

Microwaves and Nutrition

Science-based medicine is a concept that is larger than the analysis of any specific topic. It is, essentially, an approach to answering health and medical questions, one that involves careful and thorough analysis of scientific evidence within a framework of understanding of critical thinking, mechanisms of self-deception, and the



process of science itself. We feel this creates the best opportunity to arrive at tentative conclusions that are most likely to be reliable.

We often address claims that are the result of a very different process. In fact there seems to be a thriving subculture on the internet that emphasizes the naturalistic fallacy, fear of anything technological (including irrational chemophobia), paranoia about the government, corporations, and mainstream medicine, and embracing anything perceived as being contrarian, exotic, or radical. To this subculture science is either the enemy, or it is used (as [Andrew Lang famously quipped](#)) like a drunk uses a lamppost, for support rather than illumination. This approach is simultaneously gullible and cynical.

It is no surprise that those who follow this fatally flawed approach consistently arrive at the wrong conclusion, especially on any controversial scientific topic. The two most prominent netizens following this approach, in my opinion, are Joseph Mercola and Mike

Adams. I do believe, however, that there is another hoping to join their ranks – Vani Hari, who blogs under the name Food Babe. (Mark Crislip also [blogged about her here](#).)

She first came to my attention as a result of her campaign to pressure Subway to [remove the benign ingredient azodicarbonamide](#) from their bread, dubbing it the “yoga mat” chemical. Looking into her writings, however, was like peeling back a small crack in a wall and finding, just under the surface, a vast infestation of termites. Unsurprisingly, for example, she is anti-vaccine. In her blog post attacking the flu vaccine she [summarizes the naturalistic-antiscience approach](#), described above, quite well.

One of the goals I made in starting this blog back in April, was to uncover and unveil information that isn't readily available for public consumption on true health, nutrition and wellbeing. I want this blog to help you break free from the “conventional” wisdom that the food industry, government agencies, pharmaceutical and medical community try to push because of greed or corruption that is ultimately harmful to you and your family.

Vaccines are not my topic for today, however, but rather the effects on nutritional content from microwaving food. There have been anti-microwave activists as long as there have been microwaves, it seems simply because it is a new-fangled technology that uses radiation to cook food. It is a perfect villain for the naturalistic-antiscience crowd.

Hari warns her readers to [throw out their microwaves](#), writing:

Live, healthy, and nutritious foods can become dead in a matter of seconds when you use a microwave. We are the only species on the planet that destroys the nutrient content of our food before eating it. A study published in the November 2003 issue of

the *Journal of Science of Food and Agriculture* found that broccoli cooked in the microwave lost up to 97 percent of its antioxidant content.

The first claim above is that food is supposed to be alive, and that cooking it “kills” the food. This is pure naturalistic nonsense. By the time certain foods, like meat, hit your table, even if it is raw, any cells in the food are dead. The cells in fruits and vegetables start dying after they are picked. Anything frozen will also be dead. Some things alive in the food, you probably don’t want there, such as bacteria that cause spoilage. The more important point, however, is that having living cells is irrelevant to nutrient content.

The core claim she is making is also that when we cook food, especially with a microwave, we “destroy” the nutrient content. Hari is one who will quickly cite a scientific study if she thinks it supports her side, but she often completely misinterprets the studies she cites. She is looking for support, not insight, and gives no evidence of making an effort to truly understand the science she references.

Before I take a look at specific studies, including the broccoli study Hari references, a little background is in order. Cooking actually has a complex effect on the nutrient content of food. In general heating food, by any method, can break down vitamins and other nutrients. The variables that are relevant to this process are the intensity of the heat, the duration of heating, and contact with water. The latter seems to be the most important variable.

Boiling vegetables, therefore, has the most dramatic effect on their nutrient content, especially on water-soluble vitamins. The water leeches out the nutrients, which then evaporate with the water. [An extensive study of various cooking methods](#) on the antioxidant

nutrient content of 20 vegetables found:

According to the method of analysis chosen, griddling, microwave cooking, and baking alternately produce the lowest losses, while pressure-cooking and boiling lead to the greatest losses; frying occupies an intermediate position. In short, water is not the cook's best friend when it comes to preparing vegetables.

That's right – microwaving is among the best methods of cooking in terms of preserving nutrients. Hari's conclusion, therefore, is the exact opposite of what the science says.

What about the study she references? That study, "[Phenolic compound contents in edible parts of broccoli inflorescences after domestic cooking](#)", added water to the vegetables during microwaving. In essence, they were boiled using the microwave, so the results were more similar to boiling vegetables. Other studies looking at microwaving without added water demonstrate minimal nutrient loss. The advantage of microwaving is shorter cooking time – just don't add water to your vegetables before putting them in the microwave.

Cooking, in fact, can increase the amount of certain nutrients in certain vegetables, such as [lycopene in tomatoes](#) and [carotenoid levels in carrots](#).

Also, Hari fails to consider bioavailability. The nutrient content of food is only half the equation, we also need to know how much we can extract from the food through digestion. This is the main advantage of cooking, it weakens cell walls and breaks down proteins so they are easier to digest, enabling us to extract more nutrition. In fact, [studies show that cooking broccoli increase the bioavailability](#) of certain nutrients.

The bottom line is that cooking has complex but net positive effects on how much nutrition we get from our food, and that microwaving is one of the best methods for cooking (in terms of nutrient content). Hari's advice to readers is therefore exactly wrong, as is her interpretation of the scientific literature.

Her other claims about microwaves are equally misleading, and venture into the truly bizarre. She claims that microwaving food releases carcinogens into the food. She repeats the dioxin claim, which is [nothing but an urban legend](#).

The kernel of truth is that you should not heat food, by any method, in plastics that are not specifically designated as safe for the microwave or cooking. To be safe, place food into inert containers like glass or ceramics for microwaving.

She also warns about the risk of radiation from microwaves. She quote the dubious book, *Cancer is Not a Disease*, as saying:

And apparently, the same can happen to the human body when it is exposed to this type of radiation on a regular basis. After all, human cells are made of molecules and molecular bonds are broken and destroyed when exposed to radiation.

This is simply wrong. Microwave radiation is not energetic enough to break molecular bonds. It is considered non-ionizing radiation. Microwaves can heat water, including water in your body, and this can have biological effects. That's why microwave ovens are shielded. The best advice is not to use a really old microwave that may not be functioning well. Also, don't stand directly in front of the microwave when it is operating. Radiation falls off quickly with distance, so stand a few feet away and any minimal radiation leakage will be harmless.

Finally, Hari cites the work of Dr. Masaru Emoto, who claims that being mean to water will make it form ugly crystals when it freezes, while being nice to it will make it form beautiful crystals. This, of course, [is pure pseudoscience](#). That doesn't stop Hari from citing it as if it were real scientific evidence, because Emoto also claims that microwaving water makes it unhappy and ugly. This is provided as evidence that microwaving food will cause a host of health problems.

Conclusion

Microwave cooking is a safe technology. It's not my favorite method of actually cooking, but it is a great tool for heating food. It is fast and convenient, and, it turns out, has a favorable profile in terms of the net effects on food nutrition.

Vani Hari's conclusions about microwaves are all demonstrably incorrect and at odds with the scientific evidence. This seems to stem from a fatally flawed process of starting with an extreme naturalistic ideology, combined with misunderstanding and misinterpreting scientific evidence, which is used not to truly investigate or discover the truth but to back-fill her existing biases and opinions.