

Water Quality Assurance for the Food and Beverage Industry

Most food and beverage producers require a Certificate of Analysis (COA) for ingredients, but one key component in food is often overlooked—water. Water is sprayed, injected, dripped, poured, ladled and/or conveyed frequently in food production, impacting fruits, vegetables, frozen foods, sauces and other foodstuffs.

Many food and beverage producers assume the municipal water they use in their processes is adequately monitored, analyzed and determined to be safe. However, reports from the CDC and others show that public water supplies can still represent a microbial or chemical risk. Even in an environmentally conscious country such as the U.S., municipal suppliers are subject to extensive waivers and also very limited monitoring is conducted in distribution systems. This is recognized by the water industry as an area of vulnerability for both microbial and chemical contamination.

The World Health Organization and European Union put more scrutiny on water quality, but that doesn't ensure that it is routinely monitored. If a food manufacturer's water supply is not municipal, there may be no water quality data to rely on at all, putting a manufacturer's brand at risk.

Many food processing companies are now multi-national, and the extent of the monitoring of incoming water that occurs in many countries may be limited or involve unreliable analytical techniques. NGO studies questioning the safety of water for a company can have a major impact on brand protection worldwide.

The Safe Drinking Water Act 1996 amendments require the EPA every five years to issue a new list of 30 unregulated contaminants to be monitored by public water systems. Thus, we continue to learn about new contaminants potentially introduced into public water systems. In some cases proactive municipalities with an extensive monitoring program may still not know all that is in their water supplies.

If a company's goal is to sell a safe final product, it must verify the same for its raw materials. Water supplies are known to vary over time with regard to taste, odor, chemistry and the presence of microbes, potentially altering the desired final food or beverage products.



"Each year, seven million people are estimated to become ill in the United States, and more than 1,000 people die from disease causing microbes in drinking water."¹

The CDC's 2007-2008 surveillance report comments that "ground water outbreaks comprised the majority of drinking water out-breaks and showed no decrease over time."

There are numerous examples where lack of ongoing or adequate water monitoring data has led to major problems for food companies, as shown in the following case studies.

India Pesticide Issue: In 2003, the Centre for Science and Environment (CSE), a non-governmental organization in New Delhi, said that waters produced by soft drinks manufacturers in India, including PepsiCo and Coca-Cola, contained lindane, DDT, malathion and chlorpyrifos. At the time of the allegations there was no ongoing monitoring data available to dispute the claims. Subsequent monitoring by the soft drink companies demonstrated conclusively that pesticides were NOT present in the water, but the lack of data at the time of the allegations led to a significant drop in sales.

LADWP: In 2007, monitoring of a beverage manufacturer's incoming municipal water in Los Angeles by Eurofins found levels of bromate up to 10x the allowable drinking water standard, necessitating extensive additional treatment by the company to meet FDA limits. Once the Los Angeles Department of Water and Power was made aware of the issue they conducted extensive monitoring and identified the cause as a previously unknown reaction between chlorine, sunlight and bromide in several of their reservoirs. This resulted in the City draining two major reservoirs and implementing a corrective action program to minimize bromate formation.

¹Morris RD, Levin R. Estimating the incidence of waterborne infectious disease related to drinking water in the United States. In: Reichard E, Zapponi G, editors. Assessing and managing health risks from drinking water contamination: approaches and applications. Proceedings of a symposium held in Rome, September 1994. Wallingford (UK): International Association of Hydrological Sciences; 1995; publ. no. 233.

Contamination During Processing

Contamination may also originate from within a factory. Water treatment systems may contribute contaminants such as hexavalent chromium to treated waters. Food processing plants are a complex array of pipes, valves, conduits, tanks and kettles.

Piping may contain potable or nonpotable water and sometimes even waste or sewage streams. Cross connection of these pipes adds to the threat of contamination, not to mention practices within the factory that may result in contamination as well.

Prevention

A food or beverage manufacturer's HACCP (Hazard Analysis and Critical Control Point) compliance program should include monitoring and testing of source water used either directly in products or indirectly, as an aid or other function. Per FSMA, monitoring at critical points of production is recommended to document continued safety as well. While techniques such as heating or Cleaning In Place (CIP) practices may be effective in minimizing microbial contamination, they usually will not impact chemical contaminants. Many emerging, but as of yet, unregulated contaminants in public water supplies such as n-nitrosodimethylamine (NDMA), perchlorate or 1,4-dioxane are not fully removed by either conventional water treatment or RO systems used in some food processing plants.

Methyl Isoborneol (MIB) and Geosmin are the most common causes of earthy musty odors in water supplies and can impact flavors of food and beverages. They can be tested rapidly at levels as low as 1 ppt, below the typical odor threshold of 5-10 ppt, using a solid phase microextraction (SPME) following Standard Methods 6040E.

How Can We Support Your Water Monitoring Needs?

- Establishment of appropriate internal company standards and effective internal monitoring programs
- Extended monitoring lists (WHO/EU/FDA)
- Assessment of emerging contaminants
- Water recovery quality evaluations



Experience

- Largest Full-Service Water Testing Laboratory in the nation
- Leading laboratory to test for unregulated contaminants/emerging contaminants for EPA-required monitoring
- Provides analytical services to every major bottled water company in the U.S. and global support to the world's largest soft drink and food manufacturers
- Offers a complete list of compliance monitoring programs for drinking water, water re-use and bottled water, including testing for unregulated compounds
- Actively participating in regulatory and standard setting processes, serving on multiple federal, state and industry work groups (AWWA, IBWA, ISBT, ILSI)
- Support for bottled water plants, beverage (juices, CSD, etc.), dairy, cereal and sauce producers
- Comprehensive ISO 17025 accreditation for the Monrovia Laboratory



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