# CRS Insights

Microbeads: An Emerging Water Quality Issue

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For decades, water quality professionals have faced the challenge of controlling a variety of conventional and nonconventional pollutants (e.g., nutrients and suspended solids, oil and grease) and toxic chemical compounds that can harm aquatic life in lakes, streams, and coastal waters, as well as public health. Microbeads are contaminants of recent and growing concern. Microbeads are synthetic particles made of either polyethylene or polypropylene plastic. They are used as abrasives and exfoliants in hundreds of consumer and personal care products such as facial scrubs, shampoos and soaps, lip gloss, deodorants, and toothpaste. The particles are tiny—between 50 and 500 micrometers in diameter (the latter is about the size of the period on a printed page), and a single product can contain hundreds of thousands of microbeads. A number of companies are voluntarily removing microbeads from their products, and some states—eight so far—have passed laws to ban manufacture and sale of products with microbeads. At issue is whether federal regulation to control or ban microbeads is needed.

In most cases, microbeads are intended to be washed down the drain after use and end up in the municipal sewer system. Because microbeads are so small, most wastewater treatment plant technology is not capable of removing them from the wastestream. Most microbeads do not biodegrade, as they require high heat processing to break down, which municipal sewage systems are typically unable to do. As a result, the particles pass through the plant and are discharged into nearby waters. A recent report by the New York State Attorney General's Office found microbeads in effluent samples from 25 of 34 wastewater treatment plants studied, "suggesting that microbeads are being discharged at the majority of treatment plants operating across New York State." Plastic microbeads have been found in oceanic gyres (rotating ocean currents), bays (including Chesapeake Bay), gulfs, and seas worldwide.

Microplastic debris includes microbeads and small particles that result from the breakdown of plastic bottles and other containers. In the aquatic environment, marine mammals, birds, and fish and shellfish cannot distinguish microplastics from food. Once in the food chain, microbeads may threaten aquatic life and public health, but risks are not well understood. The particles themselves may contain toxins. Other toxins in waters, such as polychlorinated biphenyls, are attracted to microbeads, which can act like sponges, absorbing the chemicals and potentially adding to environmental concerns. Particles that enter water supply systems are not removed by drinking-water treatment technologies.

To date, research to assess the extent and effects of microbeads in aquatic environments has been limited but is increasing. Recent studies have drawn attention to concentrations of plastic particles in the Great Lakes and Lake Champlain. In 2014, the U.S. Geological Survey began a study of microplastics in rivers, sampling 29 Great Lakes tributaries across six states.

Responses

Consumer and advocacy groups have urged that products containing microbeads be redesigned to incorporate less problematic constituents. Some groups maintain lists of products that contain microbeads and urge consumers to seek out alternatives. In response, companies such as Johnson & Johnson and L'Oreal have initiated voluntary efforts to eliminate the use of microbeads.

At the federal level, no agency currently regulates plastic microbeads. The Environmental Protection Agency has authority under the Clean Water Act to regulate microbeads that enter wastewater from industrial discharges, but that authority does not extend to directly regulating microbeads that are found in wastewater effluent released from households. For most cosmetics, the Food and Drug Administration's (FDA) authority under the Federal Food, Drug and Cosmetics Act (FD&C Act) is limited primarily to labeling requirements. Most cosmetics are not subject

to FDA premarket approval or consideration of water quality impacts of product discharges. Under the FD&C Act, more rigorous regulatory procedures, including premarket approval, apply to drugs than to cosmetics. In a few cases, such as beauty products that bear sun-protection factor claims or antidandruff shampoos, cosmetics are subject both to FDA drug listing and labeling rules and cosmetic labeling requirements.

In the 114th Congress, a bill addressing the microbeads issue was approved by a House Energy and Commerce subcommittee on May 14. The legislation, H.R. 1321, would amend the FD&C Act (21 U.S.C. §361) to ban the sale or distribution of cosmetics containing synthetic plastic microbeads beginning on January 1, 2018. It would add "synthetic plastic microbeads" to the statutory list of cosmetics that are deemed to be "adulterated"; the FD&C Act prohibits the marketing of adulterated or misbranded cosmetics in interstate commerce. Companion Senate legislation is S. 1424.

Legislative responses to the microbeads issue have primarily been at the state level. So far, of the more than two dozen states have taken some level of legislative activity (bills introduced, measures passed by at least one house of the legislature), eight have passed laws to ban manufacture and sale of products that contain microbeads. Illinois was the first state to enact legislation, in 2014; others include Colorado, Connecticut, Indiana, Maine, Maryland, New Hampshire, and Wisconsin. There are differences in provisions of the state laws, including how terms such as "plastic microbeads" and "biodegradable" are defined, whether biodegradable products are excluded from bans, and what types of products are covered. All of the new state laws establish separate schedules for banning manufacture and sale of personal care products that contain microbeads and prohibiting manufacture and sale of over-the-counter drugs that contain microbeads, but the laws differ in timelines for implementation. Advocacy groups, such as the Alliance for the Great Lakes, argue that state law differences could create a confusing patchwork of standards across the country and urge Congress to enact a federal ban on microbeads in cosmetics and personal care products. Industry representatives, such as the Personal Care Products Council, support a uniform federal approach that avoids multiple, different requirements across the states while giving manufacturers sufficient time to reformulate their products.