FOOD SAFETY

Five steps for improving your food safety program.

Rockwell Automation

BEGIN

MODERN CHALLENGES

When it comes to food safety, there's no room for compromise. Yet today's markets present new challenges to ensure safety and quality in consumable products.

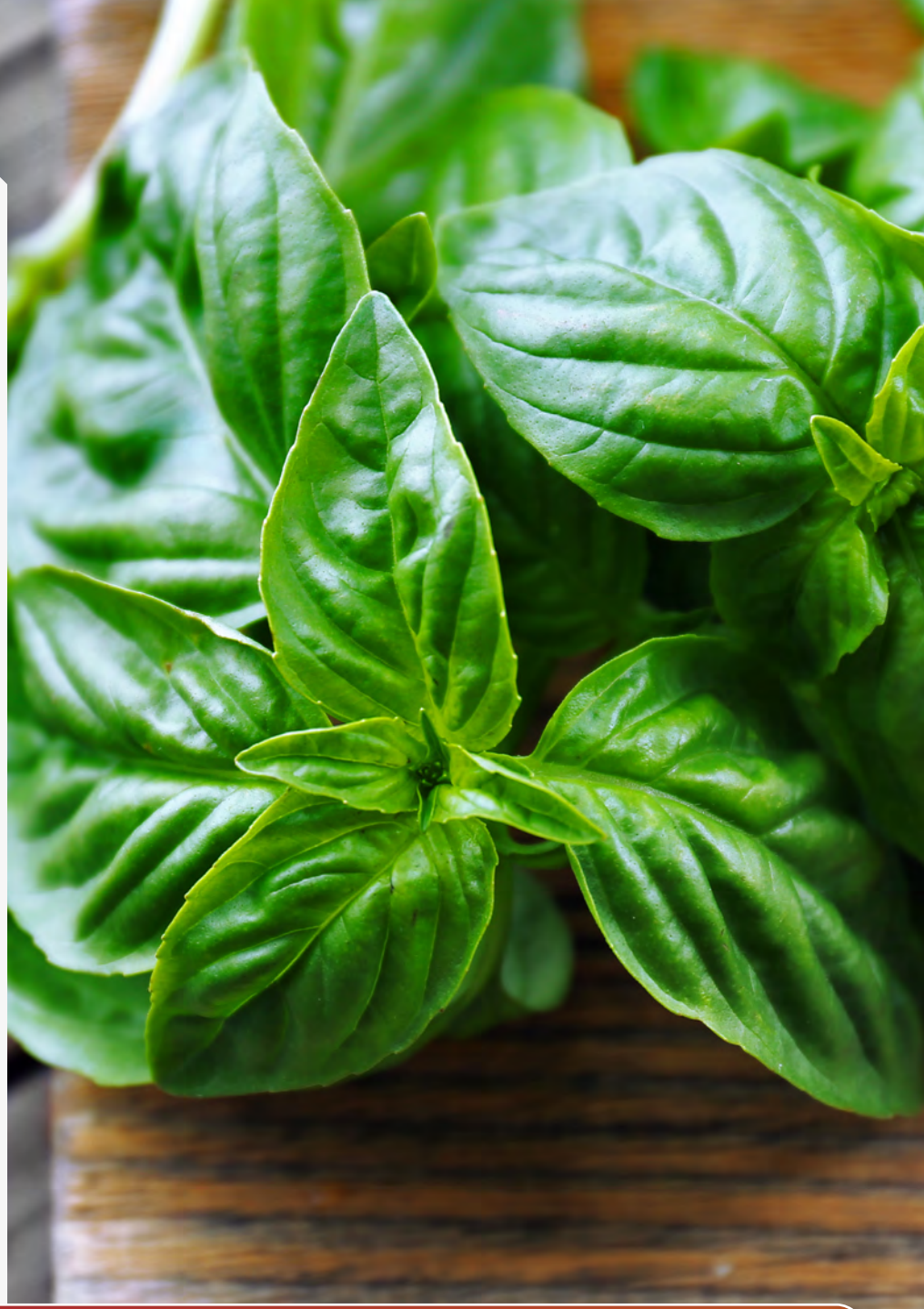
Driven by more diverse consumer demands and greater competition, food and beverage makers are **producing more SKUs than ever**. This has introduced greater complexity into their production processes and supply chains, requiring that they manage food safety and quality across a broader product spectrum. Meanwhile, global food and beverage regulations continue to evolve:

- Food Safety Modernization Act (FSMA) section 204(d) new regulations for food and beverage producers to incorporate traceability requirements by 2026
- Heightened guidance on PFAS and heavy metal presence in food
- New food labelling and allergen declarations such as sesame
- Greater regulatory framework for reduction in salmonella illness including enhancing plant process control monitoring

Amid these internal and external changes, food and beverage producers also must continue to be more proactive to identify and resolve issues that lead to product recalls. Recalls are costly in the short-term and have a detrimental long-term impact on brand loyalty, insurance premiums, employee retention and more.

Source: Food Safety Priorities 2023

https://www.foodprocessing.com/food-safety/regulatory-compliance/article/21548965/food-safety-priorities-for-the-food-beverage-industry-in-2023



THE RIGHT RECIPE

So how do you recommit your operations with a heightened focus on food safety in the face of these wide-ranging challenges?

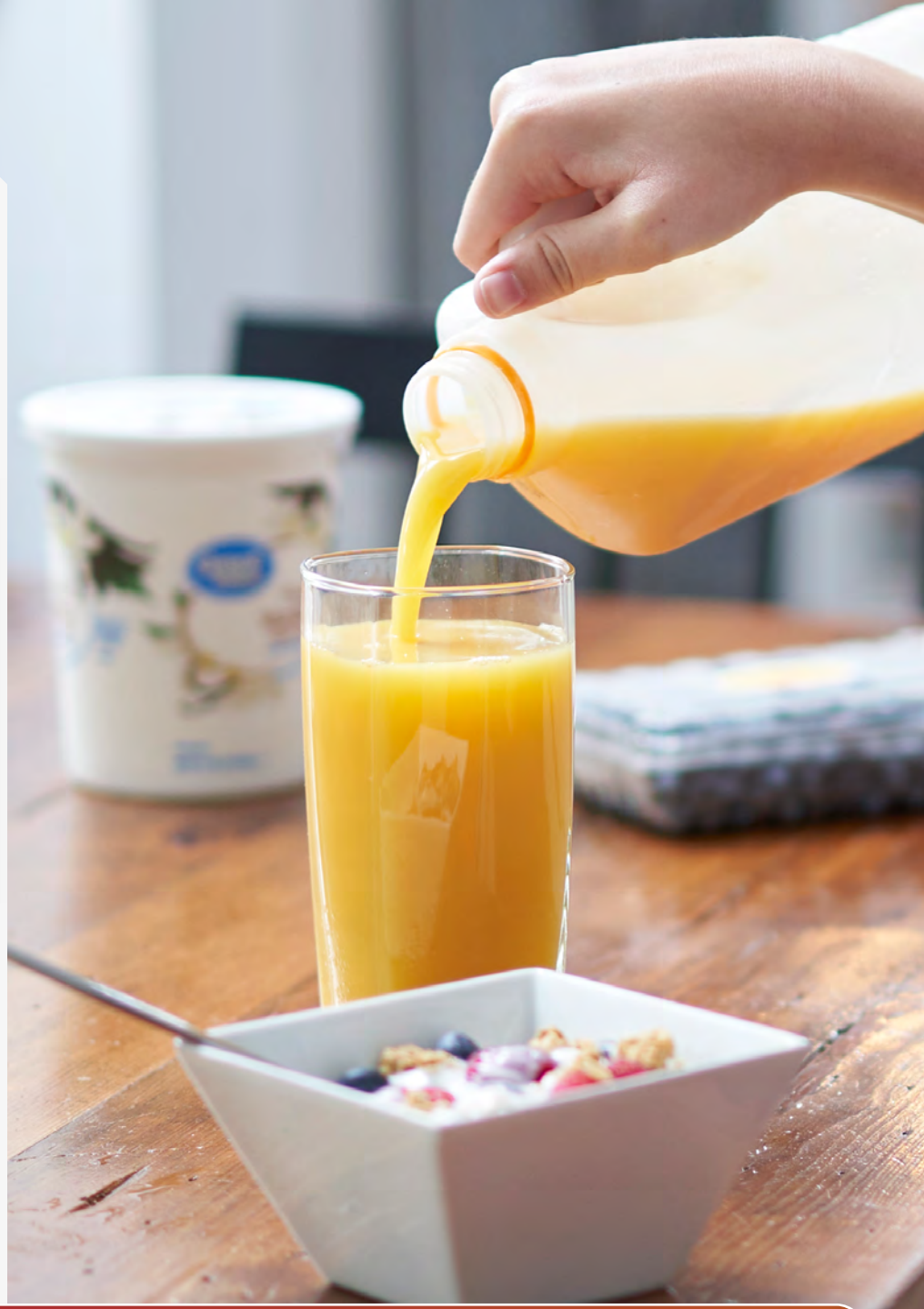
There is no magic bullet. But taking an enterprise wide approach—one that embraces information-enabled technologies and automation—can help you address food safety across your operations while increasing productivity.

This approach involves five key steps:

1. Get **Connected**
2. **Secure** your Networks
3. Implement Product **Traceability**
4. Employ a Risk-based **Preventative** Control Program
5. Improve Operational **Efficiency**

600 million—almost 1 in 10 people in the world—fall ill after eating contaminated food

Source: Food Safety, World Health Organization, May 19, 2022



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GET CONNECTED

How well do you understand the variables in the heating, cooling, weighing and filling processes that can impact your products' safety and quality?

What visibility do you have of the supply chains, where your raw materials originate and finished products are sent? These are questions that must be answered in the age of smart manufacturing.

Of course, smart operations are connected operations. For the future of information-enabled manufacturing to truly take hold, disparate networks and "islands of automation" must become a thing of the past.

Perhaps the most significant step involves converging your operations technology (OT) and information technology (IT) systems into a single unified network architecture, which Rockwell Automation refers to as **the Connected Enterprise.** This lays the foundation for seamless connectivity and greater collaboration among the many people, processes and technologies that impact product safety and quality.

Now, you can identify opportunities to use enabling technologies, such as **mobile platforms, cloud computing and Ethernet.** While the Connected Enterprise provides the foundation for greater connectivity, these technologies serve as the actual tools that can help you improve visibility into safety—and quality—related processes. They also enable easier viewing and sharing of that information across the enterprise.

Internet-connected sensors can measure time and temperature set points in real time and immediately send a notification if they are not met. This helps save time and money while reducing the risk of the product leaving the facility. Thanks to real-time IIoT technology, potential food safety issues can be detected quickly and dealt with internally before getting to the point of a recall.

Source: Four areas where the IIoT is revolutionizing the food and beverage industry, Plant Engineering, January 11, 2019

https://www.plantengineering.com/articles/four-areas-where-the-iiot-is-revolutionizing-the-food-and-beverage-industry/

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SECURE YOUR NETWORKS

Security is a top concern for anyone opening their operations up to greater connectivity and digital collaboration—and with good reason.

The multibillion-dollar global counterfeiting industry thrives on stolen intellectual property. Data breaches can occur by way of sophisticated cyber attacks or something as simple as an unguarded industrial computer port.

Internal missteps can jeopardize your proprietary information as well. This could include poor cable identification that leads to misconnections or a worker mistakenly accessing the wrong program and making recipe changes.

Network security directly impacts food safety and quality. As more manufacturers bring their quality-critical applications onto the network—from irradiation processes to managing proper heating and cooling temperatures—they must take the necessary measures to ensure a robust security program is in place.

DEFENSE-IN-DEPTH SECURITY

The breadth and ever-changing nature of today's threat landscape means that a "security through obscurity" approach is no longer viable.

Instead, a multilayered security approach is needed that builds several lines of defense across multiple levels of your network infrastructure.

That's what a defense-in-depth (DiD) security approach aims to accomplish. A DiD security approach addresses both internal and external security threats across six areas of focus:

- **Physical Security:** Guards, gates, lock-in/block-out devices, physical access control
- **Network Security**: Firewalls, IDS/IPS, switches and routers, DMZ, VLANs
- **Computer Hardening:** Antivirus software, application whitelisting, HIDS, software-patching best practices
- **Application Security**: Authentication, authorization and audit integrated into control-system applications
- **Device Hardening:** Adjusting out- o f-box device configurations in areas, such as change management and restrictive access
- **Policies:** Defining security technologies and how they are implemented; shaping processes and procedures for employees

Rather than being tacked on after the fact, your DiD security should be holistically developed to serve as a natural extension to your manufacturing processes.

Similarly, using an open network architecture, such as EtherNet/IP versus closed proprietary networks, will enable you to easily incorporate more security solutions from more vendors. That means you can integrate commercially available antivirus software, patches, intrusion-detection tools and other hardware or software to create a more dynamic network and better stay ahead of threats.

3

EMPLOY A RISK-BASED PREVENTATIVE CONTROL PROGRAM

With your operations connected and secured, you need to be able to access and act on your process control data to initiate a proactive approach to managing your food safety program. Replacing slow and outdated paper-based information gathering methods, software can automate the collection and visualization of process control data to give you deeper insights into your manufacturing processes.

With the right technology, you can apply a more proactive approach to your food safety program. This preventative approach can help to comply with regulations as follows:

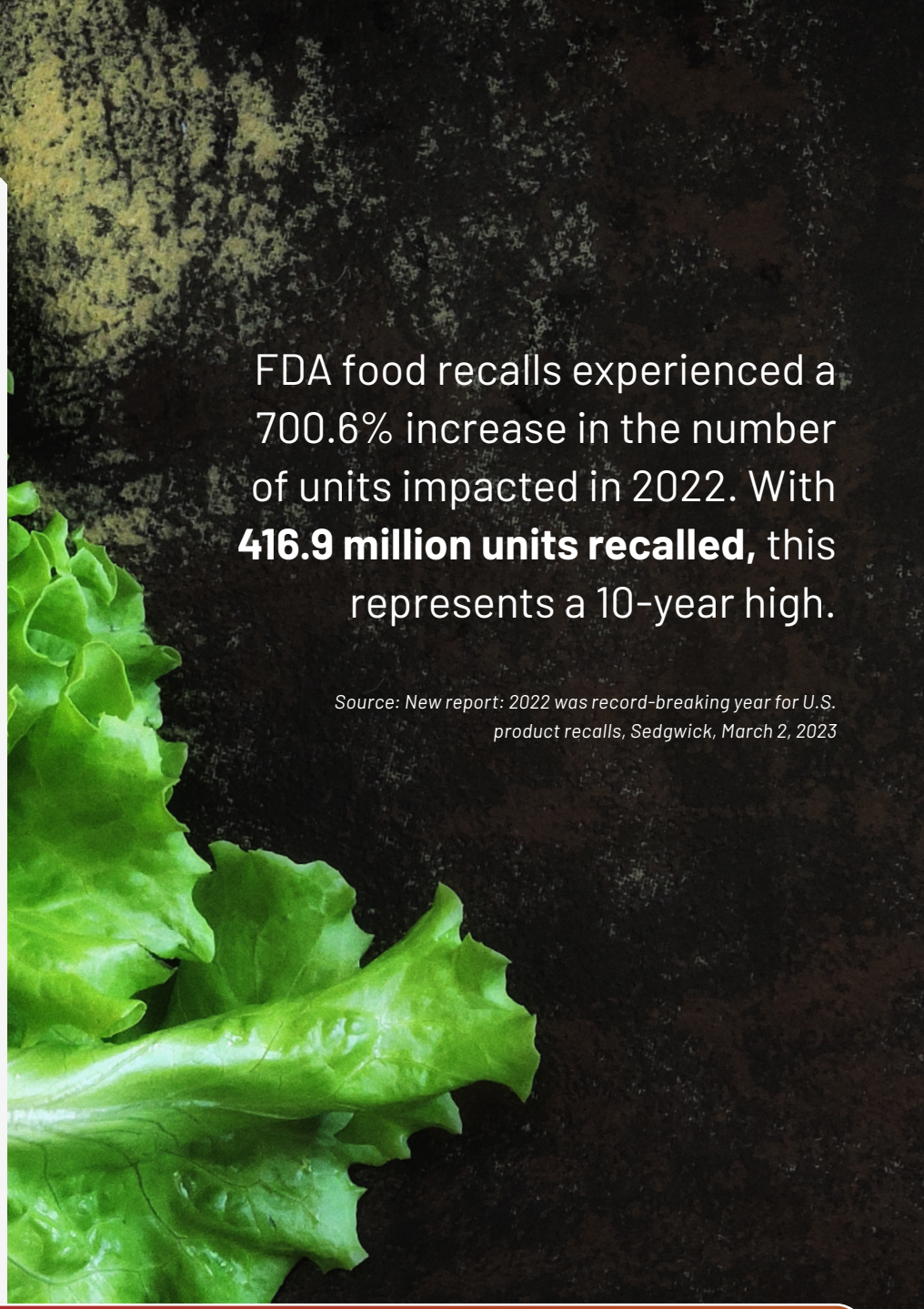
Real Time Monitoring of Critical Control points in Your HACCP Plan: Get real time process control information on parameters such as temperature, pressure, flow rate, cook time, line speed and clean-in-place (CIP). Create food safety dashboards to have a holistic view of critical control point performance across the plant.

Data Trending and Statistical Process Control: Obtain early warning when certain thresholds are met or before the process is out of spec for a more proactive approach.

Corrective Action Logs: Use 'monitor' and 'alarm' functions to gain visibility if certain process parameters are out of spec. Record when the required corrective action was taken. Leverage this information to meet regulatory rapid response requirements such FSMA.

Records Management and Verification: Visualize real time data and access historical data. Leverage trends, correlations and generate time stamped reports quickly—without having to dig through paper based reports.

Hygienic Design-IP69K Compliant: Integrate equipment and processes that support IP69K to minimize the risk of bacterial and cross-contamination from water ingress.



FDA food recalls experienced a 700.6% increase in the number of units impacted in 2022. With **416.9 million units recalled,** this represents a 10-year high.

Source: New report: 2022 was record-breaking year for U.S. product recalls, Sedgwick, March 2, 2023

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IMPLEMENT PRODUCT TRACEABILITY

Implementing a risk based preventive controls program enabled by the right technology is only one piece of the food safety puzzle—employing product traceability is also of critical importance and essential to your recall plan.

The pressure is on globally to increase traceability in the food supply chain. In China, regulations continue to evolve for greater traceability for infant formula. The latest British Retail Consortium (BRC) food-safety standard also includes stronger traceability requirements, and it is required for certification in all GFSI standards. In the U.S., the latest Food Safety Modernization Act (FSMA) section 204(d) regulations require increased traceability by January 2026.

Implementing a **supply chain track-and-trace system** can help you comply with these emerging regulations, and help protect your products against potentially dangerous counterfeits and supply chain diversions. A supply chain track-and-trace system also can offer additional business benefits, such as helping you conduct more efficient product recalls and supporting customer-targeted marketing programs.

Designing a system in-house can be tempting, but can lead to long-term issues, such as support difficulty and parts shortages. Instead, consider using an out-of-the-box system that can be easily integrated into your lines. Also, to ease the integration process and minimize production disruptions, consider using a standardized system that was designed at the MES level. This can help ensure interoperability down to the machine level and up to the enterprise and cloud levels.

The final rule will **enable speedier adoption of tech-enabled traceability**, a pillar of the New Era of Smarter Food Safety Blueprint. The final rule establishes a universal language that can be leveraged to increase the use and availability interoperable data, improving the agency's and industry's abilities to **trace the movement of food** and respond to food safety incidents

Source: https://www.food-safety.com/articles/8139-fda-issues-fsma-food-traceability-final-rule-holds-briefing

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IMPROVE OPERATIONAL EFFICIENCY

A secure, connected infrastructure can play a critical role in strengthening your food safety program and can help with regulatory compliance such as FSMA, but the benefits do not end there.

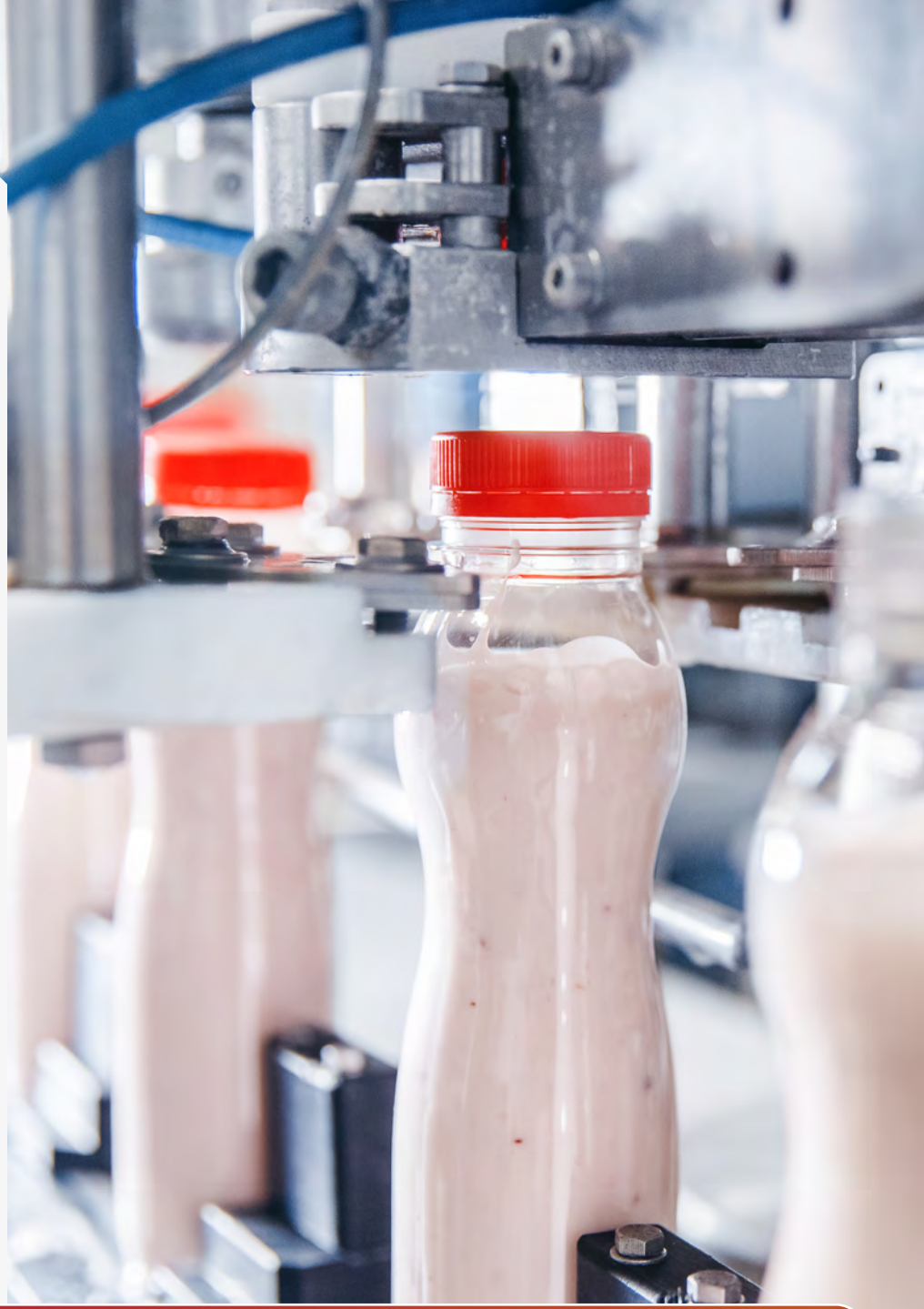
It can also be used to improve product quality, asset utilization, yield and energy usage. It is more important than ever that you take advantage of technologies that improve asset utilization to meet demanding production goals and support faster changeovers while also maintaining high product quality.

Manufacturing intelligence tools, such as metrics applications and data-rich dashboards, can report on how your machine is performing, as well as why it's performing at that level. This can help you improve OEE while also delivering more consistent batches, even as raw materials or processes vary.

A process automation system that delivers predictable batch processing, consistency between batches and event-based information can be critical to helping you reduce process variability and achieving consistent product quality.

Mixing optimization solutions can help manage process changes and ingredient variability to improve product consistency for applications ranging from single repeatable processes to large processes that have complex batch and sequencing requirements.

To help manage a growing number of product varieties, packaging options and new products, a **configurable line-control solution** can enable easier integration of discrete production lines and use production analysis to help you monitor key quality metrics.



SUCCESS STORY

MANUFACTURING INTELLIGENCE SUPPORTS FSMA COMPLIANCE AND IMPROVES YIELD

With new preventive measures against foodborne-illness hazards implemented within Food Safety Modernization Act (FSMA) section 204(d), a leading packaged meats producer sought to upgrade the manufacturing intelligence capabilities at one of its facilities to support the new guidelines.

Tasked with producing several dozen varieties of meat-based products, the company needed to better manage its large number of product variations and the changeovers taking place on the plant floor every day. Product changes impact variables in the production process, from cooking times and temperatures to raw material amounts and combinations—all of which could result in quality deviations. And because operator data was manually entered, searching for the root cause on quality-deviation issues was cumbersome and time-consuming.

The company wanted a manufacturing intelligence solution that could improve visibility into production processes and ensure compliance with the FSMA requirements. As an added benefit, the improved visibility into process variability would also help the company reduce waste and improve yield.

The company chose to use the FactoryTalk® software suite from Rockwell Automation. The software integrates with the Rockwell Automation Integrated Architecture® system for plant control and leverages an EtherNet/IP™ network architecture. The integrated system can deliver plantwide insights with the ability to drill down into each production area to monitor critical control points and improve efficiencies and product quality.

The system pulls more than 1,500 data points, giving plant personnel the ability to monitor across numerous production and packaging processes. Information is displayed on dashboards available via PCs or viewed from anywhere in the plant on Microsoft® Surface™ tablets.

In addition to giving plant personnel greater insights into their operations and supporting compliance with the new FSMA requirements, the system has helped the company cut its inedible waste nearly in half. As a result, the company is saving over 1 million pounds (or 450,000 kilograms) of product annually.

CHALLENGE

The lack of visibility and real-time reporting during production led to an increased amount of inedible product and posed potential food-safety compliance risks.

SOLUTIONS

Manufacturing Intelligence

- FactoryTalk VantagePoint® and Historian software from Rockwell Automation gathers, stores, aggregates, correlates and presents production information to operations, so variances are more easily identified and corrected in real-time
- Microsoft Surface tablets extend operator mobility and collaboration between plant-management functions

Integrated Architecture System

Standardized on the Logix control platform and EtherNet/IP for scalable, seamless, real-time communications structure and single design environment

RESULTS

Reduced Waste

- Decreased inedible goal by half, from 1.6 to 0.8 percent, resulting in nearly 1 million pounds of product saved annually
- Eased record keeping and reporting
- Obtained real time visibility into critical control point performance

SUMMARY

Unsafe food and beverage products can have devastating and long-term consequences.

The most significant toll is always human. That toll can extend to your operations in the form of massive worker layoffs. Financial impacts can be wide-ranging, from wasted product, recall efforts and plant shutdowns to drawn-out litigation costs. Meanwhile, the reputation damage and loss of trust resulting from these incidents rarely can be quantified.

How prepared is your operation to prevent or identify safety and quality issues before they reach consumers? Where do you fall short?

Taking action to mitigate any shortfalls will require investments, but those investments are likely miniscule compared to the full scope of costs that would result from a major product recall.

Remember: Your brand and your business are represented in every food or beverage item that rolls off the line. A comprehensive approach to protecting product safety and quality can strengthen your reputation, satisfy increasingly scrutinizing customers and regulators, and ultimately boost your bottom line.

Get **connected**

Secure your **networks**

Employ a risk-based preventative **control program**

Implement product **traceability**

Improve operational **efficiency**

$110 billion USD is lost each year in productivity and medical expenses resulting from unsafe food

Source: Food safety, World Health Organization, May 19, 2022

NOT SURE WHETHER YOU'RE AFFECTED?
CONTACT A ROCKWELL AUTOMATION FOOD SAFETY EXPERT FOR HELP.

rok.auto/food-safety

Connect with us.

AMERICAS: Rockwell Automation, 1201 South Second Street, Milwaukee, WI 53204-2496 USA, Tel: (1) 414.382.2000
EUROPE/MIDDLE EAST/AFRICA: Rockwell Automation NV, Pegasus Park, De Kleetlaan 12a, 1831 Diegem, Belgium, Tel: (32) 2663 0600
ASIA PACIFIC: Rockwell Automation SEA Pte Ltd, 2 Corporation Road, #04-05, Main Lobby, Corporation Place, Singapore 618494, Tel: (65) 6510 6608
UNITED KINGDOM: Rockwell Automation Ltd., Pitfield, Kiln Farm, Milton Keynes, MK11 3DR, United Kingdom, Tel: (44)(1908) 838-800

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