Miracle Thaw!

By David Shaw

You've returned home from your exciting, fulfilling, but nonetheless hectic school day. It's time to make dinner, but your Dad forgot to thaw out something from the freezer. Before you grab the phone to call for yet another delivery of Chinese takeout, reconsider your options. It's still possible to thaw your frozen meat in just minutes! How? With the incredible Miracle Thaw Defrosting Tray!

According to the television ad, "the incredible Miracle Thaw Defrosting Tray is the natural way to thaw foods quickly and perfectly every time." This amazing product, available from the television offer for only $19.99, can also be found at most wholesale clubs and discount stores for $10 or less.

The Miracle Thaw's effectiveness is demonstrated by melting ice. I refer to the product brochure: "Just for fun, take two ice cubes. Put one on the counter, and one on the Miracle Thaw. Place your hand on the tray to show it's cool to the touch. Watch how fast the cube melts on the tray while the other one remains rock hard."

In the interest of scientific investigation of the product's miraculous claims, I purchased a Miracle Thaw and tested it in a rigorously controlled environment: my kitchen. The performance of the Miracle Thaw was compared with that of other items found in the test area.

I prepared uniform test ice cubes by individually filling the wells of a plastic ice cube tray with water measured out in half-ounce amounts with a standard bulb turkey baster. Ambient temperature was monitored with a Taylor "Freeze-Guide" thermometer. All times were recorded with a stopwatch function of a Seiko 10X sports diving watch.

The first ice cube placed on the Miracle Thaw melted in 5 minutes, 35 seconds. The tray was then allowed to return to room temperature before the second trial, which took 6 minutes, 40 seconds. By comparison, an ice cube placed on the kitchen countertop was only partially melted after 20 minutes had elapsed (after which time the trial was suspended because of observer boredom).

Does the Miracle Thaw possess amazing properties? Inspection of the tray provided no surprises. It's a slab of black painted aluminum, measuring 8 x 14 in. and 3/16-in. thick. The top surface has a series of grooves spaced 1/2 in. apart, running parallel to the long axis of the tray (these grooves channel water away from the thawing materials). Four small, rounded feet on the underside keep the tray from making contact with a work surface. Nothing unusual here.

What about the claim, " the superconductive tray actually takes in the natural heat energy in the air and then redistributes it into the frozen food"? Although aluminum is a good conductor, it can hardly be called superconductive, but I'm willing to allow for marketing hyperbole. (After all, would anyone think they could get a pound of yttrium oxide ceramic superconductor for 20 bucks?)

The miraculous operating principle lies in the second part, in which heat is transferred to the frozen food. This is simply a restatement of the second law of thermodynamics, which describes the direction of heat flow.

So, the Miracle Thaw is just a heat sink. This is confirmed in the instructions, which suggest that the tray should be preheated by running it under hot water for 20–30 seconds. This provides more heat to be transferred to the thawing food.

So it works. Is it worth $20—or even $10? Is there anything else that works as well? It depends on what you have in your kitchen. I decided to test a few other items I had at hand.

A standard aluminum Silverstone-coated 12-in. frying pan (Mirro, model 4032) melted a regulation ice cube in 7 minutes, 13 seconds: which is about a minute and a half longer that the Miracle Thaw. The difference in the times, however, is most likely due to the insulating properties of the Teflon-based nonstick surface. An enameled cast-iron frying pan took 10 minutes to melt a test cube. The thermal conductivity of aluminum is about three times greater than that of iron.

The final test object yielded different results. A Calphalon aluminum sauté pan (2 quart, 8-in. diameter, model 5002) with the same thickness as the Miracle Thaw) melted test cubes in 4 minutes, 10 seconds, and 4 minutes, 16 seconds—a 1.5 to 2 minutes less than the Miracle Thaw. Is expensive yuppie cookware the only other solution? A cheap knockout anodized aluminum omelet pan from a discount store worked just as well, melting cubes in less than 4.5 minutes.

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PHOTOS BY MIKE DIESELSKI

It doesn't take anything more than common kitchen items to test the claims made by Miracle Thaw.

So, next time you forget to defrost that petit filet mignon for dinner, never fear. Just slap it on any aluminum pan (preheated if you're really hungry), and watch the miracle of thermodynamics do the work for you.

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Can It Take the Heat?

Thermodynamics of Thawing

Some fundamental chemistry is at work here. Not all objects heat up and cool down at the same rate. The amount of energy required to raise the temperature of a certain amount of substance by 1 °C is called the specific heat capacity. Aluminum has a relatively high specific heat capacity, at least twice that of iron, copper, or zinc. This means that twice the amount of heat would be given off for each degree of temperature drop in aluminum as compared to iron, copper, or zinc.

Another factor in this device is the color. You may remember that black objects tend to absorb heat very well. The reverse is also true. Black surfaces tend to give off heat very well. This is called emissivity. Black surfaces tend to give off heat at a higher rate than do other surface colors.

Finally, the second law of thermodynamics ensures that heat will be transferred from the warmer body to the colder. The second law states that entropy of a system and its surroundings increases. Entropy is increased by heating, which increases the motion and the amount of disorder in the molecules.

Miracle Thaw seems to take advantage of these factors in its design. But, is it unique? A miracle? Or just good chemistry?