

4-Hydroxy-Trans-2-Nonenal

If you feed varying amounts of trans-4-hydroxy-2-nonenal to rats, they develop kidney and liver problems and some may even die. So why should anyone care? Because this substance, which we will call HNE for short, forms in our body when free radicals react with fats. We can't avoid exposure to free radicals because they are generated when our body uses oxygen. Luckily though, we are equipped with antioxidant defenses in the form of vitamins and that can deal with these rogue substances. However, when these defenses falter, oxidative damage occurs. HNE, for example, can damage DNA, proteins and cell membranes. It can even result in the death of cells. Researchers have linked HNE with cardiovascular disease, stroke, Parkinson's, Alzheimer's, liver and kidney ailments and even cancer.

Now here is the real problem. HNE forms not only when fats in our body are oxidized, it also forms when cooking oils are heated to a high temperature in the presence of oxygen. Not all oils are susceptible to this oxidation to the same degree, the biggest problem is to be found in oils that contain linoleic acid, a polyunsaturated fat. I know what you're thinking. Polyunsaturated fats are supposed to be good for us. Corn oil, canola oil, soybean oil, these are the fats we are counseled to use to prevent our cholesterol levels from going through the roof. And indeed they are a lot less likely to elevate cholesterol than saturated fats found in meat or the notorious hydrogenated oils which ply us with trans fatty acids.

But as it seems, there always is a but. And in this case the but is that when polyunsaturated fats are heated they decompose to form HNE, which is a nasty compound. The higher the temperature, and the more frequent the heating, the more HNE forms. The situation isn't so critical at home when oil is usually heated only once and is then discarded, but in restaurants it is common to keep reusing cooking oil. Those golden French fries may be laden with HNE! The moral of the story is that when frying at home, oil should be used only once, and ideally peanut oil or olive oil should be relied on. The fat in these is mostly monounsaturated and does not oxidize easily. Neither does beef tallow, but I don't think we want to go back to cooking with animal fat. Too many negatives there! And as far as restaurants go, really the best idea is to limit eating fried foods, no matter how good they taste. There is enough scientific information out there about the possible consequences of consuming trans-4-hydroxy-2-nonenal to make us limit our intake of those golden fries. I still won't give up my Wiener Schnitzel though, but I will fry it in olive oil. And not use the oil again.

by Joe Schwarcz