

INFORMATION ON MICROWAVE COOKING, SAFETY, NUTRITION, ETC.

Compiled by Bryanna Clark Grogan

***IF YOU ARE AFRAID OF USING A MICROWAVE OVEN, PLEASE READ THE FACTS BEFORE YOU THROW YOURS OUT!** *a microwave saves 80% of the energy that would have been used in a regular oven! It can also save you lots of time with steps in a recipe-- like sweating and steaming vegetables, making sauces, etc.. And it can actually preserve vitamins in vegetables, as you can cook many veggies with NO water at all (the nutrients are often lost in the cooking water). The color is also preserved.*

*Most of the doctors and scientists whom I respect use microwave ovens in their cooking: Neal Barnard, John McDougall, Joel Fuhrman, and many others.
Cheers, Bryanna*

From the McDougall

Newsletter: <http://www.nealhendrickson.com/mcdougall/031100pufavoritefive.htm>

Great discussion here: <http://www.chowhound.com/topics/474110>

Ask Nancy

*Earthsave Past President,
Nancy Callan, answers your
veggie related questions*

Earthsave Canada Newsletter July/August 2007

http://www.earthsave.ca/files/2007_0708.pdf

Q: Microwave cooking is so convenient. Do we really have to give it up for health reasons?

A: Ever since I realized how many fewer pots and pans I need to wash when I cook with a microwave and how quickly I can bake a potato, I've been a fan of the microwave. But lately, I've been inundated with anti-microwave propaganda. We are told that microwaving causes free-radicals to form, damages proteins and causes nutrient and antioxidant loss. I've even heard that watering plants with microwaved water kills them! With all that bad news,

should we be throwing out our microwaves?

We have to put these claims in context. What if I told you that I had discovered that a significant number of women who use the internet personals have been stalked by men they've met there? And what if I had the statistics, names and interviews to back up my assertions? Would you not want me to also tell you how these statistics compare with the number of women who have been stalked by men they met in more traditional ways? Would you not want to know whether more women are stalked by men they meet in bars? Or would you just instantly swear off the internet personals?

The same goes for the microwave. We have to look at how microwave cooking compares to conventional cooking.

*Let's start with the formation of free-radicals. In fact, all cooking increases the likelihood of reactions with oxygen and the formation of free-radicals, particularly in the case of meats. By the time you eat the food you've cooked, though, the free radicals will have reacted away long ago. They will have created some mutagens, but according to a review paper published in *Mutagenesis* (one of the foremost scientific journals), microwaving results in substantially lower levels of mutagens than most conventional cooking. Using a microwave oven to reheat meat, for example, resulted in mutagen levels in meat 50 times lower than reheating by any other method. You may not eat meat, but the point is that microwaving is no more likely to produce mutagens than other cooking methods, and much less likely to do so than frying. The free radicals that we really need to be concerned about are those formed in our bodies during normal metabolism. That's why it's wise to include fresh fruit and vegetables with their antioxidant properties in abundance in our diets.*

How about the claim that microwaving denatures (or damages) proteins? All cooking denatures proteins and there is no notable difference in protein retention between microwave and conventional cooking. Furthermore, denatured protein, while slightly slower to be digested and absorbed, still retains full nutritional value with regard to amino acid composition.

How about antioxidant loss? Same story. All cooking results in the loss of antioxidants – good reason to include more raw foods in the diet.

And how about the loss of other nutrients? In recent peer reviewed studies, vitamin C retention was found to be higher in microwaved foods than in conventionally cooked equivalents. Both beta-carotene and B vitamins have also been shown to fare better in microwave cooking, more than likely because of the shorter cooking times.

What about the claim that microwaved water kills plants? The easiest way to debunk that one is to try it yourself.

There is no question that a microwave oven with a door that is not properly closing is dangerous, since microwaves will leak out and, if you're close enough, cook you as well as the food! But, other than that, there are no good reasons to throw out your microwave and many reasons to cook with it more often.

It takes roughly three times as much energy to cook in a conventional electric oven and seven times as much to cook in a gas oven as it does to do same amount of cooking in a microwave oven. The global warming implications are obvious. We have to get serious about reducing our ecological footprint and cooking more efficiently is one simple way.

Should We Use Microwaves?

<http://www.newgreenbasics.com/articles/should-we-use-microwaves/>

Are Microwaves Safe?

By Kate Heyhoe (author of [Cooking Green: Reducing Your carbon Footprint in the Kitchen](#))

A Reader's Question...

Hi Kate,

I admire you so much, and use many, many of your recipes and ideas. I have a question and do not mean to be disrespectful, but really want to understand. Do you really use the microwave as much as it appears? Do you think we should use microwaves? Being an Austin gal, I figure I can straight out ask you. I actually bought my first microwave from a small chef's shop in Austin in 1986, one of those huge Amana Radar Range monsters, bought the bacon fryer, Nordicware bundt pan, the whole shebang. Dyed my food brown with caramel coloring—you know what I mean 😊)

But I haven't used microwaves for many years now because of green information that they destroy nutrients in foods and are unhealthy in our environments. I didn't even feel comfortable heating my Kashi frozen dinners, although I think they are in PETE 1 containers. I want to be green and healthy. Please let me know what you think.

Most sincerely, and with great gratitude for all I have learned from you,
CB

Reference Librarian



Dear CB,

Thanks for the kind words. This passage is from my book and relates to radiation heat. It speaks to the issue of microwaves, one particular wave form of radiation, which is all around us, and for more info, seek out the works of Harold McGee.

Radiation heat transfers by electromagnetic waves (not the same thing as nuclear radiation). More accurately, thermal radiation happens when atoms and molecules release energy they've absorbed in the form of infrared waves. When the waves hit a food's atoms, they spark movement within those atoms. They work without a medium (like a pan or liquid) to come between the food and the heat source. The energy literally beams into the food. Microwave ovens, for instance, agitate water molecules. All things emit radiation constantly, but mostly at levels so low they're inconsequential. When cooking at higher temperatures, like those of a barbecue grill, broiler, or very hot oven, infrared radiation generates waves that are potent enough to cook foods; however, at lower temperatures, conduction and/or convection methods are more efficient ways to cook. (The spectrum of radiation isn't just about cooking. Starting at the lower end of the scale, your car radio emits weak waves; and higher up, microwave towers relay cell phone calls, and microwave ovens heat frozen dinners. On the upper end of the spectrum, ultraviolet waves

cause sunburns, and x-rays show us our bones.) Not all materials absorb radiation in the same way, and radiation waves themselves differ in their capacity to generate heat. For more details on the infinite nuances of radiation, dial up curiouscook.com and explore the works of Harold McGee, the cook's authority on kitchen science.

—Kate Heyhoe

Also from Kate Heyhoe on energy saving:

*"**Microwave Ovens:** Not only do they cook quicker, but microwave ovens use about half the energy of conventional electric ovens. and they don't heat up the house, keeping summer air conditioning bills down."*

Read

more: <http://www.globalgourmet.com/food/kgk/2001/0501/kgk050501.html#ixzz1fKfHeTbZ>

This is a great article explaining where the myths about microwave came from:

Fact vs. fiction.(Microwave Myths)

From: Nutrition Action Healthletter | Date: 4/1/2005 | Author: Schardt, David

http://cspinet.org/nah/04_05/microwavemyths.pdf

"We are increasingly concerned about the damage done to food in the home microwave oven," the editor of an upstate New York newspaper e-mailed Nutrition Action Healthletter last November.

"According to the sources we find online and elsewhere, microwaving food creates carcinogens, and in parts of Europe, health authorities have banned microwaves as dangerous to human health."

It's not clear why so many people are uneasy about microwave ovens. "Maybe it's because there's no obvious reason why the food cooks," offers physicist Louis Bloomfield of the University of Virginia in Charlottesville, who answers questions about microwaves at howthingswork.virginia.edu.

And those questions are becoming more urgent, as charges and rumors speed across the Internet. Here's how to separate microwave fact from fiction.

It all started with Hans Hertel.

The Swiss food chemist and seven fellow vegetarians confined themselves to a hotel for two months in the late 1980s. There, they consumed milk and vegetables prepared in the microwave oven and in other ways.

Hertel emerged with an astonishing pronouncement. Eating microwaved milk and vegetables caused changes in the men's blood that "appear to indicate the initial stage of a pathological process such as occurs at the start of a cancerous condition."

Hertel didn't actually find that microwaved food caused cancer. And his "study," which no researchers have tried to reproduce, was never peer-reviewed or published in a scientific journal.

"Without knowing more about how he conducted his study, what he measured, how he measured it, and what he found, it's impossible to even begin to evaluate his findings," says Barry Swanson, a food scientist at Washington State University in Pullman.

Hertel has dropped out of public view. So has William Kopp, described only as a "U.S. researcher," who wrote an article in 1996 claiming that Cold War research in the Soviet Union had proven the dangers of microwave ovens.

"People who ingested microwaved foods showed a statistically higher incidence of stomach and intestinal cancers, plus a general degeneration of peripheral cellular tissues and a gradual breakdown of the function of the digestive and excretory systems," Kopp wrote.

The Soviet research was never published and the institute where it was conducted, in what is now the Republic of Belarus, no longer exists. (The former Soviet Union may have banned microwave ovens for a short period, but no countries ban them today.) Kopp himself reportedly changed his name and vanished, believing that the appliance industry was out to persecute him.

While Hertel and Kopp are no longer around, their unsubstantiated charges are all over the Internet.

"The prolonged eating of microwaved foods causes cancerous cells to increase in human blood," says "10 Reasons to Throw Out your Microwave Oven," an article by Joseph Mercola, an Illinois alternative-medicine physician who operates what he says is the "#1 Natural Health Site" on the Internet (www.mercola.com).

Foods cooked in microwave ovens are "a recipe for cancer," adds medical journalist Simon Best on his Electromagnetic Hazard and Therapy Web site (www.em-hazard-therapy.com).

Hertel and Kopp aside, here's what we know about microwave ovens.

Inside the Microwave

"A microwave oven heats food using radio waves that are almost identical to radar," says Jim Felton of the Lawrence Livermore Radiation Laboratory in Livermore, California.

The frequency used in microwave ovens, about 2,500 megahertz (MHz), is more powerful than the frequency that's used to transmit radio, television, and cell phone signals. But it's thousands of times weaker than ultraviolet light, visible light, and X-rays and millions of times weaker than the gamma radiation that's used to irradiate some foods.

"While X-rays, gamma radiation [though not irradiated food], and even sunlight can cause cancer, microwave radiation cannot because it simply doesn't pack enough power to damage your DNA," says Gary Zeman of the Health Physics Society in McLean, Virginia. The Society is a nonprofit scientific organization that promotes radiation safety.

What 2,500 MHz microwaves can do is get absorbed by the water, fats, and sugars in food. That generates heat, which cooks the food. Once the oven is turned off, it produces no more microwaves. And those that it did produce are long gone.

"The lifetime of microwaves in the oven is something like millionths of a second," says physicist Louis Bloomfield.

Cancer

Forget the charges floating around the Internet. The "evidence" that microwaved foods cause cancer boils down to Hans Hertel's and William Kopp's claims.

"There is nothing solid," says Lawrence Livermore's Jim Felton, who is also associate director for cancer control at the Cancer Center at the University of California, Davis.

That may explain why scientists haven't spent time and money looking for a link. "I can honestly tell you that I have never seen a valid scientific study--and I pay

attention to most of the cooking research out there--that has given us reason to test whether microwaving food could cause cancer," says Felton.

"In fact, my research suggests just the opposite."

Grilling or frying meat and poultry can create heterocyclic amines, which may cause cancer. When Felton and his colleagues briefly microwaved meats and drained off the juices before grilling, most of the precursors of those potential carcinogens were lost along with the juices. (1)

"I generally recommend that patients microwave their meats for one to five minutes and discard the juices before grilling," says researcher Cyndi Thomson of the Arizona Cancer Center at the University of Arizona in Tucson.

Nutrients

If you microwave your food, "you're zapping away nutrients and risking your health," charges physician Joseph Mercola, who recommends that consumers get rid of their microwave ovens and eat at least a third of their food raw.

"Actually, microwaving retains more nutrients than other forms of cooking, if you don't use a lot of water and don't overcook the food," says food scientist Barry Swanson.

"For some reason, people think heat breaks down vitamins, but most vitamins are really very stable to heat. Nutrients are mostly lost into the water, and there's no reason to add water to vegetables or anything else that already contains a lot of water."

Too much water was apparently the problem in a 2003 study in which European researchers reported that microwaving broccoli in a bowl of water destroyed nearly all of several flavonoids, while steaming had only a mild effect on them. (2) (Flavonoids are plant compounds that may help protect against heart disease and cancer, though the evidence is scanty.)

That research isn't relevant to household microwaving, says Swanson. "Basically, the researchers added far too much water and microwaved the living daylights out of the broccoli."

Wraps, Containers, & Packaging

How safe are plastic wraps, frozen-food trays, and "microwave-safe" containers

and packaging?

* Plastic wrap. E-mails widely circulating around the Internet warn that plastic wraps release the carcinogen dioxin when microwaved.

"It's a chemical impossibility because the precursors for dioxin are not in the plastic wrap," says George Sadler, a professor of food packaging at the National Center for Food Safety and Technology in Summit, Illinois. The center is a consortium of scientists from academia, the Food and Drug Administration, and the food industry.

"We are not aware of any plastics that yield dioxin as a breakdown product, absolutely none," adds Kristina Paquette of the FDA's Office of Food Additive Safety in College Park, Maryland.

"I've seen another e-mail recently warning against using plastic wrap because of the phthalates it supposedly produces," says Sadler. (Phthalates make plastic flexible.) "Manufacturers quit using those many, many years ago."

While plastic food wrap hasn't been approved by the FDA for use in microwave ovens, says Paquette, "as long as the wrap doesn't touch the food while it's cooking, there's little chance of any chemicals migrating from the wrap into the food."

Besides, she notes, "there are no components of plastic wrap that are considered carcinogenic in humans."

* Containers & packaging. "If it's food you buy in a store for microwaving, like a frozen dinner, I would be 100 percent confident in using the container it came in," says Paquette. "But remember, those are usually approved for only one use, because the polymer in the packaging can start to break down during a second use in the microwave."

"The FDA has a rigorous protocol that manufacturers of food packaging must execute every time they have new packaging components they want to use," says George Sadler. "Companies must measure how much, if any, of the packaging materials migrate into the food when they're heated in the microwave. Then the manufacturer has to undertake a rigorous toxicological evaluation to show that those levels are safe."

("Safe" means that any packaging material that ends up in the food is at less than

one-hundredth the lowest level that causes harm in animal studies.) The company has to test for cancer, genetic damage, and any impact on reproduction or development.

"The FDA's testing guidelines for microwave containers pretty much cover the gamut of anything anyone would do with something in a microwave," adds Paquette, "because everybody wants to make sure they have a cushion of safety there."

Do those safeguards extend to reusable plastic containers you buy at the supermarket? Yes, as long as they say "microwave safe," which means they've been tested for up to 240 hours in the microwave. (While other containers might be as safe, their components haven't been tested.)

* Heat susceptors. Ever wonder why microwave popcorn bags are clearly marked "This Side Up" or "This Side Down"? The bottom of the package contains a metallicized surface that absorbs microwaves and becomes hot enough to pop the popcorn.

Can that "heat susceptor" generate enough heat to trigger the release of chemicals like packaging adhesives into the food? No, says the FDA's Paquette.

"If you look in a popcorn bag, you don't actually see the silver-colored heat susceptor," she explains. "It's sealed inside a pouch in the bag itself." That helps to dramatically reduce the migration of chemicals into the popcorn oil, says Paquette.

Radiation Leaks

Do microwave ovens leak radiation?

"The FDA discontinued field testing them in the early 1980s, in part because of budget cutbacks and in part because few ovens didn't meet federal safety standards," says George Kraus of the agency's Center for Devices and Radiological Health.

In 2000, Health Canada (the Canadian equivalent of the Department of Health and Human Services) tested 60 new microwave ovens and 103 used ovens. None of the new ones, and only one of the used ones, exceeded Canada's stringent leakage limits, which are similar to the U.S. limits. The one oven that failed was 23 years old.

"Leakage of microwaves can only occur if the cooking chamber--including the

metal grid over the front window and the seals around the door--has holes in it," says the University of Virginia's Louis Bloomfield.

And even in the unlikely event that your microwave does leak, you're not going to be showered with radiation. Microwaves lose intensity rapidly as they spread out. By the time they've traveled a foot or so from a small leak, they've effectively disappeared.

(1) Food Chem. Toxicol. 32: 897, 1994.

(2) J. Science Food Agric. 83: 1511, 2003.

Safe Microwaving

Cooking & Reheating

- * Arrange food evenly in the dish and add some liquid if needed.

Cover with a loose lid to let any steam escape (If you use plastic wrap, make sure it doesn't come in contact with the food.)

- * Don't cook large cuts of meat on high power (100%). Use medium power (50%) and a longer cooking time, so the heat can reach the center without overcooking the outer areas.

- * If your microwave doesn't have a carousel, stir or rotate the food midway through the microwaving time.

If you're partially cooking food in the microwave before you finish it on the grill or in a conventional oven, transfer the microwaved food immediately. Warm, partially cooked food is a breeding ground for bacteria.

- * Use a food thermometer or the oven's temperature probe to verify that meat, poultry, and casseroles have reached a safe temperature. Place the thermometer in the thickest area of the meat or poultry--not near fat or bone--and in the innermost part of the thigh of whole poultry. Check in several places to be sure red meat reaches 160[degrees]F, poultry reaches 180[degrees]F, and egg casseroles reach 160[degrees]F. Fish should flake with a fork. Leftovers should reach 165[degrees]F.

- * Food continues to cook after the microwave is turned off, as heat flows from hotter to cooler regions. So allow dense foods like meat, poultry, quiche, and

casseroles to stand for five minutes before you check the internal temperature. Foods that aren't dense--cut vegetables, bread, soup, and beverages, for example--don't need to stand.

Don't cook whole, stuffed poultry in the microwave. The stuffing might not reach the temperature needed to destroy harmful bacteria.

- * Heat ready-to-eat foods like hot dogs, fully cooked ham, and leftovers until they're steaming hot.

Defrosting

- * Remove food from its packaging before you defrost it in the microwave. Foam trays and plastic wraps can melt, which can cause potentially harmful chemicals to migrate into the food.

- * If you've defrosted meat, poultry, egg casseroles, or fish in the microwave, cook it immediately.

Cookware, Containers, & Wraps

- * The containers you use for cooking and reheating should be labeled "microwave safe." Thick, non-decorative glass is also safe.

- * "No way should you cook or reheat food in a yogurt, margarine, or dessert topping tub," says the FDA's Kristina Paquette, "because they haven't been tested or approved." They can warp or melt, which can cause chemicals--like the plasticizers that make the containers flexible to migrate into the food.

- * It's okay to use wax paper, cooking bags, parchment paper, microwave-safe paper plates, and white microwave-safe paper towels (the dyes used in non-white paper towels haven't been approved for use with food in the microwave).

- * Never use thin plastic storage or grocery bags (they can melt), brown paper bags or newspaper (both sometimes contain bits of metal and the bags' seams could contain glue), or aluminum foil (it can cause dangerous arcing).

Source: Adapted from U.S. Department of Agriculture

(www.fsis.usda.gov/factsheets/cooking_safely_in_the_microwave/index.asp).

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Microwave doesn't zap nutritional benefits

http://www.heraldextra.com/lifestyles/article_0685bd79-f1c7-5482-bddf-9cc2c97d45c5.html

By Washington Post

Q. *A magazine article I read about cooking fresh broccoli strongly advised against microwaving the vegetable. It said nutritional and health benefits are lost in this cooking method. Is this true? Is steaming broccoli better?*

How about other fresh vegetables (Brussels sprouts, cauliflower, asparagus, etc.)? Microwaving is the only option for cooking vegetables at my office, unless we want to eat them raw.

I don't like raw broccoli or cauliflower.

A. This warning has been circulating ever since the November 2003 issue of the Journal of the Science of Food and Agriculture reported a study by F. Vallejo et al., a group of researchers at Spain's Center for Edaphology and Applied Biology in Murcia. (Edaphology is the study of soils and their effects on plants and other organisms.) To many people, this study seemed to indicate that microwaves kill the nutrients in broccoli and presumably in other vegetables as well.

The researchers cooked broccoli florets in four ways: microwaved, steamed, boiled and pressure-cooked. Among other things, they measured the percentage of healthful flavonoids removed from the vegetable by each cooking method. Flavonoids are phenolic compounds that are widely distributed in fruits and vegetables. In addition to giving these foods their colors, they behave as antioxidants; that is, they destroy the free radicals that can damage our DNA, possibly leading to cancer, stroke and other diseases. Flavonoids are therefore among the "good guys" in our foods.

The Spanish researchers reported that microwaving broccoli removed 97.2 percent of its flavonoids, boiling removed 66.0 percent, steaming removed 11.1 percent and pressure-cooking removed 8.8 percent.

Almost instantly after the publication of this research, a London-dated news story trumpeted, "Microwave blasts out broccoli's health benefits." An article in Prevention magazine was headlined "Nuking Broccoli a No-No." And dozens of other media stories carried the study's purported finding that "microwaving destroys foods' nutrients."

Obviously, then, we should not microwave our vegetables if we want to retain their

nutrients. A scientific study said so. Right?

Wrong. The study showed no such thing. In fact, as I'll show, microwaves can be the best way to cook vegetables to ensure minimal loss of nutrients.

Findings, Shortcomings

I obtained a copy of the original research report, which is hardly a document to be skimmed by the uninitiated reader. But I was able to analyze the experiments and determine exactly what the study did and did not prove. Here's what I found:

- The researchers measured the before-cooking and after-cooking amounts only of total flavonoids and two flavonoid derivatives. However, they did not analyze the many other kinds of antioxidants or for vitamins or minerals, so generalizing these results to all nutrients is completely unjustified.
- During microwaving, pressure-cooking and boiling, the broccoli was immersed in water, while for steaming the broccoli was placed on a rack above boiling water. The researchers reported that flavonoids in the broccoli were diminished to some extent by all four cooking methods. This is only to be expected, because all flavonoids are soluble in water. As borne out by the Spanish data, exposure to steam removes relatively little water-soluble material, compared with boiling in water.
- The microwaving was done at 1,000 watts for five minutes, boiling for five minutes, steaming for 3 1/2 minutes and pressure-cooking (at an unspecified pressure) for three minutes. According to the report, these conditions were selected by "an informal testing panel consisting of three trained people, who decided the best combination among different options for each of the four treatments," whatever that means. These seemingly arbitrary sets of conditions cannot be construed as universal characterization of the four cooking methods. In actual kitchen practice, the microwave power, pressure-cooker pressure, cooking times and amounts of water will vary widely, affecting the amounts of flavonoids extracted. One cannot simply say that "boiling does this" or "microwaving does that."

Because the Spanish study has been misunderstood and misreported, it has triggered undue mistrust of microwaving. But the Spanish research results have nothing to do with the effects of microwaves. As far as anyone knows, microwave radiation itself does not destroy or affect antioxidants, vitamins, minerals or any other nutrients in our foods.

A microwave oven is simply a high-tech way of heating food, and it is heat,

whether from burning fuel, an electric heating element or absorbed microwave energy, that changes the properties of food in ways we call cooking. The more heat -- that is, the higher the temperature and the longer the food is held at that temperature -- the more cooking changes take place. And all cooking inevitably causes a certain amount of nutrient loss. For example, the B and C vitamins and various antioxidants, including flavonoids, not only leach out into the cooking water but also are unstable to heat.

Water-Free Cooking

The moral, then, is that we should cook our vegetables for as short a time and with as little water as we can get away with. We can't do without heat in cooking, but we can reduce the amount of water.

Well, how about using no water at all? After all, the vegetables are already about 90 percent water.

I have experimented with the water-free microwave cooking of broccoli, cauliflower and Brussels sprouts, with excellent results. Here is the procedure: Rinse the vegetables in cold water and dry with a clean kitchen towel. Place the vegetables in a small, covered, microwave-safe container. Do not add water. Zap at full power for three to four minutes or until vegetables are tender. Do not overcook --- the vegetables will have cooked in their own steam.

Robert L. Wolke (www.robertwolke.com) is professor emeritus of chemistry at the University of Pittsburgh. His latest book is "What Einstein Told His Cook 2, the Sequel: Further Adventures in Kitchen Science" (W.W. Norton, 2005).

NOTE FROM BRYANNA: I use NO water when microwaving broccoli and it is delicious!

I read that microwaving broccoli destroyed all of its antioxidants. Should I stop using my microwave oven?

Posted Oct 01 2008 8:12pm

<http://www.wellsphere.com/exercise-article/i-read-that-microwaving-broccoli-destroyed-all-of-its-antioxidants-should-i-stop-using-my-microwave-oven/390597>

No. The researchers in this study cooked the broccoli in 2/3 cup of water for 5 minutes at full power (*Journal of Science in Food and Agriculture*, November

2003). Antioxidants were destroyed by the long cooking in water at a high temperature, not by microwaves. The study authors noted that it's the length of time vegetables are exposed to hot water that determines the amount of water-soluble nutrients lost, whether the cooking is done in a microwave oven, steamer, pot or pressure cooker. Unfortunately, newspaper reporters misinterpreted the study and scared many people away from their microwave ovens. If you follow the standard instructions for microwaving vegetables, using just a tablespoon or two of water for a short time, the effect is similar to steaming and antioxidant loss will be minimal.

Microwave and Vegetables

By Dr. James J. (Jay) Kenney, PhD, RD, FACN

[Home](#) > [Ask the Experts](#) > [Microwave and Vegetables](#) <http://www.pritikin.com/askexperts/002.shtml>

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Question: “Does microwaving destroy the nutrients in vegetables”

Answer: You’re probably asking because of a recently published study in the *Journal of the Science of Food and Agriculture* that found that microwaved broccoli lost many of its flavonoids, substances in fruits and vegetables with anti-oxidant properties, when the broccoli was microwaved.*

But other studies have found just the opposite. Microwaving created the least nutrient loss of common cooking methods. **

Heat from any sort of cooking often does lower the levels of some vitamins, but water exposure is another major factor. If vegetables are prepared in too much water, some of the nutrients leach out and get thrown away with the water, and that’s very likely what happened in this latest study on broccoli. The broccoli was cooked in 10 tablespoons of water. That’s a lot of water.

Plus, the broccoli was cooked far longer than most people would normally microwave it. Basically, the higher the temperature, the longer the time at that higher temperature, and the more water used, the greater the nutrient losses.

If you use minimal water – frozen vegetables don’t even need extra water – and you don’t overcook your vegetables, you can use your microwave and get most of your nutrients, too.

* Journal of the Science of Food and Agriculture, 2003; 83: 1389.

** Plant Foods For Human Nutrition, 2002; 57: 83.

October 17, 2006

Really?

The Claim: Microwave Ovens Kill Nutrients in Food

By ANAHAD O'CONNOR

http://www.nytimes.com/2006/10/17/health/17real.html?_r=1

THE FACTS They are a staple in kitchens everywhere, but for about as long as microwave ovens have been around, people have suspected that the [radiation](#) they emit can destroy nutrients in food and vegetables.

According to most studies, however, the reality is quite the opposite. Every cooking method can destroy [vitamins](#) and other nutrients in food. The factors that determine the extent are how long the food is cooked, how much liquid is used and the cooking temperature.

Since microwave ovens often use less heat than conventional methods and involve shorter cooking times, they generally have the least destructive effects. The most heat-sensitive nutrients are water-soluble vitamins, like folic acid and vitamins B and C, which are common in vegetables.

In studies at [Cornell University](#), scientists looked at the effects of cooking on water-soluble vitamins in vegetables and found that spinach retained nearly all its folate when cooked in a microwave, but lost about 77 percent when cooked on a stove. They also found that bacon cooked by microwave has significantly lower levels of [cancer](#)-causing nitrosamines than conventionally cooked bacon.

When it comes to vegetables, adding water can greatly accelerate the loss of nutrients. One study published in The Journal of the Science of Food and Agriculture in 2003 found that broccoli cooked by microwave — and immersed in water — loses about 74 percent to 97 percent of its antioxidants. When steamed or cooked without water, the broccoli retained most of its nutrients.

THE BOTTOM LINE Microwave ovens generally do not destroy nutrients in food. scitimes@nytimes.com

Are microwaves dangerous?

We uncover the truth about the alleged impacts on health

http://www.consumerreports.org/cro/appliances/kitchen-appliances/microwave-ovens/microwave-safety-9-06/overview/0609_microwave-safety_ov.htm



COOKING UP MYTHS Safety is essential when you use a microwave, but some concerns about these appliances are nothing more than urban legends.

A Web search of urban-legend purveyors reveals a treasure trove of rumors and myths related to microwave ovens. Have you heard the one about the [elderly woman nuking her just-bathed pet](#) in order to dry it? But other stories go beyond the bizarre and probably have you questioning how healthy it is to cook with one of these omnipresent appliances. One oft-told tale, for instance, details the [perils of microwaving food in plastic containers](#).

Given the likelihood that you have a microwave in your home—nearly 44 million microwaves were sold from 2004 to 2006 alone—and with the freak-out potential of all this Internet innuendo, it's understandable that you might have questions about the alleged impact that microwaves have on your health. We've cut through the clutter for you below. After you get the lowdown, be sure to read our [microwaves report](#). You'll get [expert buying advice](#) as well as [Ratings](#) (available to [subscribers](#)) of the latest models. And look for our upcoming report on microwaves in the February 2007 issue of *Consumer Reports*.

Click for answers:



[Microwaving with plastic releases cancer-causing dioxins into food.](#)

False. A popular Web rumor wrongly contends that plastics contain dioxins, which are a likely carcinogen. Some plastic wraps may, however, contain chemical plasticizers that add flexibility, and those can migrate

into food when heated. The risks associated with consuming trace amounts of plasticizers are small. But more research is needed, so leave space between plastic wrap and food, or use a paper towel to cover your food instead. (Note that plastic containers not approved for microwave use could warp and leak hot food.)

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Microwaves can leak radiation.

True, though it's unlikely. While the Food and Drug Administration does allow for some leakage (at levels far below any known to cause harm), it also requires that microwaves stop producing radiation once the door is opened. Bottom line: Don't operate a microwave if the door is broken.

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Microwave radiation can cause cancer.

False. Intense microwave radiation can cause burns, temporary sterility, and cataracts, since it can heat body tissue just as it heats food. But you would have to be exposed to levels that are much higher than the allowable limits for leakage on newer ovens.

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Microwaves can affect pacemakers.

Probably false. Since 1980 pacemakers have been manufactured with shielding, which should prevent electronic interference.

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Microwave cooking sucks the nutrients out of food.

False. Microwave-cooked food may retain vitamins and minerals better than stove-top-cooked food because the microwave zaps food quickly and without much water. The longer you cook food in liquid, the more nutrients may seep out, which is fine for soups and stews, but it's a problem if you discard the liquid before eating. One study found that spinach retained all of its folate when cooked in a microwave, compared with 77 percent when cooked on a stove.

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Heating water in a microwave could cause the liquid to violently erupt.

True. Although burns and other injuries are rare, there have been reports of those injuries after plain water was heated past the boiling point and erupted out of its

cup. When making hot drinks in a microwave, add sugar, tea, or coffee to the water before heating it and wait a minute before you remove the cup from the oven.

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The quiz first appeared in the October 2006 issue of [Consumer Reports on Health](#).