

# The Best Vanilla Ice Cream

The main reason more people don't make their own ice cream? It's never as creamy, smooth, or dense as the best stuff from the store. We decided to change that.

≡ BY DAN SOUZA ≡

In the five years that I've owned my canister-style ice-cream maker, I'd say that it has produced, optimistically, a mere couple of gallons of ice cream. It's not that I don't love the taste of homemade ice cream—believe me, I do. Rather, it's that the texture of my homemade creations never measures up to the ultra-dense, impossibly smooth “super-premium” ice cream at the grocery store. Instead of thick, dense, and velvety, my results invariably turn out crumbly, fluffy, and icy. And forget about storing homemade ice cream for more than a few hours; an overnight stint in the freezer only amplifies the iciness. Before I decided to sell off my machine at my next yard sale, I wanted to exhaust any lead that might allow me to make ice cream with a texture rivaling the highest quality commercial stuff.

I reviewed what I knew about custard-based ice cream, which typically calls for nothing more than milk, cream, sugar, eggs, and flavorings. Once the custard has frozen, the ice cream is composed of three basic elements: ice crystals of pure water; the proteins, sugars, and fats left behind as the water in the mix is crystallized; and air. The amount of air affects denseness, whereas both the makeup of the custard and how it is frozen contribute to smoothness. I decided to start with a standard custard base and focus first on finding the most effective way to freeze it.



Our super-premium quality ice cream stays dense and creamy for five days.

## The Importance of Fast Freezing

Smooth ice cream isn't technically less icy than “icy” ice cream. Instead, its ice crystals are so small that our tongues can't detect them. One way to encourage the creation of small ice crystals is to freeze

the ice cream base as quickly as possible. Fast freezing, along with agitation, causes the formation of thousands of tiny seed crystals, which in turn promote the formation of more tiny crystals. Speed is such an important factor in ice-cream making that commercial producers as well as restaurant kitchens spend tens of thousands of dollars on super-efficient “continuous batch” churners. The best of these can turn a 40-degree custard base (the coldest temperature it can typically achieve in a refrigerated environment) into soft-serve ice cream in 24 seconds, at which point roughly half of the freezable water has crystallized. Even the slowest commercial freezer will get the job done in 10 minutes. To maintain this super-fine ice-crystal structure, the churned ice cream is then transferred to a blast freezer in smaller ice cream shops or a hardening room in large commercial operations, where the temperature ranges from 20 to 50 degrees below zero. Under these arctic conditions, the remaining freezable water freezes in a matter of minutes.

I took stock of what I was working with: My canister-style machine takes roughly 35 minutes to turn a chilled custard into

soft-serve consistency—more than three times as long as the slowest commercial option. Even our favorite self-refrigerating model takes that long. Then, depending on how often the freezer door is opened, the partially frozen custard from either style of machine can take up to eight hours to fully freeze. No wonder my results are always icy.

Since the speed of freezing is critical, I wondered if I could improve my results by starting with a colder base. After letting my hot custard cool for a few minutes, I transferred a cup of it to a small bowl, which I popped into the freezer. I then put the rest of the custard in the fridge to cool overnight, per the usual method. The next day, I scraped the frozen custard into the refrigerated stuff and stirred it until the frozen custard dissolved, at which point the mixture registered

## TASTING Vanilla Beans

For recipes in which vanilla is the star, we've always found that beans impart deeper flavor than extract. We tested five brands of vanilla beans, three mail-order and two from the supermarket, wondering if the tides had changed since we rated them more than a decade ago. At that time, we couldn't recommend any supermarket samples, finding them dried out and hardened, with few seeds and even less flavor. We used the beans first in an uncooked cream cheese frosting, then cooked in the base of our Vanilla Ice Cream and in a simple crême anglaise. Turns out, times have changed: In a surprising reversal, we found the supermarket beans not only improved but better than the mail-order brands. Although all of the samples were acceptable—including cheaper Spice Islands (\$8.49 for two)—we recommend splurging on McCormick Madagascar Vanilla Beans (\$15.99 for two) for their plump, seed-filled pods and “vivid,” “robust” flavor. For complete tasting results, go to [www.CooksIllustrated.com/aug11](http://www.CooksIllustrated.com/aug11). —Hannah Crowley

**VANILLA SUPREME**  
McCORMICK Madagascar  
Vanilla Beans

Price: \$15.99 for two beans

Comments: The maker of our favorite vanilla extract wins again, with a vanilla bean with warm “caramel notes” and “hints of butter and lemon.”



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## RECIPE TESTING Getting to Yes

Creating smooth ice cream means cutting back on ice crystals—or preventing them from forming in the first place. We tried a slew of ingredients promising to do just that, most with unfortunate side effects.



**NO**

Condensed and evaporated milk contribute less water to the mix, leading to fewer ice crystals. But ice cream made from each tasted “cooked.”



**NO**

Cornstarch traps water so it can't form ice crystals, but it produced a “weird,” “gummy” texture. Gelatin and pectin bombed, too.



**NO**

Nonfat dry milk ups the overall milk solids in the custard base, thus blocking ice crystal formation, but it left a “cheesy” flavor.



**YES**

Some granulated sugar plus corn syrup, which also interferes with crystal formation, made for a super-smooth texture—with no funky side effects.

around 30 degrees. Once in the canister, this base reached soft-serve consistency in just 18 minutes and, tasted straight from the machine, exhibited less iciness than previous batches had. Another bonus of this shortened churning time was that it allowed less air to be beaten into the mix; I needed some air, but too much only diluted the ice cream's flavor and lightened the texture. To my great disappointment, however, after four hours of hardening, this ice cream was almost as icy as before.

With no way to make my freezer colder, it would have seemed that I was out of luck. However, since the rate of cooling is a function of both temperature and surface area, there was still hope. For my next batch, instead of scraping my churned ice cream into a tall container before placing it in the freezer, I spread it into a thin layer in a chilled square metal baking pan (metal conducts heat faster than glass or plastic). In about an hour, my ice cream had firmed up significantly and could be easily scooped and transferred to an airtight container. Its hardening time had been cut significantly, and you could taste the difference—this was my smoothest batch yet.

### SCIENCE Combating Iciness with Corn Syrup

One key to our ice cream's smoothness was to replace some of the sugar with corn syrup. This sweetener has a twofold effect: First, it is made up of glucose molecules and large tangled chains of starch that interrupt the flow of water molecules in a custard base. Since the water molecules can't move freely, they are less likely to combine and form large crystals as the ice cream freezes. Second, corn syrup creates a higher freezing point in ice cream than granulated sugar does. This makes the ice cream less susceptible to the temperature shifts inevitable in a home freezer. These shifts cause constant thawing and refreezing, which creates crystallization even in the smoothest ice cream. Our ice cream stayed smooth for nearly a week—far longer than most homemade ice creams do.

However, as improved as the ice cream was, it still wasn't as smooth as store-bought. Could the ingredients themselves provide any help?

### A Custardy Battle

Playing with the amounts of sugar and fat was out: My tasters felt that the ice cream had optimal sweetness and richness with  $\frac{3}{4}$  cup sugar, 6 egg yolks, and slightly more cream than milk. That left me with trying to manipulate the milk solids and water amounts. Milk solids interfere with the formation of crystals, so the more of them the better (up to a point—too much creates a sandy texture). And since crystals are created from water, the less of it the better (up to a point—too little water leads to gumminess).

A few of the recipes that I came across called for replacing a portion of the milk or cream with condensed or evaporated milk, which contain less water than fresh dairy does. While both products proved effective at reducing iciness, they contributed a “stale” and “cooked” flavor to the ice cream, even in relatively small doses. I also tried stirring in nonfat powdered milk to boost milk solids. Unfortunately, in order to be effective, I needed at least  $\frac{1}{4}$  cup, at which point tasters deemed the ice cream “cheesy” and “funky.”

With these options exhausted, I began researching the ingredients in commercial ice cream. Many commercial producers use powerful stabilizer mixes

were far less noticeable—in fact, the batch with gelatin was completely smooth. But this easy success came at a price: Each ice cream had an artificial texture and strange melting properties. The sample with gelatin refused to melt, even after 10 minutes at room temperature.

After racking up so many failures, I was tempted to throw in the towel and cede victory to the pros. Instead, I decided to call on a few of them for help.

### Expert Advice

I sought advice from two of the Boston area's best-known ice-cream makers: Gus Rancatore of Toscanini's, in nearby Cambridge, and Rick Katz, chef and owner of Pizza and Ice Cream Company, in Boston's South End. Each provided me with a different perspective on ice-cream theory (yes, ice-cream theory is a real thing). But each man circled back to an ingredient that I had all but glossed over in my testing: sugar. I'd stuck with granulated white sugar, without looking further. But ice-cream producers rely on a laundry list of different sweeteners to achieve particular textures and sweetness levels. One highly valued sweetener is invert sugar, a syrup made by cooking sugar water with an acid—a slow, finicky process that converts sucrose into glucose and fructose. With even more molecules than table sugar to interfere with ice formation, invert sugar dramatically lowers the freezing point of the ice-cream mixture so that more of the water remains liquid in

## Meet the Makers: Winning Ice-Cream Machines

Our new approach to making ice cream improves the results from each of these winning models.

### WHYNTER SNÖ Professional Ice Cream Maker

Price: \$219.99

Comments: This self-refrigerating model, our favorite, makes continuous batches of ice cream without the need to freeze a canister. For the smoothest results, we recommend letting the machine run for 5 to 10 minutes to prechill it before adding the custard.



### CUISINART Automatic Frozen Yogurt-Ice Cream & Sorbet Maker

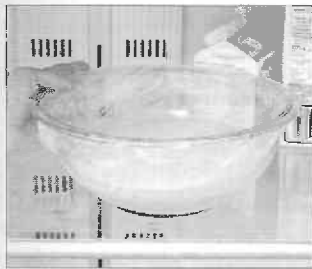
Price: \$49.95

Comments: For the best results, the canister in this remake of our Best Buy (the old model was discontinued) must be frozen for 24 hours before each use. But given its modest price, you can hardly go wrong.



## STEP BY STEP | FOR SUPER-PREMIUM SMOOTHNESS, KEEP IT COLD

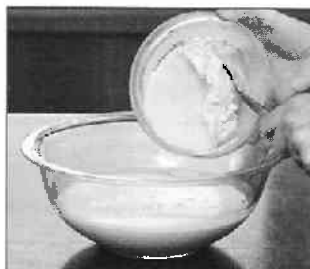
Freezing the custard as quickly as possible ensures the formation of small (versus large) ice crystals that are critical to smooth ice cream. Commercial producers use blast freezers or hardening rooms, where the temperature can hover as low as -50 degrees. We resorted to far humbler methods—with surprisingly similar results.



**1. REFRIGERATE MOST OF CUSTARD** Transfer all but 1 cup cooled custard to large bowl and chill in refrigerator at least 4 hours, until it registers 40 degrees.



**2. FREEZE 1 CUP CUSTARD** Place remaining 1 cup custard in small bowl and freeze for same amount of time.



**3. COMBINE CUSTARDS** Scrape frozen custard into chilled custard and stir until fully dissolved; now deeply chilled base registers around 30 degrees.



**4. CHURN SUPER-CHILLED BASE** Strain custard and churn until ice cream has soft-serve texture and registers about 21 degrees, 15 to 25 minutes.



**5. FAST FREEZE** Transfer ice cream to chilled metal baking pan, where it will freeze faster than in usual tall container, and freeze until firm around edges, about 1 hour.



**6. FULLY FREEZE** Transfer ice cream to airtight container, press out air pockets, and freeze until firm, at least 2 hours.

the freezer. While a boon to an ice-cream shop that can hold its product at super-cold temperatures, a depressed freezing point spelled disaster in my home freezer. Even the smoothest ice cream eventually becomes coarse and icy in a home freezer due to inevitable shifts in temperature that cause thawing and refreezing. These temperature shifts have a more dramatic effect on ice creams with a depressed freezing point—they melt much more easily—than they have on ice creams that freeze harder at warmer temperatures. Furthermore, while professionals can buy ready-made invert syrup, I had to make my own—an activity that proved both time-consuming and unreliable. I crossed it off my list, along with two other unobtainable sweeteners: atomized glucose and dextrose powder.

I desperately rummaged through the pantry in search of neutral-tasting alternative sweeteners that I could use. The list was depressingly short: corn syrup. Containing about 25 percent water, corn syrup seemed like the last ingredient that might work in an effort to eliminate large ice crystals. But what did I have to lose?

I mixed up batches of my working recipe, replacing some of the sugar with increasing amounts of corn syrup. Right away, I could tell that something was

different. The custard bases were more viscous than my all-sugar recipe straight out of the fridge, and they all churned to a thick, soft-serve consistency in record time. The real revelation, however, came when it was time to taste. The batch with  $\frac{1}{3}$  cup of corn syrup was the closest thing to super-premium perfection I had ever achieved. Not only was it dense, but, most important, it showed no trace of iciness. Though I was tempted to sit in the kitchen and finish off the rest of the quart, I was too eager to get back to my desk and figure out why this solution had worked so well.

After a few exchanges with our science editor, I had my answer. First, due to its viscosity, corn syrup prevents water molecules from grouping and freezing into large ice crystals. Second, corn syrup doesn't depress the freezing point as much as sugar does. My corn-syrup ice cream froze faster in the canister and remained harder at home-freezer temperatures than did the all-sugar recipe. This stuff was virtually free of large ice crystals, and it stayed that way for nearly a week in my freezer.

After months of churning countless batches of ice cream, I had tasted sweet victory. Another thing I could count on: My ice cream machine wouldn't be showing up at a yard sale anytime soon.

## VANILLA ICE CREAM

MAKES ABOUT 1 QUART

Two teaspoons of vanilla extract can be substituted for the vanilla bean; stir the extract into the cold custard in step 3. An instant-read thermometer is critical for the best results. Using a prechilled metal baking pan and working quickly in step 4 will help prevent melting and refreezing of the ice cream and will speed the hardening process. If using a canister-style ice-cream machine, be sure to freeze the empty canister at least 24 hours and preferably 48 hours before churning. For self-refrigerating ice-cream machines, prechill the canister by running the machine for 5 to 10 minutes before pouring in the custard. For our free recipes for Triple Ginger Ice Cream and Coffee Crunch Ice Cream, go to [www.CooksIllustrated.com/aug11](http://www.CooksIllustrated.com/aug11).

- 1 vanilla bean
- $1\frac{3}{4}$  cups heavy cream
- $1\frac{1}{4}$  cups whole milk
- $\frac{1}{2}$  cup plus 2 tablespoons sugar
- $\frac{1}{3}$  cup light corn syrup
- $\frac{1}{4}$  teaspoon salt
- 6 large egg yolks

**1.** Place 8- or 9-inch-square metal baking pan in freezer. Cut vanilla bean in half lengthwise. Using tip of paring knife, scrape out vanilla seeds. Combine vanilla bean, seeds, cream, milk,  $\frac{1}{4}$  cup plus 2 tablespoons sugar, corn syrup, and salt in medium saucepan. Heat over medium-high heat, stirring occasionally, until mixture is steaming steadily and registers 175 degrees, 5 to 10 minutes. Remove saucepan from heat.

**2.** While cream mixture heats, whisk yolks and remaining  $\frac{1}{4}$  cup sugar in bowl until smooth, about 30 seconds. Slowly whisk 1 cup heated cream mixture into egg yolk mixture. Return mixture to saucepan and cook over medium-low heat, stirring constantly, until mixture thickens and registers 180 degrees, 7 to 14 minutes. Immediately pour custard into large bowl and let cool until no longer steaming, 10 to 20 minutes. Transfer 1 cup custard to small bowl. Cover both bowls with plastic wrap. Place large bowl in refrigerator and small bowl in freezer and cool completely, at least 4 hours and up to 24 hours. (Small bowl of custard will freeze solid.)

**3.** Remove custards from refrigerator and freezer. Scrape frozen custard from small bowl into large bowl of custard. Stir occasionally until frozen custard has fully dissolved. Strain custard through fine-mesh strainer and transfer to ice-cream machine. Churn until mixture resembles thick soft-serve ice cream and registers about 21 degrees, 15 to 25 minutes. Transfer ice cream to frozen baking pan and press plastic wrap on surface. Return to freezer until firm around edges, about 1 hour.

**4.** Transfer ice cream to airtight container, pressing firmly to remove any air pockets, and freeze until firm, at least 2 hours. Serve. (Ice cream can be stored for up to 5 days.)