

The Forever Chemical in Our Water – What Do We Know About TFA?

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Clean water is something most of us take for granted. We turn on the tap, fill a glass and expect the water to be safe. But in recent years, increasing attention has been directed toward a large group of chemicals known as PFAS.

One of the smallest and most mobile PFAS is trifluoroacetic acid, or TFA. Unlike several other PFAS, TFA is not currently regulated in Swedish nature- or drinking water legislation. In fact, Denmark appears to be the only European country with a legally binding limit for TFA in drinking water.

But how widespread is TFA in Swedish water, where does it come from, and should we be more concerned about it?

TFA is an ultra-short-chain PFAS. This means that it is a very small molecule with high persistency and easily transported in water. Once it reaches groundwater or surface water, it can accumulate and remain there for a very long time. Conventional water treatment methods are also not well suited to remove it, which makes prevention and monitoring especially important.

The master's thesis "*TFA in Groundwater and Surface Water: Mapping, Trends and Regulatory Perspectives*" investigates the occurrence of TFA in Swedish waters, possible trends over time, potential

formation from pesticides, and how TFA is treated in current national and international regulations.

The study analysed 437 measurements of TFA in Swedish groundwater and surface water from 2023 to 2026. The measurements covered most Swedish regions, with results indicating a southward concentration gradient. The highest mean and maximum concentrations measured were found in Skåne. Trend analyses also showed indications of an increase in concentrations across Sweden. Several scholars claim that fluorinated pesticides are major contributors to increasing TFA concentrations in waters. A mass balance showed a potential accumulation of more than a hundred tonnes of TFA since the year 2000 in Swedish waters due to the use of certain pesticides.

Studies show that TFA can be harmful to humans and ecological systems, but the long-term effects due to exposure of TFA present in waters is mostly unknown. It is not yet explicitly regulated under any European legislation except for Danish law. Since the concentrations are increasing and TFA is a "forever chemical" action is needed. Clear regulations, extended monitoring and deepened knowledge about potential harmful effects should be addressed before it might be too late.

Today, concentrations of TFA found in Swedish ground- and surface water are generally below levels assumed by scholars to be potentially harmful. However, as trend analyses indicate, concentrations are increasing, and long-term effects are mostly unknown. The World Health Organization is set to create harmonised health-based guideline values for TFA in drinking water and food exposure by 2027. Until then, TFA remains a persistent and largely unregulated substance.