Innovation for Better Food Safety from Industry Perspective

Chulwoo Jeong

Samyang Foods

Contents

Images that Come to Mind When Thinking of KOREA

1

K-Pop(17.8%)

2

K-Food(11.8%)

3

Drama(8.7%)

4

Beauty(6.4%)

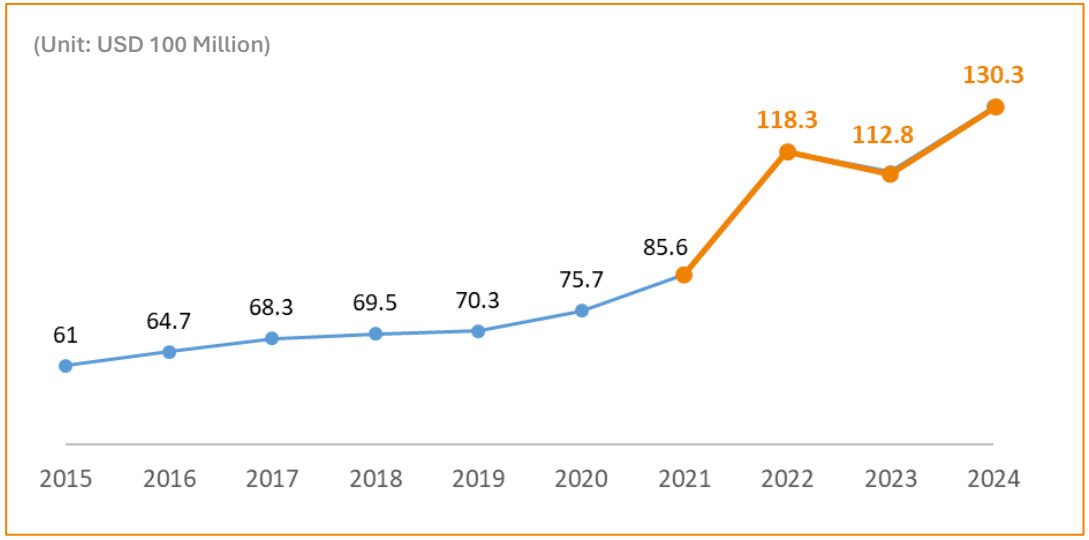
5

Movie(5.6%)

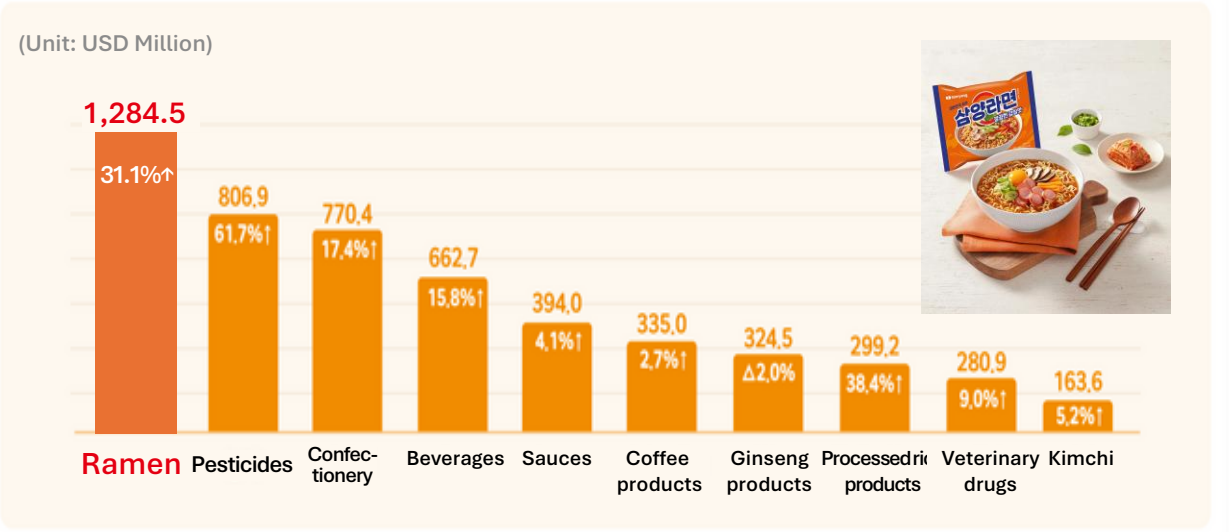
Source – 2025 Overseas Hallyu Status Survey Results
Ministry of Culture, Sports and Tourism

K-Food Export Status

K-Food Annual Export Performance



Export Performance of Major Product Categories

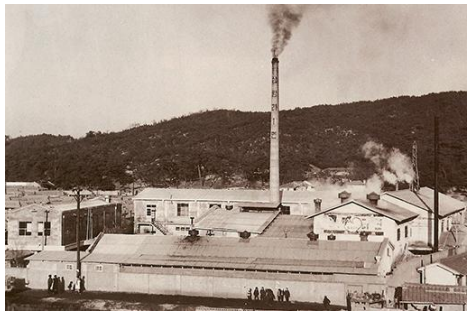


Source – Ministry of Agriculture, Food and Rural Affairs

Samyang Foods

In September 1963, Korea's first ramen noodle,

Samyang Ramen, was launched.

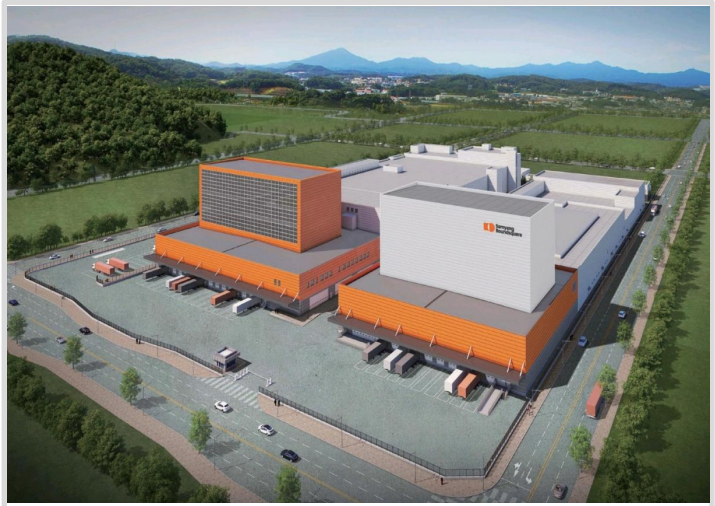


Nissin, Chicken Ramen (1958)

Production facilities

Founded February 1989
Location Wonju-si, Gangwon-do
Products Noodles, snacks, sauces, and seasoning materials
Size 130,867㎡

Founded February 1971
Location Iksan-si, Jeonbuk-do
Products Noodles
Size 86,839 ㎡



Miryang Plant Smart Factory / Green Factory Facility

Founded May 2022
Location Miryang-si, Gyeongsangnam-do
Products Noodles, sauces
Size 70,303㎡

Manufactured Products

Global Export Destinations

Food Safety Management Trends and Cases from an Industry Perspective

Food Safety Management Trends from an Industry Perspective

Digital Transformation	• Digitizing production management using smart factories and more • Managing risk prediction using AI and IoT technologies • Implementing blockchain-based food traceability
Globalization	• Responding to global regulations and expanding exports • Complying with global food safety standards
Advancement of analytical technology	• Adopting precise and rapid analytics • Shifting to preventive food safety through real-time, on-site analytics
Sustainable management	• Integrating environmental responsibility with food safety management in the food industry • Managing a sustainable supply chain

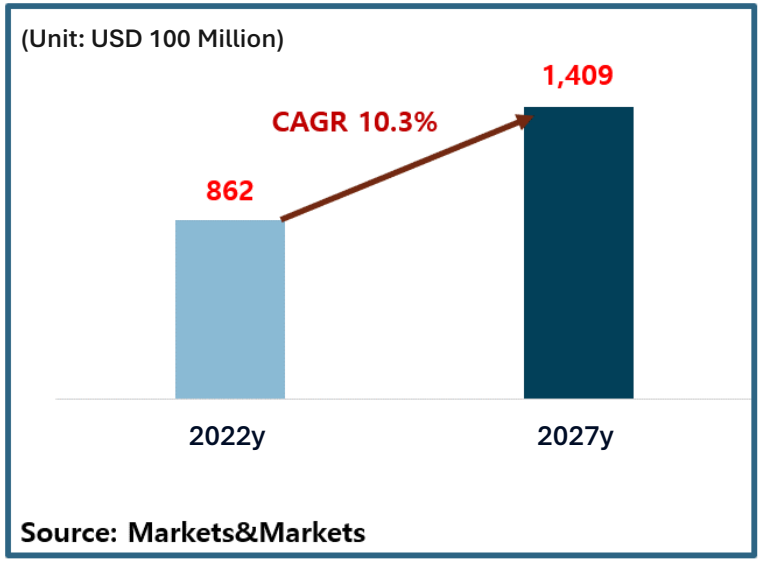
Digital Transformation: Smart Factory

Smart Factory

IoT sensors are installed on equipment and machinery to collect and analyze data in real time. Factory operations are visualized for observability, and the data is analyzed and controlled for specific operational purposes (controllability).

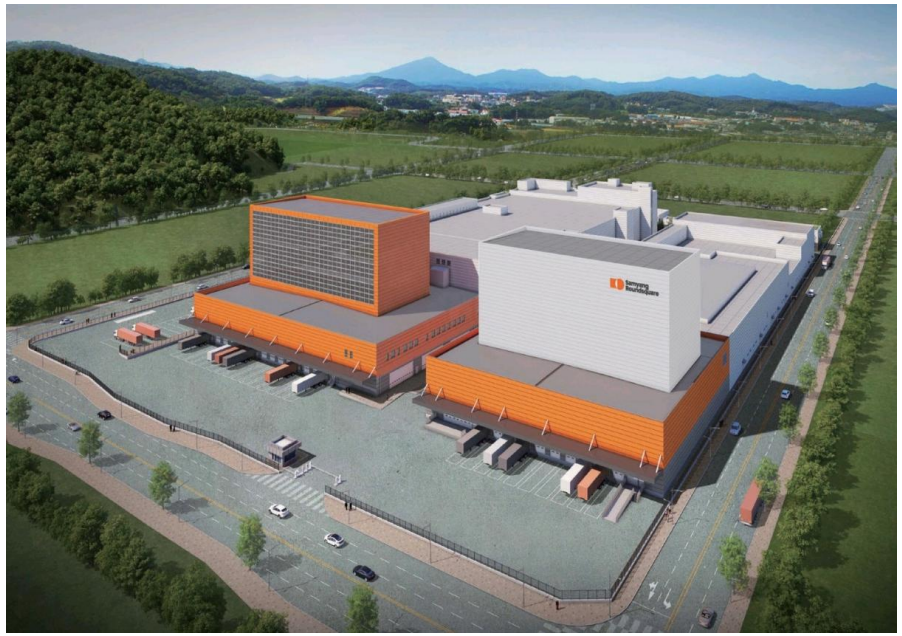
- Analyze data collected from each factory
- Establish a data-driven factory operation system (Data Driven Operation)
- Enable root cause analysis of issues on the production floor

Global Smart Factory Market Forecast



Samyang's Smart Factory

Samyang Foods Miryang Plant



Founded	May 2022
Location	Miryang, Gyeongsangnam-do
Products	Noodles, sauces
Size	70,303㎡

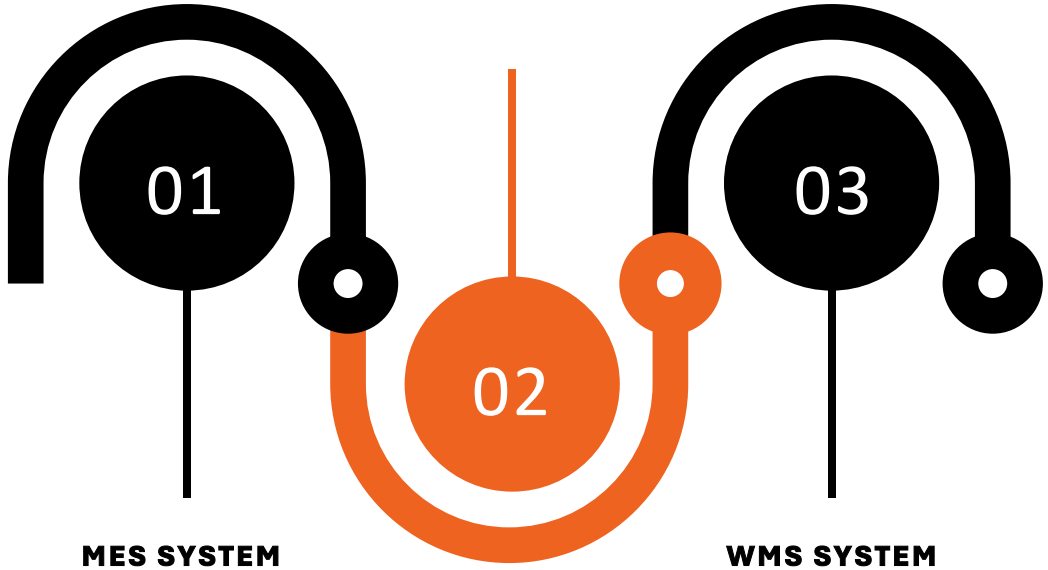
- Smart Factory
  Implementation of automation systems such as MES, WMS, and BMS
- Eco-friendly factory
  Adoption of building-integrated photovoltaic (BIPV) system

Samyang’s Smart Factory

BMS SYSTEM

Building Management Systems

Samyang Foods' Miryang plant is introducing automation systems for energy management, including electricity, steam, gas, and air conditioning.



MES SYSTEM

Production Execution Management System

Samyang Foods' Miryang Plant uses a real-time MES to monitor quality, automate facilities, and manage performance—enhancing efficiency across all manufacturing operations.

WMS SYSTEM

Automated warehouse management system

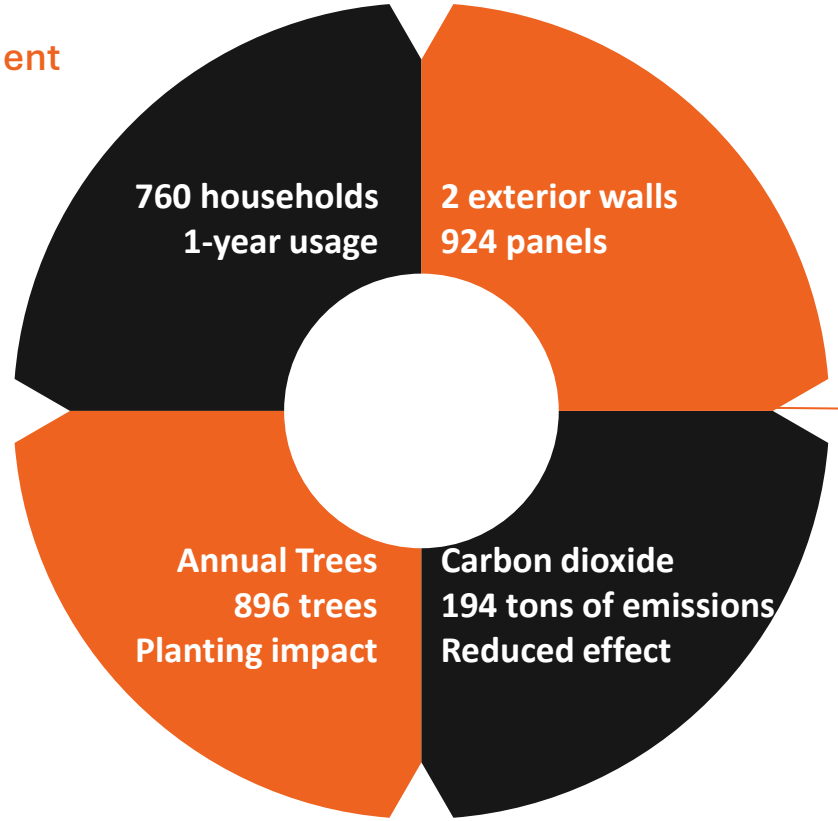
The automated WMS integrates production, quality, and logistics through barcode-based management of raw materials and finished products.

Samyang's Smart Factory

Building-integrated solar panel installation

Creating an ESG environment

- 2140 square feet
- 924 panels installed
- Annual generation 436 MWh/yr
- 1-year usage for approximately 760 households



Digital Transformation: QMS

QMS : Quality Management System

QMS

A system that manages quality information generated throughout the production process in real time based on data and reflects this information in quality policies and decision-making.

- Establishment of a preventive quality management system through database construction
- Systematization of quality standards and technical information on product design
- Minimizing human error and improving data reliability
- Rapid response to quality issues and traceability of issue lots

[QMS Scope of Application]

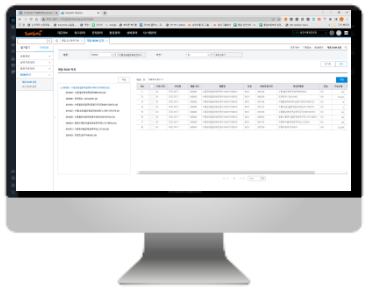
Process Management	Standard Management	Inspection Management	Claims
Certification Management	Nonconformity Management	Incoming Goods Management	...

The scope and form of application are not standardized, and the system is customized according to the company's quality requirements, current systems, and environmental conditions.

Samyang's QMS

Track 1. Digitization of the quality management process

Integrated Platform for Quality and Process Management



Main Category

- Stored inspection
- Delivery inspection
- Management of partner
- Standard Management
- Samyang checklist
- Claim
- Regulations
- Education program
- Process inspection
- Calibration
- LIMS
- Monitoring equipment
- CCP monitoring
- Defective Product Management

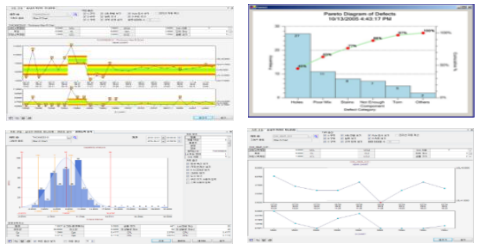
Real-Time Data Management through Digitalization

- Manual entry of main process inspection and checklist
- Store documents related to quality processes

Manage inspection and maintenance data records

Add or update checklists through standardization

Data analysis in real time



Track 2. Automating Risk Management in Manufacturing through Statistical Quality Control

Data Collection by Process Stage (Noodle Production Process)

Mixing → Rolling and Steaming → Frying → Cooling → Wrapping

Temperature, Humidity, Thickness, Pressure, Oil level, weight, RPM Etc.,

Transmission of Collected Data via Cellular Network

Indicator, Sensor

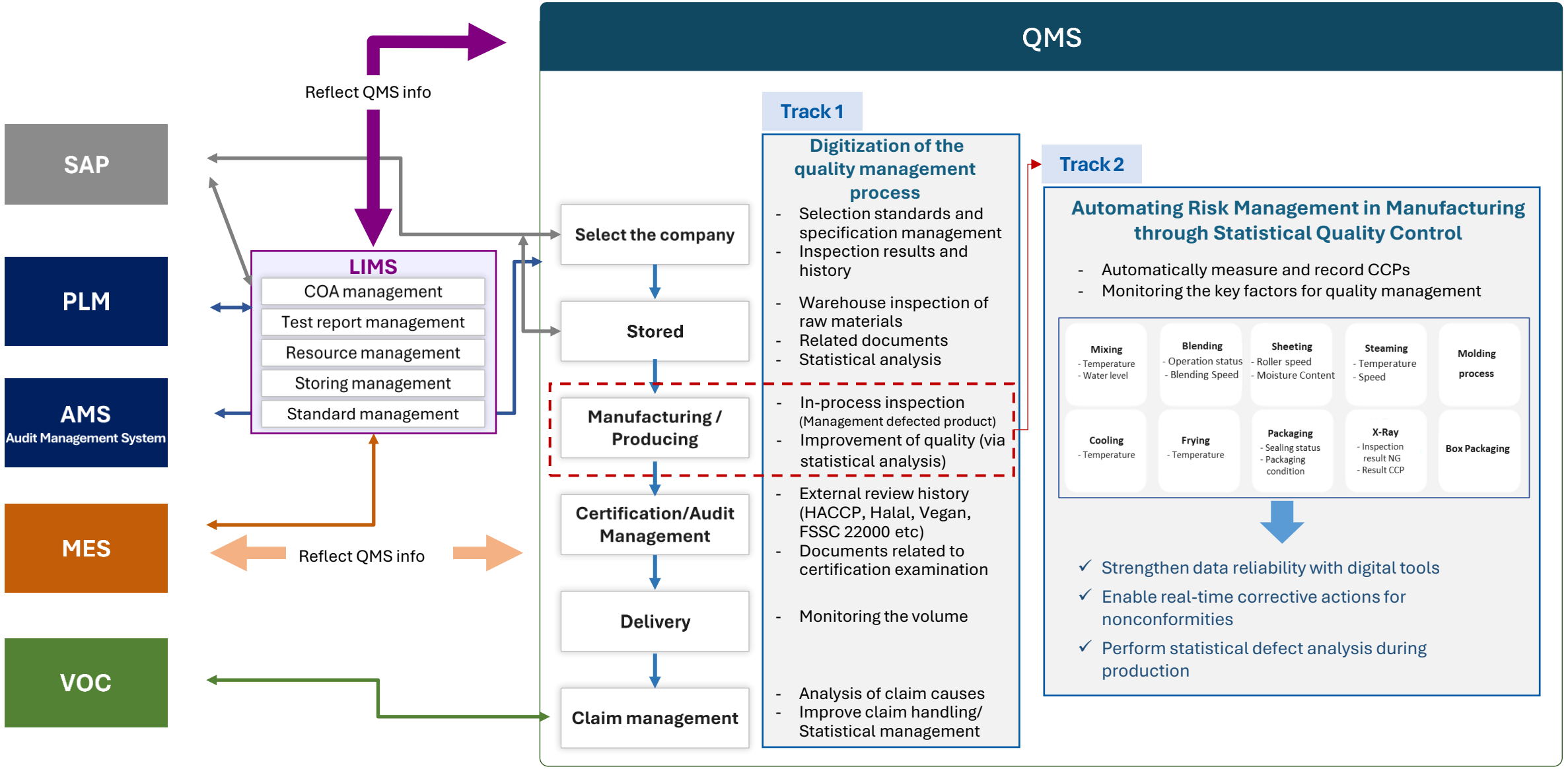
Gateway

Cloud Platform

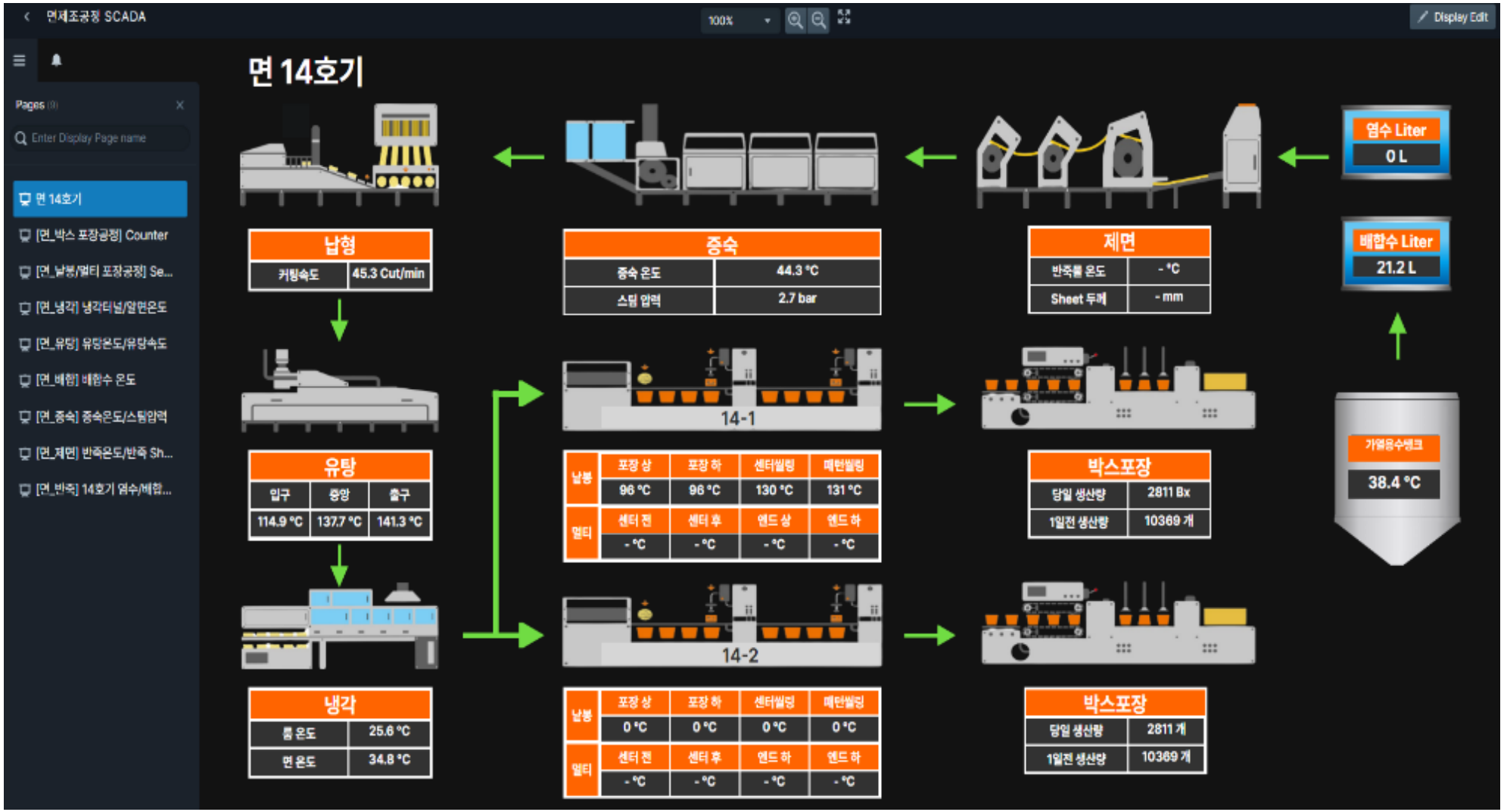
Software Tool

- Collect data in real time and manage key performance indicators
- Analyze root causes of defects using collected data
- Improve operational efficiency and reduce process variation

Samyang's QMS

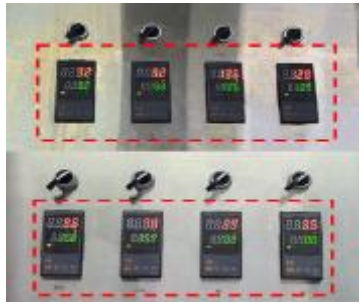


Samyang's QMS



Samyang's QMS

Packaging Process (Single-Pack / Multi-Pack)



[Screen]

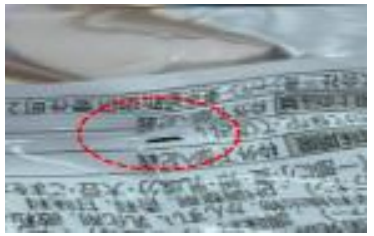
Data Collected

1. End and center sealing temperatures of single packs
2. End and center sealing temperatures of multi-packs
3. Temperature and humidity of the workspace

◯ Quality Issues: Packaging Defects (Under-sealing / Over-sealing)
: No alarm function in case of insufficient or excessive sealing temperature

◯ Utilization Plan: Real-Time Response and Production Traceability
: Alarms are triggered based on temperature log analysis, enabling traceability of production conditions.

[Example]




Samyang's QMS

Digitalization of Quality Data

- Real-time collection of equipment data
- Implementation of data standardization and normalization
- Analysis and monitoring of quality data with integrated alarm systems

Ensuring Reliability Through Data-Driven Approaches

- Reduce manual labor and minimize human error in data measurement
- Ensure reliable quality data from equipment and processes

Maximizing Efficiency in Quality Management Operations

- Digitalization of manual tasks
- Enhanced traceability and management capabilities for quality issue response

- ◯ Leading the Digitalization of Quality Management Technologies in the Global Export Market
- ◯ Rapid Traceability and Management in Case of Quality Issues
- ◯ Continuous Quality Improvement Based on Data

Digital Transformation: RPA

Responding to Global Regulations through RPA

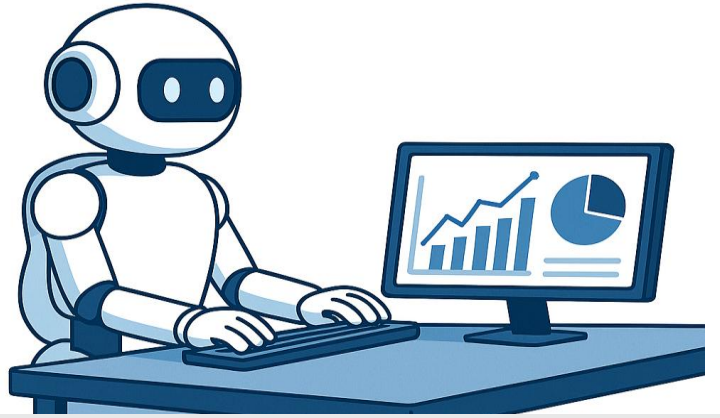
RPA ; Robotic Process Automation

A technology that automates repetitive and routine tasks traditionally performed by humans, using robotic software

- Differences in Standards and Regulations by Country
- Continuous Updates of Standards and Specifications
- Global Food Safety Issues
- Samyang Foods Exports to Over 100 Countries

Proactive Strategy

- Real-time management of global food safety data
- Develop company quality policies based on data analysis
- Respond proactively to global regulations



Automation Through the Introduction of RPA

Real-time monitoring of over 20 domestic and international sites

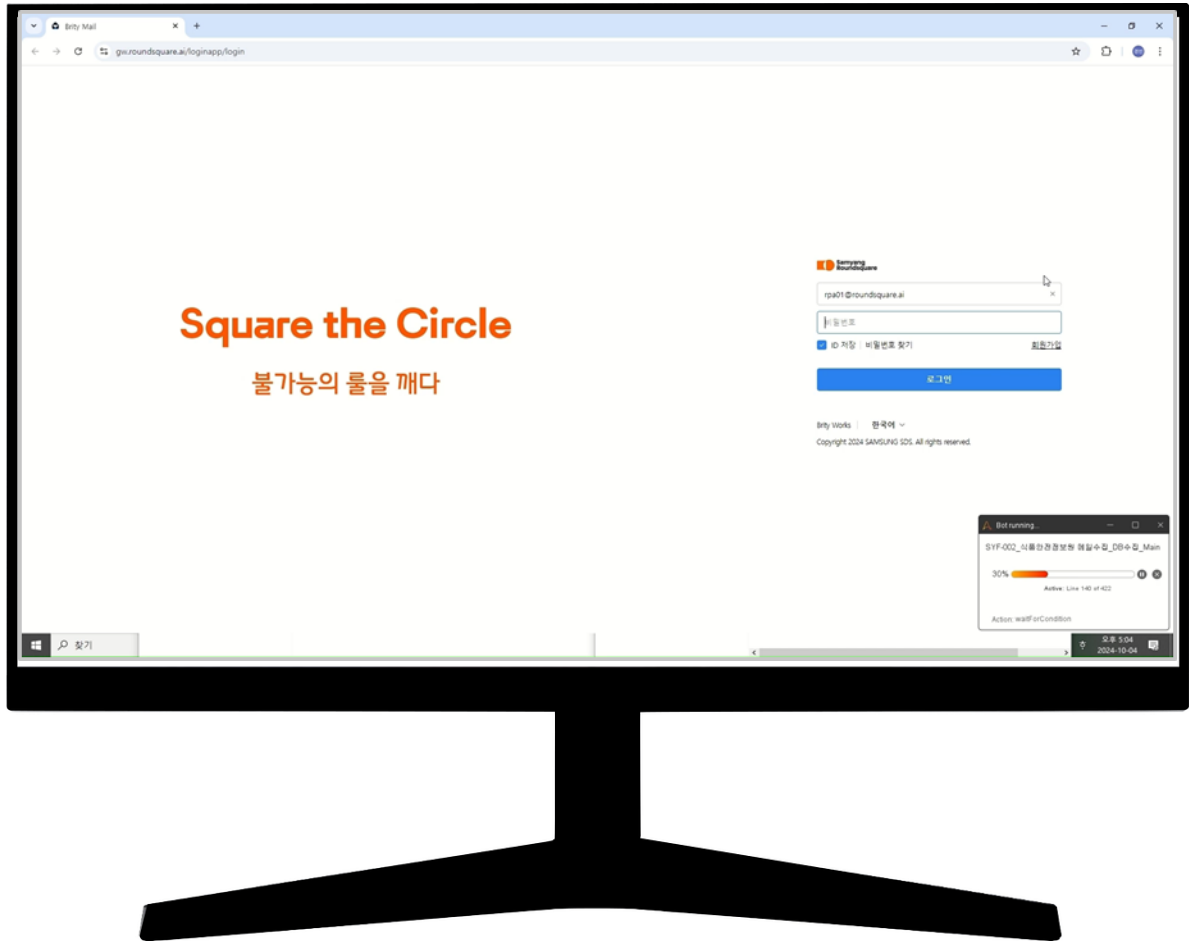
Approximately 970 working hours saved per month

- ✓ Simple tasks
- ✓ Repetitive tasks
- ✓ Time-consuming tasks
- ✓ Accuracy-critical tasks

Digital Transformation: RPA

Responding to Global Regulations through RPA

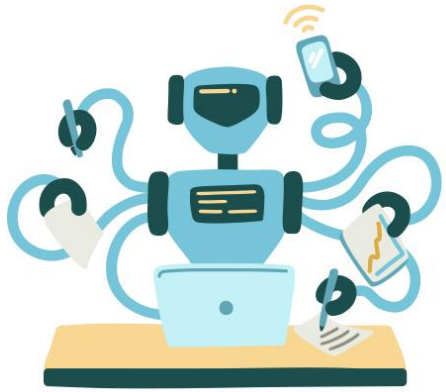
- RPA Demonstration Screen



As is

970 hours/month of
manual work required

To be

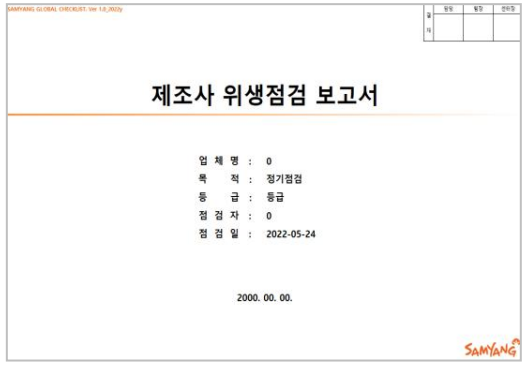


Only 126 hours/month required
No human intervention needed

- ✓ Increased productivity by reducing manual working hours
- ✓ Shift from repetitive tasks to value-creating work
- ✓ Reduced human error and improved accuracy

Implementation of Global Standards in Manufacturing Facilities

Samyang Global Checklist

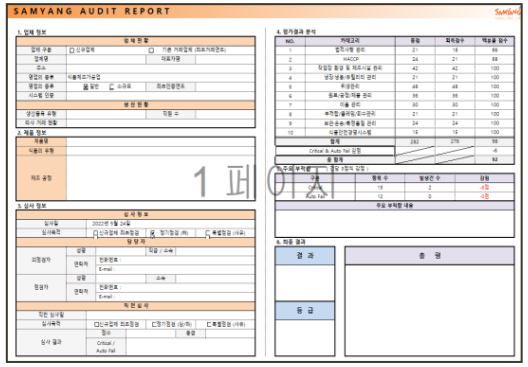


제조사 위생점검 보고서

업 체 명 : 0
목 적 : 정기점검
등 급 : 등급
점 검 자 : 0
점 검 일 : 2022-05-24

2000. 00. 00.

SAMYANG



SAMYANG AUDIT REPORT

- **Food-Related Regulations**
  - Food Sanitation Act, Livestock Products Sanitation Control Act, and other relevant food regulations
- **Food and Livestock Safety Certification Standards (HACCP)**
  - HACCP and Prerequisite Program Management
- **Global Requirement**
  - GFSI Benchmarking Requirements (e.g., FSSC 22000)
- **Halal Requirements**
  - Applicable only to designated production lines

The same standards are applied not only to our own production lines, but also to raw material suppliers and OEM partners.

Application of Global Standards in Manufacturing Plants

KFS (K-Food Safety) Certification Program

Scanning the Product's QR Code

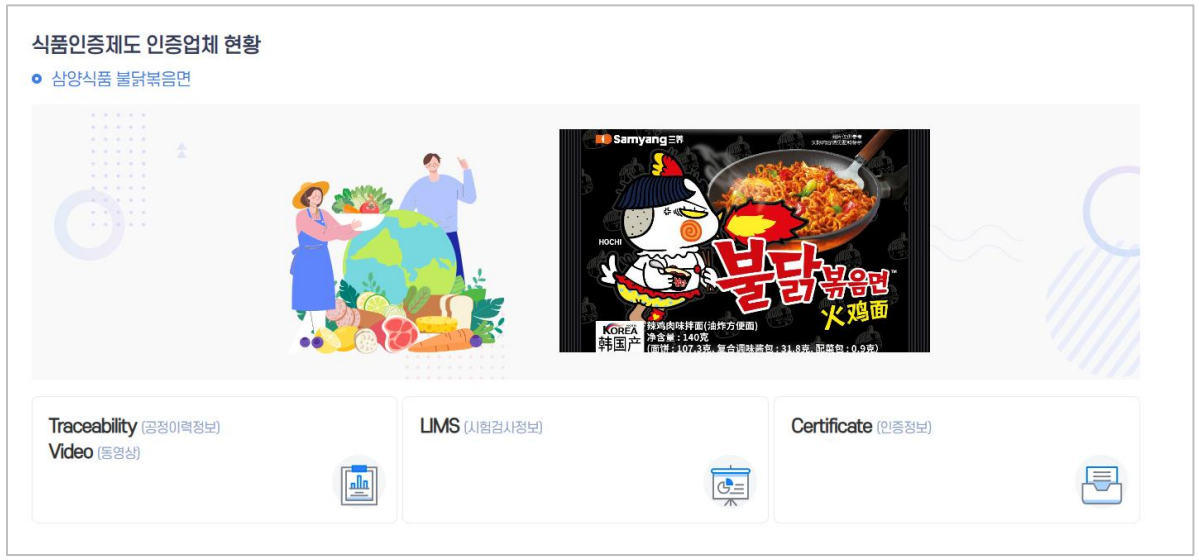
QR Code-Linked Information

① Manufacturing Process Information

② Product Inspection Records

③ Audit and Certification Results

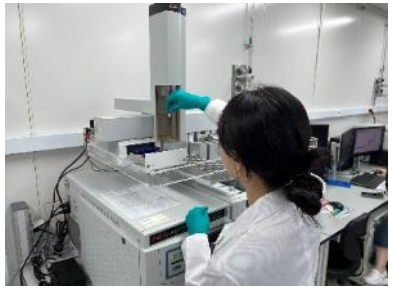
https://www.haccp.or.kr/user/board.do?board=1364



Advancement of analytical technology

Product Quality and Safety Analysis Standards

- Compliance with Country-Specific Standards and Regulations
- Maintaining Quality and Safety Throughout Distribution
- Sensory Quality



Advancement of analytical technology

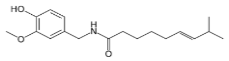
Standard for Spiciness

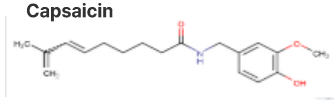
Scoville Heat Unit (SHU)

A numerical scale that quantifies spiciness by measuring capsaicin concentration in chili and black peppers.
(Total capsaicin × 15 to 16)

Analytical management of manufactured products

HPLC analysis of cooked products


Capsaicin

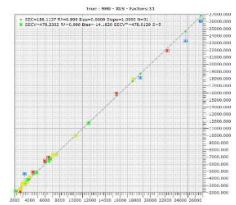

Dihydrocapsaicin

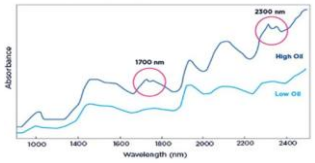

HPLC

- ✓ Approx. 20 hours required (based on 6 samples)
- ✓ Requires trained analytical personnel

Real-Time Spiciness Control During Processing

NIR (Near-Infrared Spectroscopy)





- ✓ Approx. 30 minutes required (instrument runtime)
- ✓ No trained personnel required

Future Direction of Food Safety Management

Collaboration for Food Safety

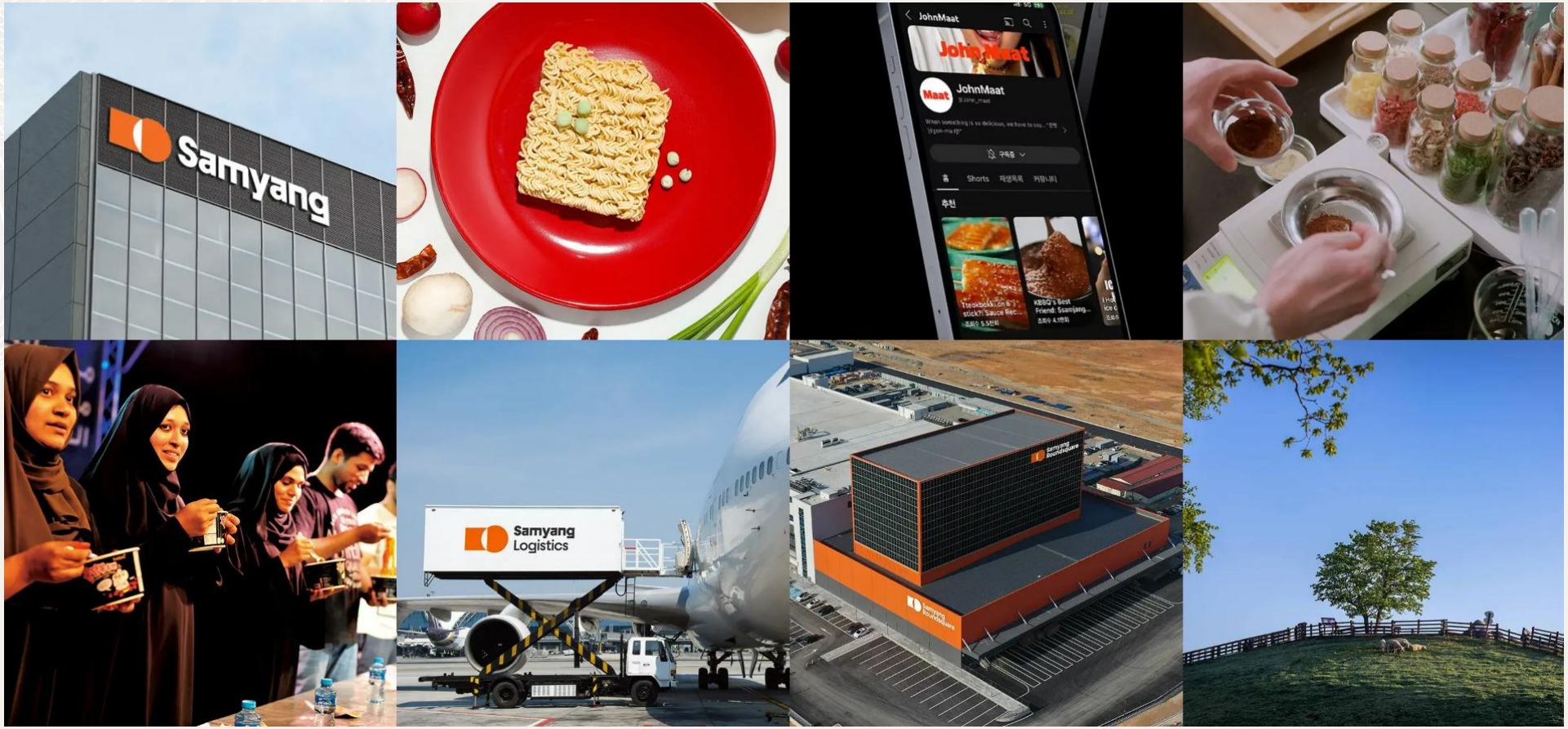
- Harmonize food safety standards and build trust
- Build real-time food safety response systems via public-private collaboration
- Develop a global food safety system through international cooperation

Technology and Innovation in Food Safety

- Accelerate innovation in AI-powered food safety systems
- Deploy advanced technologies across the entire food supply chain
- Strengthen risk prediction and traceability capabilities in the food industry

ESG-Based Food Safety Management

- Adapt food safety standards in response to environmental changes
- Strengthen management practices to meet sustainability certifications, including RSPO, SMETA, and FSC



Thank you

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Asia-Pacific Food Regulatory
Authority Summit