

The Ultimate Guide To Artificial Rice Production Line

Updated 2025

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<https://www.facebook.com/foodmachineloyal>

Artificial **Rice Production Line** utilizes broken rice, corn, millet, wheat, oats, buckwheat, beans, and starch as primary ingredients, supplemented with essential vitamins and minerals to fortify its nutritional profile. The process begins with the meticulous mixing of these components, ensuring a balanced blend of flavors and textures. The mixture is then fed into a high-precision screw extruder, where it undergoes intense pressure and heat, transforming it into perfectly shaped grains that mimic the appearance and texture of real rice. These extruded grains are subsequently conveyed to a rotary dryer, where they are gently tumbled and dried to achieve the desired moisture content, preserving their integrity and enhancing shelf life. This innovative production method results in a nutritious, versatile artificial rice that not only looks and feels like traditional rice but also offers comparable culinary versatility, making it an excellent alternative for various dietary needs.

In the rice processing industry chain, dealing with broken rice has always been a challenge for companies' profitability. Traditionally, about 15%-20% of broken rice is usually sold at lower prices as animal feed (worth less than one-third of whole grain), often ending up in bakeries and farms where it provides basic sustenance for livestock. Alternatively, it is used in food processing such as brewing, where its potential is barely tapped, resulting in significant underutilization of its value. The aroma of broken rice, slightly different from whole grain, often goes unnoticed in these applications, leading to a waste of its unique flavor profile. However, the emergence of new-generation artificial rice production lines is completely changing this situation—by converting low-value broken rice into high-value nutritional enhanced rice, it not only achieves efficient resource utilization but also opens up a new profit growth channel. These advanced production lines employ cutting-edge technology to reconstitute broken rice into a form that retains its nutritional benefits while enhancing texture and taste, making it indistinguishable from whole grain rice in both culinary and health aspects. This innovation not only maximizes the economic value of broken rice but also promotes sustainability by reducing waste in the food industry.

Technology Empowerment: The Transformation from Waste By-products to Premium Food

Micronization recombination technology grinds broken rice into fine powder with a mean particle size of 150 (with a starch damage rate below 8%) at low temperatures, eliminating its original structural defects. Then, it undergoes molecular recombination in a twin-screw extruder at 75-85°C. The crystal structure of the restructured rice grains is similar to that of whole rice grains, reaching a similarity of 92%, completely solving the traditional issues of broken rice products such as easy gelatinization and poor texture.

Nutrient-targeted fortification?

Adding B vitamins, iron, zinc, calcium, and other trace nutrients to the raw materials, laboratory testing shows that after cooking, nutrient retention exceeds 90%, significantly outperforming spray coating methods (less than 65%).

Precise shape replication?

Customized molds can simulate the physical characteristics of different rice varieties like indica and japonica rice, producing grains with length-to-width ratio tolerances controlled within $\pm 0.1\text{mm}$, transparency exceeding 88%, and maintaining grain integrity after steaming.

Consumer Resistance: The "Taste and Texture" Barrier

Even though they know it's good for them, many people avoid commercial fortified rice because it just doesn't feel or taste right. They complain about broken grains, odd shapes, and a texture that's either too mushy or too coarse when cooked. The grains often lack the delicate sheen and uniformity of high-quality regular rice, which can make the dish appear unappetizing. It lacks the aromatic fragrance that wafts up as you cook, the satisfying firmness that gives each bite substance, and the delightful chewiness that makes every mouthful enjoyable. When people say it's 'not tasty' or 'unnatural,' all the nutritional benefits don't matter. The visual appeal, sensory experience, and overall palatability are crucial factors that influence consumer acceptance. Getting the texture and look just right is the biggest challenge for fortified rice, as achieving a balance between fortification and maintaining the natural qualities of rice remains elusive.



Production Realities: The Cost-Efficiency Squeeze

Traditional **Fortified Rice process** methods involve repeated soaking, steaming, coating, and drying to attach nutrients to grains. This intricate process creates three main challenges:

Low Efficiency: Cumbersome steps throttle throughput.

High Energy Waste: Steam and electricity consumption skyrockets.

Quality Risks: Fragile grains crack during processing, slashing yields.

The result? Soaring costs that erode profitability before products even reach shelves.

Process Of Fortified Rice Production Line

GRINDER: The grinder is specifically designed for the reprocessing of broken rice. The high-strength alloy grinding disc pulverizes rice fragments or old rice into ultra-fine powder (particle size $\leq 100\mu\text{m}$), ensuring uniform nutrient mixing in subsequent steps. The temperature control system maintains the grinding temperature below 40°C to prevent pre-gelatinization, providing an ideal raw material foundation for restructured rice grains.

SCREW CONVEYOR: Fully enclosed dust-free conveying and crushing of materials, using food-grade stainless steel shaftless screw conveying at a 15° incline for smooth material advancement. A specially designed anti-arching structure prevents layering or clumping of nutritional rice powder during conveyance, ensuring continuous production.

KING78 TWIN-SCREW EXTRUDER (with cooling system)

- Core processing equipment of Artificial Rice Production Line

- Counter-rotating twin screws complete the plastic reformation of rice vermicelli at a temperature range of 75-85°C, with screw configuration divided into zones for conveying, compressing, and melting
- Built-in nutrient liquid injection ports for molecular-level encapsulation of nutrients
- Ruby molds precisely replicate the natural shape of rice grains (aspect ratio 1.6-1.8)
- Barrel dual circulation cooling system (water temperature $\pm 1^\circ\text{C}$) instantly shapes the vermicelli, locking in nutrition and texture

CHILLER: Rapidly cool extruded rice grains with 5°C chilled water, reducing the core temperature from 85°C to 25°C within 90 seconds. Quickly pass through the starch retrogradation temperature range of 60-40°C to prevent cracking and deformation of grains, maintaining their elastic texture.

VIBRATE COOLER 3M WITH FAN: The three-layer reciprocating vibration screen, combined with vertical airflow (wind speed 2.5 m/s), efficiently removes the water film surface of rice grains. The amplitude and frequency are intelligently adjusted to ensure no collision damage to the rice grains, and the moisture content is uniformly reduced to 1%.

HIGH PRESSURE AIR CONVEYOR: Cooling rice grains with a clean airflow of 0.6 Mpa, with a conveying distance of 50 meters and a breakage rate less than 0.1%. The entire pipeline undergoes food-grade polishing to eliminate the risk of secondary contamination, producing nutritional rice.

HOT AIR CIRCULATION OVEN 7 LAYERS 12 METERS (Key energy-saving equipment)
 Gradient temperature control: 65°C (upper layer for rapid moisture removal) → 55°C (middle layer for stress relief) → 45°C (lower layer for moisture balance)

Heat pump waste heat recovery system reduces steam consumption by 60%
 12-meter mesh belt ensures that rice grains achieve 25 minutes of scientific drying, final moisture content of 14.5% $\pm$ 0.3%

ELECTRICAL HEATING (WIDTH BELT): A 1.2-meter wide frequency conversion motor with built-in infrared supplementary heating device eliminates temperature difference anomalies at the edges of the drying tower (lateral temperature difference $\leq \pm 1^\circ\text{C}$), ensuring uniform moisture content for each grain of rice.

COOLING CONVEYOR: The 20-meter slow cooling zone is equipped with an automatic temperature and humidity control system (25°C/45% RH), ensuring that the grains achieve moisture equilibrium within 15 minutes of uniform conveyance, thereby addressing the issue of moisture gradient differences between the inside and outside after drying.

PACKAGING MACHINE:

- Nitrogen displacement with oxygen purity $\geq 99.9\%$ (residual oxygen < 0.5%)
- Heat-seal strength > 45N/15mm, ensuring a 180-day freshness period



What Is The Advantages Of Artificial Rice Production L

1.Compact structure novel design and stable performance

A compact structure novel design with sleek, minimalist lines offers a modern aesthetic appeal. This innovative design ensures efficient space utilization without compromising functionality. The stable performance guarantees reliability and durability, providing consistent results even under demanding conditions. The robust build quality incorporates high-grade materials that withstand wear and tear, ensuring long-term usability. The seamless integration of advanced technology within its compact form enhances user experience, making it a versatile choice for various applications.

2.High automatic

Highly advanced automation systems seamlessly integrate cutting-edge technology to streamline processes, enhancing efficiency and accuracy. Additionally, these automated solutions offer robust security features, safeguarding sensitive information and maintaining compliance with industry standards. The user-friendly interface and intuitive design make it accessible for operators at all skill levels, fostering a more efficient and productive work environment.

3.Easy operation

Easy operation with intuitive controls, allowing users to navigate through menus effortlessly. The streamlined interface ensures minimal learning curve, making it accessible even to those who are not tech-savvy. Smooth touch responses and responsive buttons enhance the overall user experience.

user experience, providing a seamless interaction. The clear and concise instructions guide users step-by-step, ensuring a hassle-free setup and usage.

4. Energy saving

Using an extruder barrel waste heat recovery system (energy-saving rate ? 18%), 75°C cooling water is used to preheat the air entering the drying tower, reducing steam consumption. The drying process employs a 7-layer gradient drying tower combined with heat pump technology to achieve 60% reuse of exhaust heat energy. The core power is equipped with permanent magnet synchronous motors, which save 25% more electricity compared to traditional asynchronous motors.

5. Environmental protection

The production line constructs an energy circulation system, deeply recovers and reuses residual heat, achieves clean emissions, ensuring efficient operation of nutritious rice production while safeguarding green ecology.

6. Small floor space

This nutrition rice production line adopts a three-dimensional integrated design, utilizing vertical equipment layout and process optimization to significantly reduce factory space requirements. Core units such as the seven-layer hot air circulation drying tower efficiently utilize three-dimensional space, reducing floor area by 40% compared to traditional lines with the same capacity. This intensive design is particularly suitable for renovation projects with limited factory space, allowing you to upgrade capacity without expansion.



Conclusion

The technological advantages of this production line are prominently reflected in three aspects: first, genuine rice experience without compromise. Unique forming and drying technologies ensure that cooked grains are distinct, soft, chewy, and almost indistinguishable from high-quality regular rice in aroma and texture. Second, energy efficiency is visibly improved. The integration of waste heat recovery systems, low-energy design, and automated assembly lines significantly reduces production energy consumption while greatly increasing capacity. Third, nutritional protection is more reassuring. Throughout the process, gentle processing and precise control maximize the preservation of added nutrients and the natural structure of the grains, ensuring the nutritional value and standard quality of the final product. Truly achieving beauty, taste, and better health!



Reference

The following are five authoritative foreign literature websites in the field of Industrial 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/>