



Unlocking the Secrets of Food Science



Summer Edition -Ice Cream Cake

Ice Cream Fun Facts: Cool Science & History

What Is Ice Cream Made Of?

Ice cream is more than just a sweet treat—it's a **frozen blend of milk, cream, sugar, and flavorings** like vanilla, chocolate, or fruit. To make it smooth and scoopable, manufacturers often add **stabilizers**. Which helps bind water and fat together and prevent large ice crystals from forming, keeping the texture creamy.

How Is It Frozen?

The ice cream mix is first frozen in a machine to about **24°F**. Then it's moved to a **hardening room** at a chilling **-20°F**, where it can be stored for up to a year!

What's Inside Ice Cream?

Ice cream is a clever combination of:

- **Fat** (from cream)
- **Water** (from milk)
- **Air** (whipped in during freezing)

Stabilizers work at the boundary between fat and water, helping everything stay mixed and smooth. The air adds volume and makes it easier to scoop—this is called **overrun**. Less air = richer ice cream!

A Scoop of History

- **Marco Polo** may have brought the idea of flavored ice from China to Europe. In France, people used the

technique to freeze wine, and by the **late 1600s**, they started using **milk and cream**—hello, ice cream!

- The **first U.S. ice cream factory** opened in **Pennsylvania in 1851**, making ice cream more widely available.
- During **World War II**, some pilots got creative: they mounted **five-gallon cans** of milk, cream, and sugar to their aircraft. The cold air at high altitudes froze the mix, and propeller-powered stirrers churned it into ice cream mid-flight!

The Cool Science Behind Ice Cream

Ever wonder why ice cream is so creamy and scoopable, even though it's frozen? It's not just magic—it's science!

Step 1: Sweetening the Cream

If you freeze plain cream, it turns rock solid. But when you add **sugar**, something interesting happens:

Sugar **lowers the freezing point** of the mixture. That means the cream won't freeze solid like water—it stays soft and scoopable. Why? Sugar molecules get in the way of water molecules trying to form ice crystals.

Step 2: Salt Makes It Colder

Now here's the twist: if sugar makes it harder to freeze, how do we get ice cream to freeze at all?

We use **salted ice**! Adding salt to ice makes it **colder than regular ice**—cold enough to freeze the sweetened cream.

This trick is used in old-fashioned ice cream makers with a hand crank and a bucket of ice and salt.

What's Inside Ice Cream?

Ice cream isn't just frozen milk—it's a **semi-solid foam** made of three key parts:

Ice Crystals ❄️

These form as water in the mix freezes. The smaller the crystals, the smoother the ice cream feels. Big crystals? You get a grainy texture.

Sweetened Cream 🥛

Thanks to sugar, about **20% of the water stays liquid** even when frozen. This syrupy mix coats the ice crystals and helps hold everything together.

Air Cells 🌬️

As the mix is stirred while freezing, air gets whipped in. These tiny bubbles make the ice cream lighter and easier to scoop. The more air, the fluffier the ice cream—a concept known as **overrun**. Less air means denser, richer ice cream.

Fun Fact:

Premium ice creams have **low overrun**, meaning they're packed with flavor and creaminess. Cheaper ones? They're often puffed up with air!

Hard Chocolate Shell: The Science Behind the Snap

Ever wonder how that magical chocolate topping hardens instantly on your ice cream? It's not just delicious—it's science in action!

Fats vs. Oils: What's the Difference?

Both fats and oils belong to a group of compounds called **triglycerides**. These are made of one glycerol molecule and three fatty acids.

- **Oils** are usually **liquid** at room temperature.
- **Fats** are typically **solid** at room temperature.

The difference lies in the **types of fatty acids** they contain.

Saturated vs. Unsaturated Fats

- **Saturated fats** have straight chains of carbon atoms, fully packed with hydrogen. These chains stack neatly, forming solid structures.
- **Unsaturated fats** have one or more **double bonds**, which create kinks in the chain. These kinks prevent tight packing, so the fat stays liquid.

 **Vegetable fats** are about **85% unsaturated**, while **animal fats** are closer to a 50/50 mix.

Coconut Oil: The Secret Ingredient

To make a hard chocolate shell, we use **coconut oil**, which is rich in **saturated fat**. That means:

- It's **solid at room temperature**.
- When chilled (like on ice cream), it becomes **brittle** and **snaps** easily.

Mix coconut oil with melted chocolate, and voilà—you've got a topping that hardens on contact with cold ice cream!

Sources:

1. *On Food And Cooking: The Science and Lore of the Kitchen* by Harold McGee



August 22: Back to School Edition -Toaster Pastries.

Join us at the LSU AgCenter Test Kitchen! Explore delicious recipes and discover the science behind the art of cooking.

When: Friday evenings from 5:00 pm to 8:30 pm

Dates:

- February 28 - King Cake
- April 25 – Chips and Salsa
- June 27- Ice Cream Cake
- **August 22 – Toaster Pastries**
- October 17 - Charcuterie Board
- December 12

Cost: Varies by event

Location: LSU AgCenter Test Kitchen, 39 Forestry Ln., Animal and Food Sciences Laboratories, Baton Rouge, LA.



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