Hygiene Monitoring's Role in an Environmental Monitoring Program

Using hygiene monitoring to evaluate the effectiveness of your cleaning procedures is a critical aspect of an environmental monitoring program, which can help ensure the sanitary condition of your food and beverage manufacturing environment.

What is environmental monitoring?

In simple terms, environmental monitoring involves observing all aspects of your production environment to manage risk and set standards throughout the plant to maintain sanitary conditions.

Environmental monitoring also includes obtaining and tracking data to determine whether environmental performance and hygiene monitoring standards are being met.

Every food company or food manufacturing plant may have a different strategy for environmental monitoring. As a part of that strategy there may be different components that should be monitored as a part of the comprehensive program. As you select aspects of your operation to monitor, you may consider the following list in Table 1:

- Potential sources of contamination including raw materials, ingredients, water, supplies such as packaging materials or pests.
- Conditions or events that could encourage organism growth including transportation, climate effects like temperature or humidity or adverse events like a drain backup or construction.
- Places where organisms might colonize including walls, light fixtures, manufacturing equipment and delivery areas.
- Personnel-related factors such as hands or clothing, where microbes can be found. Traffic patterns should be evaluated because employees can transfer and spread microbes as they walk from one part of a plant to another. Personal hygiene and illness must also be considered as well as places where workers can congregate such as lunch rooms or locker rooms.

Table 1: Potential Aspects of an Environmental Monitoring Program

This table shows a variety of parameters that you may choose to evaluate as part of your environment monitoring program. However, the list is meant to be representative and not comprehensive.

Potential sources of contamination	• Raw materials • Ingredients • Supplies	• Food handlers • Animals • Packaging materials	• Processing equipment and tools	• Environment including air, soil, waste, water, silage, facility
Places where organisms might colonize	• Floors • Walls	• Beams • Roofs	• Drains • Electrical outlets/boxes	• Manufacturing equipment • Delivery and loading areas
Factors that could impact organism growth	• Equipment design • Adverse events	• Transportation-related • Climate-related	• Facility layout and design	
Personnel considerations	• Personal hygiene • Hand-washing	• Disease reporting • Clothing and jewelry	• Areas where people congregate	• Eating/chewing in food handling areas

The food safety business of 3M is now a part of Neogen®. This combination creates a leading innovator in food safety with an enhanced geographic footprint and innovative product solutions to advance capabilities for our customers and our industry.

Hygiene monitoring helps determine the effectiveness of your cleaning procedures

Cleaning is one of the most critical actions you can take to ensure hygienic conditions to produce safe products. And just as you would monitor and maintain a piece of equipment to keep it operating efficiently, you must monitor the effectiveness of your cleaning procedures. Hygiene monitoring, which is a component of environmental monitoring, can help verify you are cleaning effectively and identify problem areas you can address to improve the cleanliness of your operation.

Three approaches to hygiene monitoring

There are three established and recognized approaches that can be used for hygiene monitoring: visual inspection, microbiological testing and Adenosine Triphosphate (ATP) testing. Each provides different information (see Table 2). A robust hygiene monitoring program would utilize all three complimentary methods.

- Visual inspection can quickly give a big-picture view about the effectiveness of your cleaning processes. But it has limitations because microorganisms cannot be seen by the naked eye. Also, there may be surfaces on production equipment that cannot be visually inspected but may be contaminated. Yet, visual inspection can be an effective precursor to either or both microbiological and ATP testing.
- Microbiological testing can enumerate organisms that may cause food contamination. However, it cannot provide immediate results on the manufacturing floor. Instead, samples must be taken to other locations for processing and analysis or may require days to produce results. During that time, food can be held, potentially reducing shelf life and sales, or food can be released but may need to be recalled if contamination is found.
- ATP testing is a widely accepted method that is highly efficient because it quickly and easily provides results. Instead of enumerating microorganisms, it measures ATP from microorganisms and food residues. This immediately indicates whether cleaning has been effective so manufacturing can begin, or shows that re-cleaning and re-testing are necessary to reduce potential contamination before food manufacturing starts.

Complying with food safety regulations

To engage in either domestic or international commerce — and be competitive — your company must comply with food safety standards and regulations. However, they are numerous, complex and differ by country. Even within a country, such as the United States, regulations can be issued by multiple agencies. In addition, it may be necessary to follow audit schemes for compliance with specific customers, such as those benchmarked against the Global Food Safety Initiative (GFSI), which includes the Safe Quality Food Institute (SQF) and British Retail Consortium (BRC).

Be aware: A strong food safety program that protects consumers and your company encompasses far more than meeting regulations, which often address only minimum requirements for food safety.

Table 2: A comparison of testing methods

	Visual Assessment	Microbiological Tests	ATP Tests
Rapid	+	–	+
Sensitive	–	±	+
Quantitative	–	+	+
Detect Product Residues	±	–	±
Simple	+	±	+

It is critical to quickly determine if your cleaning processes have been effective so you can confidently begin manufacturing. ATP testing can provide more information than visual assessment and faster results than microbiological testing. And unlike other methods, ATP testing is rapid, sensitive, quantitative, effective and simple.

Advantages of using a hygiene monitoring and management system

A variety of hygiene monitoring and management systems are available that utilize data generated from ATP, microbiological or other testing.

Using a trusted and accurate system the tests for the presence of ATP lets you quickly and efficiently determine if cleaning has been effective so you can confidently make the daily high risk decision to begin food manufacturing. In addition, it can help create and manage sample plans and automate the manual process of collecting, organizing and managing data.

A complete hygiene monitoring and management system should automatically turn raw data into organized information, enabling immediate identification of trends and problem areas. Resources can then quickly be aligned to address concerns and potential areas for improvement. The baseline data can also be used to establish initial performance guidelines to create a starting point for continuous improvement. Using accurate data from a hygiene monitoring and management system will help you determine whether you are meeting the thresholds and standards you have established as part of your environmental monitoring program.

Monitoring microbes

Microbes that have the potential to cause spoilage and disease include bacteria, yeast and mold. These organisms may grow in water, on surfaces, in crevices and in biofilms. They may prefer growth conditions that include warm or cold temperatures, oxygen, water, food and surfaces to colonize.

Obtaining guidance from experts

Environmental monitoring is critical and complex. So whether you are establishing the scope of your program, determining your compliance with regulations or managing other numerous aspects of your program, we recommend obtaining guidance from in-house experts or external sources.

Closing

Environmental monitoring and hygiene monitoring are methods which mitigate the potential risk to producing safe food/beverage. One of the most critical and manageable is hygiene monitoring, which can help verify you are cleaning effectively and confidently make the high-risk decision to begin food manufacturing.

"90% of outbreaks or more are caused by failures. Virtually all track back to environmental contamination. A single failure not only harms the general public but can be highly damaging to a company. Monitoring can help protect a business from negative consequences including legal and reputational risks."

—Martin Wiedmann, PhD, Gellert Family Professor in Food Safety, Cornell University College of Agriculture and Life Sciences

"Just as you would monitor and do preventive maintenance on a piece of equipment to keep it operating efficiently, you must monitor the effectiveness of your cleaning processes."

—Rolando J. Gonzalez, PhD, Senior Director of Technical and Scientific Affairs, Acheson Group

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