

MGI Informative Research

Guiding Question: What is the best recipe for ice cream?

Article Title: “Ice Cream Making Process”

Author(s): Kevine Otieno

Publication: *Dairy Technologist*

Central Idea: An overview of the process required to make ice cream on a personal, commercial, and industrial level.

Information:

- Ingredients
 - 360 ml whole pasteurized milk (about 1.5 cups)
 - 360 ml half cream (about 1.5 cups)
 - 180 g granulated sugar (about 3/4 cup)
 - 20 ml corn syrup (binds and stabilizes the sugar)
 - 10 – 15 ml vanilla extract (about 1 tea spoon)
 - 4 egg yolks (you can omit this if you do not take eggs)
- Instructions
 - First, we need to make the ice cream base. It will help us to incorporate all the ingredients that we need to add into our ice cream.
 - The ice cream making process using zip lock bags follows the following 9 steps:
 - Warm the milk in a sauce pan. We are going to use the warm milk to temper the egg yolk so that we do not end up with scrambled eggs instead of a smooth ice cream base.
 - Meanwhile, set up the ice water bath. After filling a large bowl with the ice cubes and some water, place a smaller bowl on top.
 - Mix the corn syrup with sugar and whisk the mixture with the yolks. Mix the yolk with the sugar until you obtain a lemon yellow color. The corn syrup will stabilize the granulated sugar in the base.
 - By this time the milk shall have reached the desired temperature (80°C). Remove the milk from the fire and slowly add about 150 ml of the hot milk into the yolk-sugar mixture. Mix slowly with a spatula to temper the eggs and avoid cooking the yolk.
 - After tempering the yolk, add it back into the saucepan and continue heating it while whisking continuously until it thickens. It should be thick enough to coat the spatula.
 - Remove the ice cream base from the source of fire. Strain it through the sieve (into the smaller bowl in the ice water bath) to trap any solid or yolk that might have scrambled by accident.
 - Add the cream and vanilla extract into the base: Stir the mix continuously in the ice water bath to avoid cooking the yolk. Leave the ice cream base in the ice water bath for 20 minutes and keep stirring occasionally until the base chills completely. Transfer the base into the smaller zip lock bag.
 - Add salt to the ice cubes in the larger bag (lowers their melting point of ice). Put the bag with ice cream base into the larger zip lock bag containing ice cubes. Keep churning it until the ice cream base freezes.
 - Freeze the ice cream until it solidifies. You can now put the frozen ice cream into the freezer for 24 hours to age. Seal it with wax paper to discourage formation of ice crystals. However, you can eat it in four hours if you were looking for an instant treat.

Guiding Question: How do companies make industrial amounts of ice cream? How is this process different from when people make it at home?

Article Title: "Ice Cream"

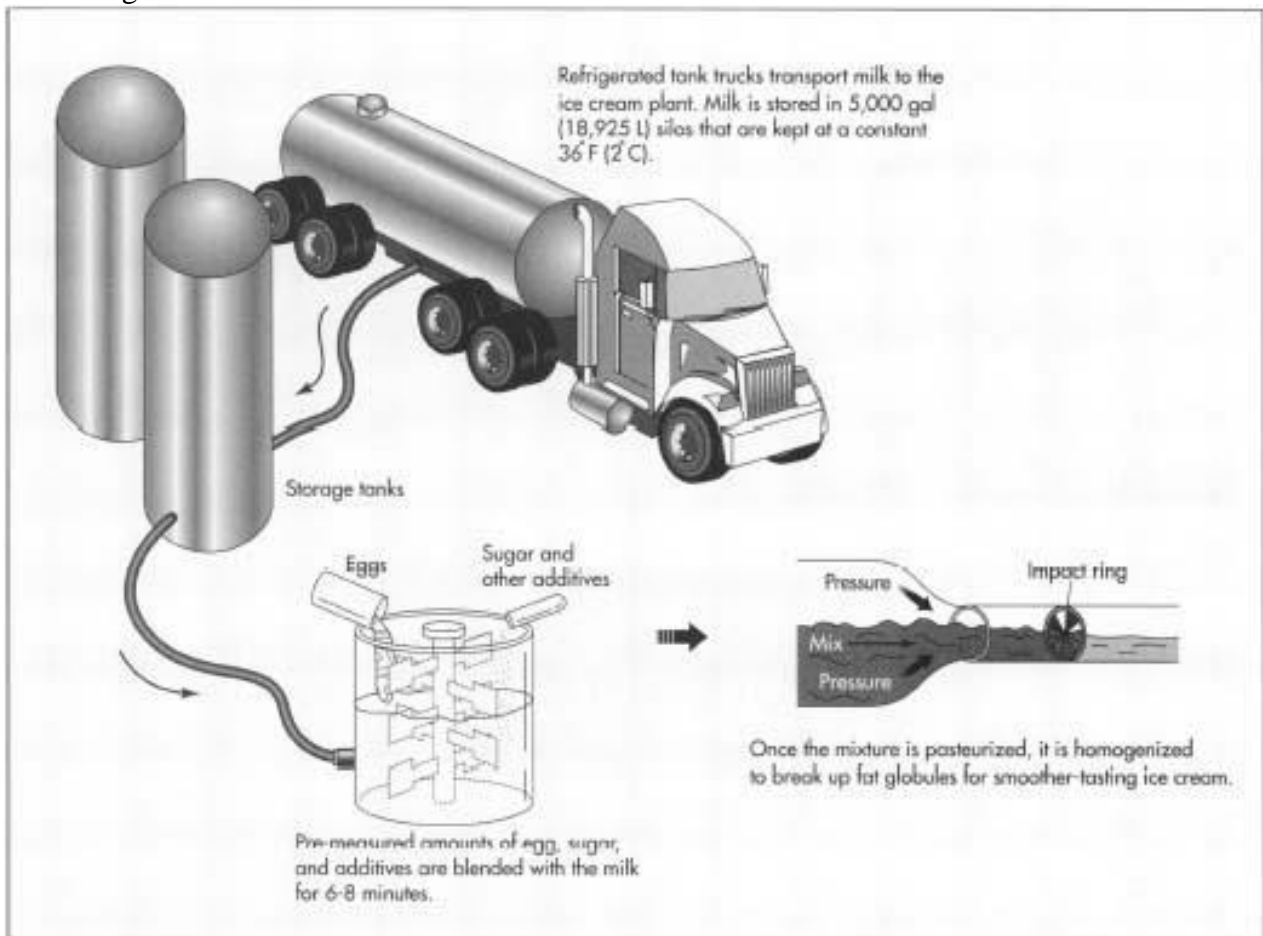
Author(s): None Listed

Publication: *How Products Are Made*

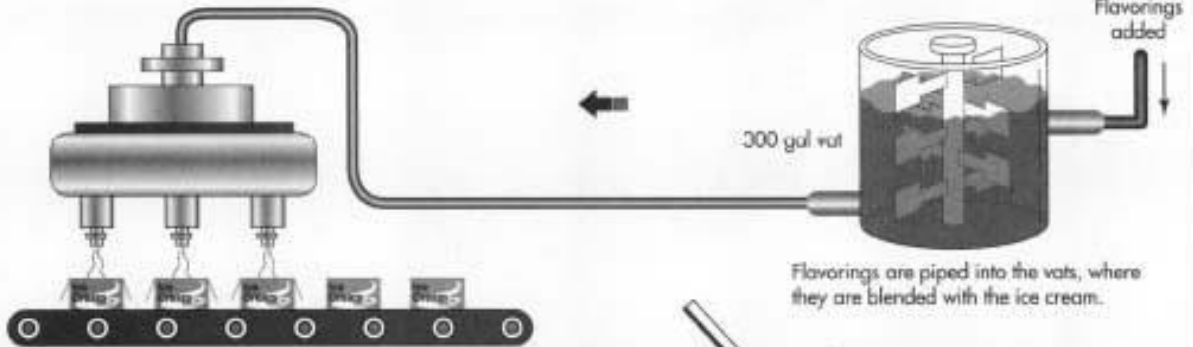
Central Idea: Including a history of ice cream making, this article highlights the process through which ice cream is made on an industrial, commercial level.

Information:

- Ice cream was first eaten with ancient Greeks and Romans.
- First public sale = 1670.
- Ice cream was only for the wealthy or those that lived in colder climates.
- Blending → Pasteurizing (killing bacteria) → Homogenizing (making the same texture) → Cooling & Resting → Flavoring → Freezing to soft serve → Adding fruit, candy, chunks → Packaging → Hardening



After being homogenized, the ice cream mixture is cooled to 36° F (2° C) and stored for 4-8 hours until the ingredients are set.



Automatic filling machines fill containers with pre-measured amounts of ice cream.

Flavorings are piped into the vats, where they are blended with the ice cream.



Before being shipped or stored, ice cream is hardened for 2-3 hours at -10° F (-23° C).

Guiding Question: What does a Ben and Jerry's ice cream plant look like?

Article Title: "How We Make Ice Cream"

Author(s): None Listed

Publication: Ben & Jerry's

Central Idea: An overview, including pictures, of how Ben & Jerry's makes their ice cream, from farm to table.

Information:

- Local farms sell cow's milk to the St. Albans Cooperative Creamery in St. Albans, Vermont. Milk is separated into heavy cream and condensed skim milk, then transported by tanker truck to two Vermont factories.
- Upon arrival, milk is pumped into 4 6,000-gallon silos and kept at 36 degrees until ready to use.
- A Mix Master creates the mix in the Blend Tank, a 1,000-gallon stainless steel mega blender.
 - Heavy cream, skim milk, cane sugar, egg yolks, cocoa powder (for chocolate) and stabilizers.
- This is then transferred to the Surge Tank, where it is stored until pasteurization.
- Pasteurization is when it is heated to 180 degrees to get rid of bacteria.
- Before the mix is cooled, it enters the Homogenizer. This makes it go through immense pressure so that the fat particles are evenly divided and mixed in completely.
- The mix is then pumped to the Tank Room, where it is held for 4 – 8 hours for the ingredients to mix together more.
- After it has simmered, it then is pumped into a Flavor Vat, which holds 500 gallons of mix. Here, that mix is turned into the flavors that people expect by adding flavorings, extracts, and even liqueurs.
- Once flavored, the mix goes into the Freezer. It stores it at 40 degrees below zero and can freeze 700 gallons an hour.
- It enters at 36 degrees, and leaves at 22 degrees—self serve consistency.
- From here, the mix is diverted depending on flavor – if there are no chunks, it goes straight to the pint filling machinery. If there are chunks, it goes to the Chunk Feeder.
- Chunks are top loaded into the hopper and at the bottom is an auger to regulate a steady chunk flow into the mix. As the wheel turns, it pushes the chunks into the mix.
- The chunked ice cream is then mixed to make sure that it goes through evenly.
- Variegates (Swirls) go through the Contherm, which lowers their temperature. Then, they pass through the Variegator, which injects the swirl in the ice cream stream at the right moment.
- Then, ice cream is pumped into containers by the Automatic Filler. This machine fills about 120 pints a minute, and it also drops containers into position for the filler-head to fill.
- The Lidder, appropriately named, puts the lid on the pints and the filled pints are pushed away on a conveyor built.
- After it is packaged, the mix still has to be frozen fully—down to 10 degrees below zero. This is called "hardening" and happens in the Spiral Hardener. Pints spend 3 hours in the Spiral Hardening Tunnel where the temperature with wind chill is 60 degrees below zero.
- From there, pints are packaged for shipment. There are 2 rows of pints parallel to each other (4 on top, 4 on the bottom). They enter the Bundler, which shrinks wraps plastic around the bundles. These are called Sleeves. Each sleeve is one gallon of ice cream.
- During all of this, the Quality Assurance Lab make sure that every flavor meets strict standards of excellence.
- Ice cream is then shipped all over the world to grocery stores, super markets, restaurants, movie theatres and many other ice cream related venues.