Analyzing the Accumulation of PFAS from Mussels in the Puget Sound

Evan Hoang

Per- and poly-fluoroalkyl substances (PFAS) are colloquially known as “forever chemicals” due to their chemically synthesized carbon-fluorine bonds that allow them to persist extensively in nature. PFAS are commonly used in coating non-stick cookware, food packaging, and waterproof clothing because of their durability. Once PFAS are polluted into the environment via firefighting foam or manufacturing waste, their long half-lives allow PFAS to collect in waterways and eventually bioaccumulate in animal tissue. Shellfish, such as mussels, have been shown to accumulate PFAS in large amounts, which humans consume and are linked with liver cancer, glioblastoma, endocrine disruption, and decreased fertility. The first-ever national drinking water standard was released by the EPA in April 2024, limiting certain PFAS to 4 parts per trillion, but no legislation limits the amount of PFAS in food, due to the small amount of studies done in this sector. This prompted the impetus for studying how much PFAS accumulate in shellfish in Washington State, the leading producer of farmed shellfish in the US. Using liquid-chromatography tandem mass-spectrometry, we analyzed the amount of PFAS in homogenized mussel tissue samples collected from several different sites within the Puget Sound and surrounding waterways. Perfluorooctanoic acid (PFOA), one of the most common PFAS, was documented at the highest levels out of all the analytes tested, enough to potentially warrant the creation of consumption limits for mussels harvested in the area. Preliminary results have yielded an average of 1.33 ng of PFOA found in 1 gram of mussel tissue.