amount of sea salt onto the top of the caramels.

Once the caramels are cool, remove them from the pan and, using a sharp knife, cut them into small squares. Wrap with waxed paper.

References

Torres, Jacques, *Dessert Circus: Extraordinary Desserts You Can Make at Home*, William Morrow Cookbooks, 1997.