EXECUTIVE BRIEF

Ensuring food safety and compliance—from farm to table and grape to glass

Back in 2015, the United Nations proposed 17 **Sustainable Development Goals** for the world which it positions as "the blueprint to achieve a better and more sustainable future for all," with the aim of achieving these goals by 2030.[1] The UN's second prioritized goal was "Zero Hunger". Yet to feed a world population that's estimated to **grow to 9.7 billion by 2050**,[2] we need to secure sustainable and safe food production systems. According to the World Health Organization (**WHO**), "Governments should make food safety a public health priority, as they play a pivotal role in developing policies and regulatory frameworks and establishing and implementing effective food safety systems."[3]

As government agencies (and major retailers) implement increasingly stringent rules and require more detailed information, complying with these food safety regulations is becoming more complex. On top of that, complying with the absolute latest food safety requirements is further complicated by growing risks from the globalization of food sourcing and distribution, as well as the increased likelihood of contamination and disease that rapidly spreads across borders. This means that food safety and traceability are more important now than ever before, and likely to become even more important over time. Today's, food and beverage manufacturers have no choice but to make the safety of food products from raw materials to consumers' tables a top priority.

The US's **Center for Disease Control (CDC)** estimates that roughly 48 million Americans get sick, 128,000 are hospitalized, and 3,000 die of foodborne diseases every year.[4] Foodborne illness breakouts are obviously an important public health issue, and they represent one of the greatest financial risks that food and beverage companies face.

That is why regulators, like the FDA with the Food Safety Modernization Act (FSMA), have been implementing new rules, which require food and beverage companies to be more proactive in preventing food safety problems. Not only does this mean establishing preventive controls, but also validating and verifying those rules—while also documenting each step along the way.

The food safety procedures must include:

- Hazard analysis and preventive controls, also known as HACCP (Hazard Analysis and Critical Control Points). This is about identification of potential food safety hazards and putting a food safety plan in place with preventive actions, monitoring procedures, corrective actions, hygiene and sanitation practices and food labeling requirements. A very important aspect here is preventing contaminations with extraneous material like metal coming from broken filling equipment, grease or detergent remnants and cross contamination with pathogens.
- Supplier verification program, making sure that the suppliers and their ingredients are compliant as well.
- Sanitary transportation, from plant to trucks to receiving facilities, companies must document all safety procedures and training for the safe and sanitary transportation of food.
- Recall plan, which is a written plan including all the steps that are necessary to document and take action in the event of a recall. The plan also includes documentation for notifying all relevant parties to remove and dispose of products that have been contaminated. Food safety incidents must be reported with a very short time frame at the FDA in the US or RASFF in the EU.

When it comes to compliance to food safety rules, the need to increase and improve documentation and record storage cannot be understated. The amount of documentation that food and beverage companies will need is going to continue to grow. Many food processors try to keep up with regulations by adding more paper forms to be completed by process operators and quality staff, which is obviously not the most efficient and effective way to meet the compliance standards.

Using modern tools to drive food safety

Modern systems have embedded quality management capabilities, so that it can drive quality procedures. Quality tests, such as laboratory analysis and checking equipment like metal detectors can be triggered based on specific events and results can be captured digitally. Also, modern systems can capture data from internet of things (IoT) sensors in the factory and upstream and downstream in the food supply chain. The captured data can be used to signal potential food safety issues in quality sensing control towers and on mobile devices. The next level is applying machine learning to predict food safety issues. An example is having vibrations being picked up by an IoT sensor on a packing line, which will automatically create a work order to replace a bearing before it breaks down and leads to loss of product.

The amount of data can become overwhelming, so food and beverage processors must first determine which IoT parameters should be collected, where is the data coming from, and how frequently should readings be saved. This is where the hazards analysis comes into play. Basically, potential failures and the effects criticality determine what should be monitored. Machine learning can then analyze the data and the take automatic corrective actions or guide the employees in their decisions.

Many food and beverage manufacturers are looking to move into this territory. This new business paradigm doesn't require an all or nothing approach. Upgrading a single segment of the operation is enough of an evolutionary catalyst to propel manufacturing plants and organizations into a more efficient, sustainable future. From here, the possibilities are limitless.

Identifying and responding to food safety issues

Although most food and beverage manufacturers are constantly seeking improvements to their food handling operating procedures, it's virtually impossible to foresee every possible event that can lead to a food safety issue. And equally important to preventing these issues from arising in the first place, is swiftly and precisely handling critical situations once they occur to prevent consumers from being impacted and food from being wasted. Customers, consumers, and regulators all expect food and beverage manufacturers to take both a proactive and responsive approach to quality and food safety. When something goes wrong, it's imperative to quickly find the root cause, identify which customers were impacted, notify regulators like the FDA and the European RASFF, and contain the issue.

Companies that are prepared, will be able to minimize production downtime and cost, as well as reduce damage to the brand. A product recall is a reactive measure and does not bring the organization forward—except to potentially learn from the issue to avoid an even bigger recall in the future.

It doesn't take much to nullify a company's food traceability efforts. For instance, if a specific lot is allocated for production, transfer, or shipping, but another lot is pulled instead and that change isn't entered into an enterprise resource planning (ERP) system, the company's tracking is now inaccurate. It's critical to determine how each consumption and receipt in the goods flow is to be booked. Ideally this is automated by integrations to production equipment and handheld devices. Smart logic can validate the consistency and correctness of the bookings, which will avoid broken traceability chains.

Track and trace doesn't stop at the fence around the factory, it can be necessary to trace ingredients upstream via multiple nodes in a global supply chain all the way to the farm. Full visibility and food transparency into the entire supply chain will help expedite a recall process. Blockchain is on the rise to pass on information on lot and transaction level from farming, via processing and distribution to the retail point of the supply chain.

Traceability: A better method to feed the planet

At the core of supply chain traceability is the opportunity for food and beverage companies to take a truly proactive approach to food safety. As you develop or update your food safety goals—both inside and outside of the organization, integrating supply chain traceability as a key component of those goals should be top priority and will enable companies to:

- **Get ready for quality audits**—Manufacturers can consolidate traceability data in one place and make it accessible with easy-to-understand visualizations. A company can share the information with suppliers, customers, and other third parties during a quality-audit process. This can help create a more collaborative environment within the organization, as well as externally with the stakeholders in both the downstream and upstream supply chain.
- **Be prepared for recalls**—Data can be quickly mined backward to find the lots, batches, intermediary products, or raw materials that are the cause of a problem. Tracing forward can find all the finished products in the supply chain that might be contaminated. All impacted customers can be identified, so they can be immediately contacted and instructed to remove the affected products from shelves. Once new and safe products are manufactured, companies can ensure that those stores' shelves get replenished. Being proactive allows for quick and efficient action and helps to minimize negative media coverage. These take-charge routines aimed at lowering risk for recalls and minimizing risk for impact once they occur will improve customer and consumer trust.
- **Build a stronger supply chain network**—Including and actively collaborating with suppliers on creating supply chain transparency will benefit all supply chain participants, forming long-term relationships. For smaller farmers, implementation of technology can sometimes be challenging but at the same time can result in new business opportunities. Traceable products will reach a larger market and consumers are **more willing to pay a higher price point** when they know where their products came from and what they contain.[5]
- **Create new revenue opportunities**—Traceability capabilities can be leveraged as a competitive advantage with new market-entry opportunities. Proof points on secure and responsible sourcing patterns of ingredients and raw materials can be supplied. Traceability capabilities can also be used as part of a company's social responsibility initiatives to create transparency and trust.

Be one step ahead

Even when traceability systems and processes are in place, food and beverage organizations should not consider their jobs done, and just "wait for trouble." Instead, they should perform recall "fire drills," with employees assigned well-defined roles. This way should an actual food safety issue happen, organizations will be much better prepared to quickly limit the impact of the recall.

A sustainable food supply depends upon a sound supply chain. Traceability concerns should be extended into the supply chain as food safety and quality issues can be managed more readily if each partner in the supply chain can identify the direct source and direct recipient of traceable items. All of this leads to smarter methods of operating a food and beverage business—as well as feeding the planet.

1. "Integrated Food Safety Centers of Excellence Factsheet," Centers for Disease Control and Prevention, Oct 16, 2019.
2. United Nations, World population to reach 8 billion on 15 November 2022, July 11, 2022.
3. "Food Safety [fact sheet]," World Health Organization, April 30, 2020.
4. "Estimates of Foodborne Illness in the United States," cdc.gov.
5. Peter Walters, "Consumers Are Willing To Pay More for Sustainable Food Products," L.E.K. Insights, July 20, 2022.

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