

Why is the science behind formaldehyde so confusing?

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Fisheries and Food and Safety officials check fish samples at Kasimedu fishing harbour in Chennai on July 9, 2018. **Why is formaldehyde in the news?**

It began with the Kerala government finding formaldehyde in fish being transported into the State. The use of this chemical is banned in fresh foods, like fish, by the Food Safety and Standards Authority of India. But unscrupulous vendors sometimes use it to preserve fish for longer. After Kerala's findings, other States began investigating. Eventually, Goan officials also found the chemical in fish, as did an [investigation by *The Hindu* in Chennai](#), in collaboration with the Tamil Nadu Dr. J. Jayalalithaa Fisheries University (TNJFU). But the TNJFU findings need to be confirmed with further tests. The Kerala government has followed up the detection with fish seizures. But Goa's Chief Minister has said formaldehyde occurs naturally in fish, and wasn't the result of contamination.

Does it occur naturally in fish?

Yes, it occurs naturally not only in fish, but other foods like mushrooms as well. However, levels vary widely. A 2005 Italian study of 12 fish species found between 1.45 mg/kg (1 mg/kg is 1 part per million or 1 ppm) in haddock fish, and 293 mg/kg in hake fish. Another study by Chinese researchers on the Bombay Duck found formaldehyde of up to 45 ppm. In general, marine fish are more likely to have the chemical than freshwater fish. This natural phenomenon makes detecting contamination tough, says Satyen Kumar Panda from India's Central Institute of Fisheries Technology (CIFT). This is why, the CIFT developed a screening kit, which the Kerala

government used in its recent findings. This kit exploits the fact that most naturally occurring formaldehyde is bound to fish tissue, while added formaldehyde is free. So, the kit detects only free formaldehyde. Still, the CIFT kit can only tell if the fish has the chemical, and not its levels. And the Kerala, Goa and Tamil Nadu governments have not revealed the levels after further testing, although this data are crucial.

Should you panic?

Not yet, because people ingest low levels of formaldehyde regularly; a 1990 study estimated that humans ingest 11 mg a day. While formaldehyde is classified as a carcinogen by the International Agency for Research on Cancer (IARC), this refers to the chemical's cancer-causing potential when it is inhaled, and not when it is ingested. The people at the greatest risk are workers in textile, automotive and other industries, where formaldehyde fumes are often released. Also, when we wash and cook fish, formaldehyde levels drop. Yet, non-carcinogenic effects do pose a danger. But these effects, too, occur at concentrations that are impossible due to natural reasons. There are no estimates for humans, but one rat study showed that when they consumed formaldehyde at 82 mg per kg of body weight every day for two years, they lost weight and their stomach lining changed.

What level of ingestion is safe?

The United States Environmental Protection Agency (EPA) has calculated that eating up to 0.2 mg per kg of body weight is safe. Calculating how much formaldehyde one is eating requires knowing one's fish consumption. In a 2012 Taiwanese study of squid, researchers found up to 45 ppm of free formaldehyde. Food consumption data show that Taiwanese eat 9-15 gm of seafood per day. The researchers calculated that if all the seafood eaten by Taiwanese was squid (an unlikely scenario), they would still not consume more than 0.011 mg/kg of body weight per day. This is lower than the EPA limit. Further, even if all daily protein consumption was squid, the maximum exposure to formaldehyde would still be 0.074 mg/kg/day.

So, is all hunky dory?

No, because the State governments have not revealed fish-formaldehyde levels. Sudershan Rao Vemula, a retired food-safety expert from Hyderabad's National Institute of Nutrition, points out that even if low-level ingestion is safe, unscrupulous vendors do not calculate safe limits

before dousing fish. So, contamination can reach dangerous levels; one Taiwanese squid study found 4250 ppm. It is imperative for the States to monitor fish regularly.