Antimicrobial, Triclosan (TCS) Increases Trihalomethanes in Tennessee Drinking Water in Response to COVID-19

ABSTRACT

Organochlorine contaminants, such as Triclosan (TCS), are present in drinking water sources across the United States. Since TCS was developed in the late 1960s, antimicrobial compounds have been widely used as multipurpose ingredients in everyday consumer products, can be ingested or absorbed through the skin, and are found in human plasma, breast milk, and urine samples. Studies have shown that the expanded use of antimicrobial agents causes them to be found and remain suspended in the ecosystem, most notably the soil and watersheds. Many studies have shown emerging concerns related to the overuse of TCS, such as dermal irritations, higher incidence of antibacterial-related allergies, microbial resistance, endocrine system disruptions, altered thyroid hormone activity, metabolism, and tumor metastasis and growth. Organochlorine contaminant exposures play a role in inflammatory responsiveness, and any unwarranted innate response could cause adverse outcomes. The ability of TCS and other organochlorine contaminants to increase inflammation, leading to sustained and chronic inflammation, is associated with numerous pathologies, including cardiovascular disease and several types of cancers. Chronic inflammation presents a severe consequence of exposure to these antimicrobial agents, as any changes could result in loss of immune competence. Our previous research examined the overuse of TCS-containing products, increasing total trihalomethane (TTHM) levels and affecting our water supply quality. To understand the impact of the COVID-19 pandemic overuse of antimicrobial exposure on water quality, we have analyzed the levels of total trihalomethanes (TTHM), such as chloroform, a product of free chlorine added to TCS in the metropolitan areas in primary water sources across the state of Tennessee, as they correlated to increased production of antibacterial agent, TCS. Our study found that increased use of TCS has created higher levels of total organochlorine contaminant, trichloromethane, leading to an increase in TTHM levels recorded on water quality reports.