

FACT CHECK:

Setting the record straight on TFA

There is significant research and published data on trifluoroacetic acid (TFA). However, this body of data is often misinterpreted or selectively sourced to draw inaccurate or exaggerated conclusions about the origin, sources, environmental impact, and human health implications.

Let's set the record straight. Here are five myths about TFA, and five facts from the scientific community that you need to know.

1. MYTH: TFA arises purely from manmade sources.

FACT: Approximately 95% of TFA in the environment is naturally occurring.

Approximately 95% of TFA in the environment is naturally occurring. One significant known source is undersea hydrothermal vents (i.e. undersea volcanic activity), which give life to ecosystems deep in the oceans. These natural processes have been occurring over millions of years and have given rise to the presence of hundreds of millions of metric tons of TFA in the environment. ^{1,2,3}

2. MYTH: TFA produced from manmade sources is environmentally significant.

FACT: The impact of man made TFA is minimal.

The impact of manmade TFA is minimal. Consider this: if all the A/C units in all the world's cars were equipped with HFO-1234yf, it would result in a 0.04% increase in the amount of TFA. So while it is true that TFA can be created by manmade sources—either through its direct production or indirectly from the production or degradation of other substances—the scale of that production and its resulting environmental impact is inconsequential. ⁴

3. MYTH: TFA is an issue due to its accumulation in organisms and the environment.

FACT: TFA does not bioconcentrate in organisms or biomagnify in the food chain.

TFA is a fluorinated compound that does not bioconcentrate in aquatic organisms and does not biomagnify in the food chain. The [2018 Scientific Assessment of Ozone Depletion](#) provides an overall perspective and concluded that: "The current and estimated future concentrations of TFA and its salts resulting from degradation of HCFCs, HFCs, and HFOs do not pose any known significant risk to human or ecosystem health." ^{5,6,7}

4. MYTH: TFA arising from atmospheric degradation of HFC and HFO use significantly harms the environment.

FACT: TFA arising from HFC and HFO use will have a negligible effect on the environment.

Studies into the likely impact of TFA arising from HFC and HFO use conclude that they will have negligible impact on the environment. Even when looking at the highest projections of TFA in land-locked lakes and oceans, the resulting environmental impact is still insignificant. Bottom line: TFA resulting from HFC and HFO atmospheric degradation will not have an observable effect on aquatic life. ^{5,7}

5. MYTH: TFA is a risk to human health.

FACT: TFA does not present a risk to human health.

Scientists have demonstrated that vast quantities of naturally occurring TFA has been present in the environment for millions of years with no indication of impact on human health. The contribution to total TFA from manmade sources (HCFCs, HFCs, and HFOs) is expected to be less than 5% for the next century and will not significantly increase the already low risk to human health. [A study of TFA sources](#), toxicity, and risks concluded that: "... current and estimated concentrations of TFA and its salts in the environment that result from the degradation of HCFCs, HFCs and HFOs in the atmosphere do not present a risk to humans and the environment." ^{4,7}

References:

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7. Solomon K.R., et al., "Sources, fates, toxicity, and risks of trifluoroacetic acid and its salts: Relevance to substances regulated under the Montreal and Kyoto Protocols," *Journal of Toxicology and Environmental Health*, 19, 289–304, 2016.