

There's a lot of science behind that hard ice cream coating

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Many of you may be familiar with chocolate topping that forms a hard shell when poured over ice cream. It's a rather ingenious thing that certainly adds an element of fun to a simple bowl of ice cream.

While squeezing far too much out of the plastic bottle onto my dessert one evening, I started wondering just how this topping worked. Naturally, the first thing to do was check the ingredient line which consisted of "sugar, sunflower oil, coconut oil, cocoa, chocolate liquor, soy lecithin, milk powder, salt, (and) vanilla extract". The order of ingredients indicates the relative proportions of each on a weight basis, so it wasn't hard to see that sugar and two types of oils made up the major share of the formulation. The other ingredients seemed reasonable since they, along with the sugar, would contribute to the overall flavour. Soy lecithin acts as an emulsifier to keep the oils dispersed as tiny droplets in the mixture, so it also made sense to be there.

The real secret of how the shell is formed lies with the oils that are used. In Food Science jargon, oils are really just fats that are liquid at certain temperatures. Different oils have distinct temperatures at which they solidify. Sunflower oil contains a high level of unsaturated fats (that's a good thing!) and solidifies at minus seventeen degrees Celsius. Coconut oil contains a much lower level of unsaturated fats and solidifies at positive twenty-five degrees Celsius – so it's solid at room temperature. By blending these oils in the proper proportion and mixing them with the other ingredients, a product with a tailor-made solidification temperature can be formulated.

Ice cream is usually kept in a freezer at a temperature of minus twenty-two degrees Celsius or lower. However, your home freezer may be slightly warmer than this. When the liquid syrup at room temperature hits the cold surface of the ice cream in your bowl, its temperature drops rapidly. Once it goes below its solidification temperature, the hard chocolate shell forms almost magically. All you need to do then is attack it with a spoon to savour the flavour and texture.

In order to demonstrate what was happening for my own benefit, I scoped out some cooking oils at the local supermarket. Armed with a list of melting / solidification temperatures, I selected bottles of peanut oil and grapeseed oil. As its name implies, grapeseed oil is extracted from grape seeds that are a by-product of the wine-making industry. It solidifies at minus ten degrees Celsius, while peanut oil solidifies at three degrees Celsius.

I put small vials containing samples of each oil in the refrigerator and freezer, as well as leaving a set of vials on the kitchen counter at room temperature. As expected, the

peanut oil solidified in the refrigerator at three degrees Celsius while the grapeseed oil remained in its liquid form. Both oils solidified in the freezer and, of course, they stayed liquid at room temperature.

If you feel a bit adventuresome, you can actually make your own ice cream topping. Instructions are available on the Internet, which should come as no surprise. Just a quick word of advice though. Don't store your topping in the refrigerator – it may solidify on you.

Personally, I'm going to continue with the store-bought stuff. That way, I can avoid the hassle of cleaning up the oily mess that's sure to result from the do-it-yourself approach.



Once the oils are below their solidification temperature, the ice cream topping becomes a hard “shell” that you can lift off.