

Discovering The World Of instant noodles making machines

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Transformation and upgrading of instant noodle production

The global instant noodle industry is undergoing a historic transformation. The latest survey by the International Food Machinery Association reveals that the global consumption of this category exceeded six billion servings for the first time in 2024. Sales in sub-Saharan Africa surged nearly 40% year-on-year, while ASEAN countries have maintained double-digit growth for three consecutive years. This consumption trend reflects profound changes in the times.

The [modern instant noodles industry](#) is undergoing three structural transformations, according to Wang Xia'ou, a senior advisor at the Global Food Technology Research Institute. Urbanization is accelerating the demand for convenient food, rising disposable incomes in emerging economies are driving (consumption upgrades), and the habit of home stockpiling formed in the post-pandemic era is becoming a long-term consumption driver. Notably, beneath the surface of industrial prosperity, a technological revolution is brewing. Traditional manufacturing processes can consume up to 1.5 million kilowatt-hours per year per set of equipment. With the implementation of 82 international environmental regulations, including the EU's Carbon Border Adjustment Mechanism (CBAM), industrial transformation has become an inevitable choice.

A breakthrough in the industry has occurred at the production end with the introduction of the sixth-generation intelligent manufacturing system. This system features a modular design and, while maintaining a

production capacity of 36,000 packages per hour, achieves a dramatic reduction in energy consumption. Data from the Osaka Food Engineering Laboratory shows that an experimental line using the innovative microwave drying system has reduced the comprehensive energy consumption per kilogram of product to 0.57 degrees, down from 1.2 degrees for traditional steaming processes.

Li Zhenhua, Vice President of the Chinese Institute of Food Science and Technology, pointed out that in a market environment where palm oil prices have risen by 28% year-on-year and wheat flour costs have increased by 15%, improving energy efficiency in manufacturing directly determines a company's survival space. After technological upgrades, a leading enterprise has achieved an annual surplus of carbon quotas at a single factory, generating transactional revenue in the tens of millions. This technology revolution, starting on the production line, is redefining the entire value chain from raw material procurement to final pricing. The following sections will analyze how intelligent production systems achieve dual breakthroughs in commercial value and environmental benefits through process innovation.



Analysis of potential development in various global regions

1. Africa: Explosive growth in emerging markets

- Sub-Saharan Africa: Sales surged by 37% in 2024, making it the fastest-growing region globally. Key drivers include accelerated urbanization, a high proportion of young people (over 60% are under

30), and a shift towards convenient foods. For instance, Ssangyang's Fire Noodles saw sales grow over 200% within two years in Nigeria and Kenya by precisely targeting younger consumers.

- North African market: The demand for instant noodles in Egypt and Algeria is rapidly increasing due to economic pressure and rising living costs. Egypt's market is projected to have a compound annual growth rate of 15.95% by 2027, positioning it as one of Africa's growth engines.

2.Southeast Asia: Stable Growth and Diversified Innovation

- Indonesia: As the world's second-largest consumer of instant noodles (consuming 14.54 billion servings in 2023), the Indonesian market accounts for more than 30% of Samyang Foods' overseas sales. Localized strategies, such as introducing halal-certified products, and price tiering (with products ranging from 1 to 20 yuan) are key success factors.
- Vietnam and the Philippines: Local brands like Vietnam's Acecook maintain an annual growth rate of 8%-10% through health-focused products (such as non-fried noodles) and expansion into convenience store channels. The Philippines benefits from the prevalence of smaller households and fast-paced lifestyles.

3.North America: Premiumization and Expansion of Consumption Scenarios

- United States: In 2023, instant noodle consumption rebounded by 3.4%, driven by the middle class's demand for diverse flavors such as Korean spicy and Japanese tonkotsu. Nissin Foods invested \$228 million in building a factory in South Carolina, aiming to capture the market with a 'premium fast food' positioning, such as microwave-ready cup noodles.
- Mexico: Sales grew by 17.2% in 2021 and 11% in 2022, making it the fastest-growing market in Latin America. Samyang collaborated with

local convenience store chain OXXO

4. Europe: Health and Sustainable Transformation

- Western Europe: The German and French markets are attracting environmentally conscious consumers by launching organic noodles, such as gluten-free buckwheat noodles, and low-carbon packaging, like Nissin's cups made of 40% recycled fibers, with a compound annual growth rate of 4.47% expected from 2024 to 2032.
- Eastern Europe: Due to food supply instability caused by the Russia-Ukraine conflict, instant noodle demand has risen as an emergency reserve, with sales increasing by 9% in 2023.

5. Middle East: Cultural Fusion and Consumption Upgrade

- In Saudi Arabia and the UAE, the Korean wave has popularized spicy instant noodles, with Ssangyong Dak Galbi Noodles doubling sales through social media challenges like the #FireNoodleChallenge. Additionally, the penetration of premium cup noodles (priced around \$5) has increased among high-income groups.



An overview of the instant noodle making machine

The core objective of modern instant noodle production lines is to achieve efficiency, stability, and automation to meet the continuously growing global market demand. A complete instant noodle production line typically includes the following key stages: dough mixing, where high-quality wheat flour is combined with water and other essential

ingredients to create a smooth, elastic dough; sheeting, where the dough is rolled out into thin sheets using precision rollers; cutting, where the sheets are sliced into precise noodle shapes by sharp blades; drying, where the cut noodles are carefully dried to remove moisture while maintaining their texture and flavor; seasoning and packaging, where the dried noodles are paired with savory seasonings and vacuum-sealed in convenient, resealable packets; quality control, where each batch undergoes rigorous testing to ensure consistency and safety; and finally, storage and distribution, where the finished products are stored under optimal conditions before being shipped to retailers worldwide.

Flour mixing - compounding - boiling - cutting and bending - frying - cooling - packaging

1.Mixing

Mixing dough is the first crucial step in instant noodle production, directly affecting the final taste and quality of the noodles. Traditionally, flour and water are mixed in a specific ratio (usually 100:28-35) and supplemented with salt and alkali to enhance the dough's elasticity. Modern fully automatic production lines use vacuum mixing technology, stirring the dough in a sealed environment to prevent air from mixing in, making the dough tighter and more elastic.

Compared to regular mixers, vacuum mixing reduces dough bubbles, making subsequent rolling processes smoother and resulting in more uniform sheets. Additionally, a dual-axis mixing design ensures thorough mixing of materials, avoiding clumping or uneven moisture distribution. Some high-end equipment also features an automatic feeding system for precise control of ingredient ratios, reducing manual intervention and improving batch consistency.

Optimizing this stage not only enhances the noodle texture but also lowers defect rates in subsequent production steps, laying the

foundation for efficient and continuous industrial production.

2.Rolling and shaping

Rolling and shaping is a crucial step in processing dough into uniform sheets, directly determining the chewiness and final texture of the noodles. Modern production lines use continuous compound calendering processes, where the dough passes through multiple precision rollers for repeated rolling, gradually forming sheets with consistent thickness and tight structure.

Compared to traditional single-machine calendering, compound calendering offers significant advantages: through progressive rolling by 5-7 rollers, the gluten network is fully extended, making the final product more elastic and resilient. The gap between each roller is precisely calculated, starting from 10-15mm and gradually reducing to 1.0-1.2mm, ensuring sheet uniformity with an error margin of $\pm 0.05\text{mm}$.

Advanced calendering equipment is equipped with automatic thickness adjustment systems, which monitor sheet quality in real-time using laser thickness gauges and automatically adjust roller pressure. Additionally, food-grade stainless steel rollers have specially treated surfaces to ensure hygiene standards and prevent sheet adhesion.

Some high-end models also feature temperature control systems to maintain optimal working temperatures for the rollers, ensuring stable calendering quality. This innovative process not only enhances noodle quality but also significantly increases production efficiency. Modern compound calendering machines operate at speeds of 30-50 meters per minute, two to three times faster than traditional equipment, providing high-quality raw materials for subsequent steaming processes.



3.Steaming

Steaming is a crucial stage in the production of instant noodles, where precise temperature and humidity control ensure that the starch in the noodles fully gelatinizes and the proteins undergo moderate denaturation, giving the final product its unique texture and flavor. Modern steaming systems use a tunnel-style continuous steamer design, allowing the noodles to receive uniform heat treatment while

being conveyed at a constant speed.

Advanced steaming equipment features the following key characteristics:

- Three-stage temperature zone control: a preheating zone (60-70?), a main cooking zone (95-100?), and an insulation zone (85-90?), designed in a gradient to ensure starch gelatinization exceeds 85%
- Steam circulation system: Achieves uniform distribution of steam through porous jet devices, with temperature difference controlled within $\pm 1^\circ\text{C}$.
- Smart humidity control: Maintains relative humidity between 90-95% to prevent the surface of the noodles from drying out and cracking.

Precise control of steaming time is particularly crucial, typically set between 2 to 4 minutes. If the time is too short, the starch won't gelatinize properly, making the noodles sticky; if too long, the noodles become too soft, affecting their subsequent shaping. Modern equipment is equipped with variable frequency speed control devices, allowing flexible adjustment of the conveyor belt speed based on different product requirements, achieving stepless regulation from 30 seconds to 5 minutes.

In terms of energy-saving technology, the new steamer uses:

- Heat recovery system: Utilizing the thermal energy from discharged steam to preheat incoming water
- Double-layer insulation structure: reduces heat loss
- Automatic water replenishment system: maintains optimal water levels, prevents energy waste

The stability of the steaming process directly affects the uniformity of product quality, noted a renowned food machinery engineer. By using a PLC automatic control system, we have achieved precise coordination of steam pressure, temperature, and time parameters, ensuring that the

degree of gelatinization variation between batches is within 2%.

This optimization not only improves product quality but also reduces unit energy consumption by 15-20%, bringing significant economic benefits to production enterprises. The steamed dough sheet then proceeds to the shaping process, preparing for subsequent frying or hot air drying.

4.Fried/non-fried drying process

The drying process is the core step that determines the final quality and characteristics of instant noodles. Modern instant noodles making machines mainly use two techniques: frying and non-frying, each with its own features and suited to different market demands.

The frying and drying system:

Using high-temperature rapid dehydration to give instant noodles their distinctive crispy texture and rich flavor. Modern frying equipment features the following technical characteristics:

- 1.Segmented temperature-controlled frying tanks: Utilizing 3-5 independent temperature zones (with a gradient change from 140-160°C) to ensure even frying.
- 2Automatic oil circulation filtration system: Capable of processing 5-8 tons of oil per hour, extending the lifespan of edible oil.
- 3.Microwave-assisted frying technology: Combining microwave preheating to reduce frying time by 30% and lower oil absorption rates.

Frying time is typically controlled between 60-90 seconds, with precise conveyor belt speed adjustments to reduce moisture content in the dough sheets to 3-5%. Advanced frying systems are equipped with:

- Automatic oil level compensation device

- Exhaust gas recovery and treatment system
- Online acid value monitor

Non-fried drying systems:

Using hot air or microwave drying to meet health-conscious dietary needs:

1. Multi-layer mesh belt hot air drying: temperature of 80-100°C, duration of 30-40 minutes;
2. Microwave-hot air combined drying: leveraging the rapid heating of microwaves and the uniform drying of hot air;
3. Far-infrared assisted drying: enhancing thermal energy efficiency and reducing drying time by 20%

5. Cooling and packaging

The cooling and packaging stages of the automatic fried instant noodle making production line are crucial for ensuring product quality and extending shelf life. During the cooling process, the production line employs a sophisticated progressive three-stage cooling system. Initially, powerful convective air cooling rapidly reduces the temperature of freshly dried noodles from a scorching 60°C down to a more manageable 40°C. The intense airflow whisks away heat with precision, ensuring the noodles retain their texture and elasticity. The noodles then transition into a balancing zone where they cool gradually to a comfortable 25°C, allowing the moisture within to stabilize without compromising the integrity of the product. Finally, the noodles reach ambient room temperature in the stabilization zone, where they rest quietly, their aroma subtly mingling with the surrounding air. This meticulously segmented cooling method effectively prevents the noodles from cracking due to abrupt temperature fluctuations, while a specially designed mesh belt ensures uniform cooling, allowing each

strand to achieve optimal consistency and freshness. The entire process is a harmonious blend of technology and culinary science, culminating in a product that promises both quality and longevity.



Reference

The following are five authoritative foreign literature websites in the field of Industrial food machinery:

1. Food Engineering Magazine

Website: <https://www.foodengineeringmag.com/>

2. Food Processing Magazine

Website: <https://www.foodprocessing.com/>

3. Journal of Food Engineering

Website: <https://www.journals.elsevier.com/journal-of-food-engineering>

4. Food Manufacturing Magazine

Website: <https://www.foodmanufacturing.com/>

5. International Journal of Food Science & Technology

Website: <https://onlinelibrary.wiley.com/>