Quinoa Flakes Specification Sheet

Ⅰ. Product Definition

Quinoa Flakes are high-end coarse grain processed products manufactured from *Chenopodium quinoa Willd* through processes including screening, saponin removal, cleaning, thermal curing (partial specifications), flaking, drying and grading, classified as instant cereal and coarse grain raw materials. They are divided into four major categories by processing technology and eating methods, fully covering household daily consumption, catering customized application and food industrial raw material scenarios. The products completely retain inherent high-quality nutrients of quinoa, rich in premium plant protein, dietary fiber and various trace elements. No extra essence, pigment, preservative or sucrose is added, which conforms to the healthy diet trend of natural low fat and high nutrition.

Classified by processing and application attributes into four types:

1. Steel Cut Quinoa (Unflaked, Long Cooking Required)

Made of high-purity white quinoa via fine screening, deep saponin elimination, clean water rinsing, whole-grain cutting and low-temperature air drying, without flaking and high-temperature curing treatment. It features complete and plump grains and requires prolonged boiling. It delivers firm, springy texture and pure cereal aroma, widely applied in high-end household diets, boutique catering coarse grain meals and premium health food raw materials.

2. Traditional Rolled Quinoa (Raw Flaked, Cook for 4-10 Minutes)

Produced from high-quality quinoa through screening, saponin removal & cleaning, raw flaking and low-temperature drying with no high-temperature curing procedure. It needs short-time boiling for consumption, featuring soft, glutinous and resilient taste without stiffness. Suitable for daily family diet, staff canteen catering and basic coarse grain processing scenarios.

3. Quick Cooking Quinoa (Semi-cooked, Cook for 2-4 Minutes)

Processed from superior quinoa by screening, saponin removal & cleaning, moderate steaming & curing, gentle flaking and low-temperature fresh-locking drying. It has uniform and moderate flake thickness with short cooking time, balancing eating convenience and original flavor. Ideal for fast-paced families, fast-food catering and lightly processed health food raw materials.

4. Instant Quinoa (Fully-cooked, Ready-to-eat with Boiling Water)

Manufactured from premium quinoa via elaborate saponin removal & cleaning, high-temperature steaming & curing, ultra-thin flaking and low-temperature air-drying shaping. Featured with thin, delicate and loose flakes, it can be directly consumed by brewing with boiling water for high convenience. Mainly used for meal replacement brewing, instant coarse grain meals, casual health foods and core ingredients in food industry.

II. Basic Product Information

- **Product Name**: Pure Quinoa Flakes (Steel Cut Quinoa, Traditional Rolled Quinoa, Quick Cooking Quinoa, Instant Quinoa)
- **Raw Material**: Selected high-purity white quinoa (*Chenopodium quinoa Willd*), free of impurities, mildew and insect infestation with natural saponin fully removed and qualified nutritional components.
- **Executive Standards**: GB 19640 National Food Safety Standard for Instant Cereal Products; compatible with NY/T 2985-2016 Green Food-Quinoa (specially for organic and green products), complying with general food safety specifications for grain processing throughout production.
- **Product Grade**: Food Grade (Premium Grade)
- **Production Technology**: Taking high-quality quinoa as raw material, processed via screening, deep saponin removal, cleaning, curing (partial specs), flaking (partial specs), low-temperature fresh-locking drying, precise grading, metal detection and sterile sealed packaging (slight technical differences among various specifications).
- **Net Weight Specifications**: Conventional supply: 400g/bag, 1kg/bag, 2.5kg/bag, 5kg/bag; industrial bulk package: 25kg food-grade inner film woven bag. Customized net weight and packaging styles are available, supporting small-batch trial packing of 5kg/10kg.
- **Shelf Life**: 12 months under unopened and standard storage conditions. Keep sealed and away from light after opening, and finish consumption within 1 month to avoid moisture absorption and oxidation.
- **Allergens**: Free of common allergens, contains no gluten, lactose, nuts, soybean and other allergic ingredients, suitable for people with allergic constitutions.

III. Physical & Chemical Indicators

1. Sensory Requirements

- **Color & Luster**: All types of quinoa flakes present uniform milky white or light beige with consistent and transparent color, free of burnt spots, mildew spots, blackened grains and variegated particles. Steel cut quinoa has evenly colored, clean and bright grains without broken residues and impurities. Traditional rolled quinoa, quick cooking quinoa and instant quinoa own neat and uniform flakes without obvious color difference and yellowing deterioration.
- **Odor**: Possesses unique mild natural cereal fragrance of quinoa, free of saponin taste, bitter taste, rancid taste, stale taste, musty odor and other peculiar smells. All four specifications retain original natural flavor of quinoa without artificial essence and flavor enhancers added.
- **Texture & Structure**: Steel cut quinoa is evenly cut whole grains with regular size, no caking, insect damage, mildew and visible foreign impurities. Traditional rolled quinoa features thick, full and resilient flakes without hard agglomeration, allowing a small amount of natural fine fragments. Quick cooking quinoa has even and thin loose flakes with no hard core and caking. Instant quinoa is delicate, loose and

light in texture, easy to disperse with no caking and impurities. All specifications are free of sediment, metal, hair and other foreign contaminants, feeling fine without hard particles when pinched by hand.

- **Solubility & Taste**: Steel cut quinoa requires long-time cooking, presenting springy, glutinous grains and sweet cereal aroma after boiling. Traditional rolled quinoa tastes dense, firm and naturally sweet after being cooked for 4-10 minutes. Quick cooking quinoa gets fully done within 2-4 minutes of boiling with moderate soft glutinous taste and no stiffness. Instant quinoa can form even and soft texture within 3 minutes by brewing with hot water above 80℃ without layering and caking, delivering delicate and smooth mouthfeel. All specifications are free of bitter taste, saponin flavor and hard texture.

2. Physical & Chemical Parameters

- **Moisture**: ≤10.0% (Tested by direct drying method in GB 5009.3-2016)
- **Ash Content**: ≤2.5% (Tested by ignition method in GB 5009.4-2016)
- **Crude Protein**: ≥14.0% (Tested by Kjeldahl nitrogen determination method in GB 5009.5-2016)
- **Crude Fat**: ≤7.0% (Tested by Soxhlet extraction method in GB 5009.6-2016)
- **Crude Fiber**: ≤8.0% (Tested by acid-base digestion method in GB 5009.88-2015)
- **Total Dietary Fiber**: ≥7.0% (Tested in accordance with GB 5009.88-2015)
- **Saponin Residue**: ≤0.05% (Internal enterprise standard, no bitter residue)
- **Particle Size**: Traditional rolled quinoa: thickness 0.7-0.9mm, width 6-16mm; Quick cooking quinoa: thickness 0.5-0.7mm, width 5-13mm; Instant quinoa: thickness 0.3-0.5mm, width 4-11mm; Steel cut quinoa: grain diameter 2-5mm (tested by sieving method and vernier caliper)

3. Safety Indicators

3.1 Heavy Metal Limits

- Lead (Pb): ≤0.2mg/kg
- Cadmium (Cd): ≤0.1mg/kg
- Total Arsenic (As): ≤0.5mg/kg
- Total Mercury (Hg): ≤0.02mg/kg

3.2 Mycotoxin Limits

- Aflatoxin B_1: ≤5.0μg/kg
- Deoxynivalenol (DON): ≤1000μg/kg

3.3 Pesticide Residue Limits

All specifications of quinoa flakes comply with GB 2763 Maximum Residue Limits for Pesticides in Food. Residues of common organophosphorus, pyrethroid pesticides are undetected or below national limit standards. Strict whole-process control is implemented in raw material planting, harvesting and processing with no pesticide residue risks to ensure edible safety.

3.4 Microbial Indicators

- Total Aerobic Bacteria Count: ≤1×10^5 CFU/g (Tested by plate counting method in GB 4789.2-2022)
- Coliforms: ≤100 CFU/g (Tested by MPN counting method in GB 4789.3-2022)
- Molds & Yeasts: ≤50 CFU/g (Tested by plate counting method in GB 4789.15-2016)
- Pathogenic Bacteria (Salmonella, Staphylococcus Aureus): Not Detected (Tested per GB 4789.4, GB 4789.10-2022)

4. Performance Characteristics

- **Solubility**: Steel cut quinoa and traditional rolled quinoa need sufficient cooking to soften and dissolve; quick cooking quinoa is soluble via boiling or high-temperature hot water brewing; instant quinoa dissolves easily in hot water above 80℃ and fully softens and shapes within 3 minutes with uniform texture.
- **Stability**: Stable in sealed normal-temperature dry environment, resistant to conventional food processing temperature (≤120℃). Prone to moisture absorption and caking under high temperature and high humidity, sealed storage is required. Hard to decompose and deteriorate without strong acid and alkali, possessing excellent storage stability.
- **Compatibility**: Can be freely matched with milk, soybean milk, yogurt, nuts, dried fruits, honey, coarse grains and cereals, applicable for breakfast, meal replacement, complementary food, desserts and other dietary scenarios. It can also serve as food industrial raw materials to compound and blend with various ingredients without flavor interference, effectively improving nutritional value and taste hierarchy of finished products.
- **Functional Properties**: Contains complete high-quality plant protein, nine essential amino acids for human body, soluble dietary fiber and various minerals & vitamins. Featured with low fat, low sodium and gluten-free properties, it brings lasting satiety, assists intestinal metabolism and balances dietary nutrition, meeting healthy dietary demands for fitness, calorie control and health preservation.

5. Functions & Applications

Classified into four types by processing specifications with respective functions and application scenarios as follows:

5.1 Steel Cut Quinoa (Unflaked, Long Cooking Required)

5.1.1 Core Functions

- Superior taste: Complete and firm grains present springy, glutinous texture and sweet aftertaste after full cooking without bitter saponin taste, maximally retaining original flavor and grain texture of quinoa.
- Maximum nutrition retention: Free of high-temperature curing and heavy flaking processes, it barely loses plant protein, amino acids, dietary fiber and trace elements, enjoying better nutritional integrity than other specifications.
- Strong satiety: Compact grain texture ensures gentle digestion and absorption with long-lasting satiety and

excellent calorie control effect, ideal for fat loss, fitness and mild health preservation crowds.

5.1.2 Application Scope & Recommended Dosage

- Household consumption: Cook quinoa porridge, coarse grain rice and health-preserving soup; recommended dosage: 30-40g per person per serving, matched with milk, coarse grains and fruits & vegetables.
- Catering application: Applied in high-end hotels, private restaurants and light food stores to make boutique coarse grain meals, health porridges and salad side dishes; recommended proportion: 30%-50% in grain formula.
- Food industry: Used as raw materials for high-end meal replacement gift boxes, premium coarse grain combinations, health complementary foods and high-end light foods, added moderately according to product formulas to upgrade product grade and nutritional value.

5.2 Traditional Rolled Quinoa (Raw Flaked, Cook for 4-10 Minutes)

5.2.1 Core Functions

- Balanced taste: Original flaking technology maintains resilience and soft glutinous texture of quinoa, delivering dense and springy taste with pure sweetness after cooking, suitable for people of all ages.
- Balanced nutrition: No nutritional loss caused by high-temperature curing ensures complete nutrient retention, achieving perfect balance between taste and nutritional value with high cost performance in daily diet.
- Strong versatility: Edible alone or mixed with rice, millet, oats, beans and other coarse grains, adaptable to various household and catering dietary scenarios.

5.2.2 Application Scope & Recommended Dosage

- Household consumption: Daily cooking of quinoa porridge, mixed grain porridge and braised rice; recommended dosage: 30-40g per person per serving, collocated with jujube, longan, Chinese yam and other ingredients.
- Catering application: Mass production of coarse grain porridge and health meals in canteens and breakfast shops; recommended proportion: 25%-35% in total cooked grains.
- Food industry: Flexibly added as basic coarse grain ingredients, cereal breakfast and health food raw materials per product formula requirements.

5.3 Quick Cooking Quinoa (Semi-cooked, Cook for 2-4 Minutes)

5.3.1 Core Functions

- High efficiency: Moderate semi-curing process greatly shortens cooking time for rapid ripening, fitting fast-paced life and mass meal serving scenarios.
- Wide taste adaptability: Moderate soft glutinous texture without hardness or mushiness balances original

flavor and eating convenience, suitable for the elderly, children and office workers.

- Flexible usage: Edible via boiling or hot water stewing with strong matching performance to meet diversified dietary needs.

5.3.2 Application Scope & Recommended Dosage

- Household consumption: Quick-cooked breakfast porridge and midnight snack meal replacement; recommended dosage: 30-40g per person per serving, mixed with milk, nuts and dried fruits to enrich taste.
- Catering application: Rapid meal preparation in fast-food stores, community breakfast shops and enterprise canteens; recommended dosage: 40-50g per serving.
- Food industry: Widely used as raw materials for convenient breakfast foods, brewed coarse grain products and light food meal replacements, generally accounting for 40%-60% of total raw materials.

5.4 Instant Quinoa (Fully-cooked, Ready-to-eat with Boiling Water)

5.4.1 Core Functions

- Ultimate convenience: High-temperature full curing and ultra-thin flaking process eliminates cooking needs, enabling instant consumption with boiling water to greatly save dining time for fast-paced scenarios.
- Easy dissolution & absorption: Thin, loose and delicate flakes soften and dissolve rapidly without hard core and caking, featuring smooth and glutinous taste and easy digestion, suitable for people with weak spleen and stomach function.
- Strong adaptability: Directly brewed for meal replacement or used as core raw materials for various instant health foods with high added value and extensive application coverage.

5.4.2 Application Scope & Recommended Dosage

- Personal & household consumption: Daily instant meal replacement, breakfast and extra meals; recommended dosage: 30-40g per person per serving, mixed with milk, soybean milk, yogurt and honey.
- Food industry: Served as ingredients for meal replacement powder, instant coarse grain meals, solid brewed beverages, baked foods and casual health snacks, generally occupying 50%-80% of total raw materials.
- Other scenarios: Portable instant snacks for office, outdoor activities and travel; available in 30-40g independent small packages for easy storage and instant eating.

6. Edible Methods

- **Steel Cut Quinoa**: Take 30-40g into a pot, add 200-250ml clean water, milk or soybean milk, bring to boil over high heat then simmer on low heat for 18-25 minutes with timely stirring until grains turn soft, springy and soup thickened. Season with nuts, dried fruits and coarse grains as preferred.
- **Traditional Rolled Quinoa**: Put 30-40g into a pot, pour in 200-250ml water or milk, boil over high heat and simmer for 4-10 minutes while stirring evenly until fully soft and transparent, suitable for household daily use and mass catering cooking.

- **Quick Cooking Quinoa**: Add 30-40g into a pot with 200-250ml water or milk, boil then simmer for 2-4 minutes and stir until thickened; alternatively, steep in hot water above 90℃ for 6 minutes and stir well for time-saving consumption.
- **Instant Quinoa**: Place 30-40g in a bowl, pour 200-250ml hot water (above 80℃), milk or soybean milk, stir thoroughly and stand for 3 minutes before direct eating. Ideal for instant meal replacement and quick snacks, also serves as core raw materials for downstream brewed and meal replacement foods.

7. Safety Evaluation

- **LD_{50}**: Oral administration to rats > 15g/kg (bw), classified as practically non-toxic product.
- **ADI**: No specification required (Officially recognized by JECFA, FDA and EFSA, safe for long-term regular consumption).
- **GRAS**: Recognized as Generally Recognized As Safe substance by US FDA with no edible safety risks.
- **Metabolism**: Decomposed into high-quality protein, complex carbohydrates, dietary fiber and trace elements after ingestion, participating in normal human metabolic circulation without residue and cumulative toxicity, suitable for long-term daily diet.
- **Contraindications**: No conventional eating taboos; prohibited for consumption once deteriorated, caked due to moisture or with peculiar smell.

8. Packaging Specifications

- **Inner Packaging**: Food-grade composite film bags (moisture-proof, light-proof, sealed and fresh-locking) complying with GB 4806.7-2016 national food safety standard. Thickened inner bags are adopted for steel cut quinoa to prevent package piercing and moisture deterioration by grains.
- **Outer Packaging**: Food-grade kraft paper bags or thickened cartons with compression resistance, moisture proof and breakage prevention properties, suitable for daily storage and long-distance transportation. 25kg industrial bulk goods adopt food-grade double-layer woven bags with sealed inner film to avoid moisture contamination.
- **Conventional Packaging Dimensions**: 400g/bag (18cm×25cm), 1kg/bag (22cm×30cm), 2.5kg/bag (25cm×35cm), 5kg/bag (30cm×40cm), 25kg/woven bag (45cm×65cm)
- **Customization Service**: Customizable packaging material, appearance, size and net weight per client demands, supporting small-batch trial packaging and exclusive private label packaging.

9. Storage & Transportation

- **Storage**: Store hermetically in cool, dry, ventilated and clean places (ambient temperature: 15-25℃, relative humidity ≤60%). Strictly avoid moisture, sunlight exposure, high temperature, peculiar smell and pollution, keep away from toxic, harmful and corrosive articles. Seal tightly after opening and finish eating

within 1 month to prevent oxidative deterioration and flavor loss.

- **Transportation**: Non-dangerous goods. Avoid rain soaking, sun exposure, heavy pressure and severe impact during transit to prevent package damage and product caking. Strictly prohibit mixed transportation with toxic, harmful, odorous and corrosive goods. Transport vehicles shall be kept clean, dry and ventilated. Stack 25kg industrial packages neatly in layers with careful handling to avoid extrusion damage.
- **Shelf Life**: 12 months for unopened original packages under standardized storage conditions. Products expired, damaged in package, caked by moisture or with musty odor are forbidden for eating and market circulation.

10. Test Methods

Inspected in accordance with stipulated methods specified in GB 19640, NY/T 2985-2016 and corresponding national food safety standards:

- **Sensory Indicators**: Color and texture observed visually under natural light plus hand pinching inspection; odor tested via normal-temperature olfaction method; solubility verified by standard brewing test; taste evaluated by unified standard tasting test.
- **Physical & Chemical Indicators**: Moisture tested by direct drying method in GB 5009.3-2016; ash content by ignition method in GB 5009.4-2016; crude protein by Kjeldahl method in GB 5009.5-2016; dietary fiber tested per GB 5009.88-2015; particle size measured by standard sieving method and vernier caliper.
- **Microbial Indicators**: Total aerobic bacteria counted by plate method in GB 4789.2-2022; coliforms detected via MPN method in GB 4789.3-2022; pathogenic bacteria tested following standard methods in GB 4789.4 and GB 4789.10-2022.
- **Contaminants, Mycotoxins & Pesticide Residues**: Detected respectively by specified methods in GB 5009 series standards and GB 2763.

11. Quality Commitment

All four specifications of quinoa flakes (Steel Cut Quinoa, Traditional Rolled Quinoa, Quick Cooking Quinoa, Instant Quinoa) are strictly produced in compliance with national food safety standards and high-end internal enterprise control standards. No sucrose, essence, pigment, preservative or other additives are added throughout production, completely retaining natural nutrients and original flavor of quinoa. Closed-loop whole-process management is implemented covering raw material screening, saponin removal processing, production curing, grading packaging to warehousing and transportation. Authoritative quality inspection reports are attached to each batch of products to ensure stable and controllable quality and safety. Customized services including flake thickness, curing degree, sieve mesh size, particle specifications and packaging styles are available per downstream client production demands, providing one-on-one professional raw material matching services.

Nutritional Facts of Quinoa Flakes

1. Nutritional Composition (Per 100g)

Nutritional Item	Content per 100g	Content per 100 kcal	NRV%
Energy	1580kJ/377kcal	419kJ/100kcal	19%
Protein	14.80g	3.92g	25%
Fat	6.20g	1.64g	10%
Saturated Fatty Acid	0.85g	0.23g	4%
Carbohydrate	64.50g	17.11g	22%
Dietary Fiber	7.80g	2.07g	31%
Sugar	0.90g	0.24g	1%
Sodium	3mg	0.80mg	0%
Cholesterol	0mg	0mg	0%
Vitamin B1	0.62mg	0.16mg	52%
Vitamin B2	0.18mg	0.05mg	13%
Niacin	2.30mg	0.61mg	14%
Vitamin B6	0.25mg	0.07mg	13%
Folic Acid	45μg	11.93μg	11%
Vitamin E	0.65mg	0.17mg	4%
Calcium	147mg	38.99mg	18%
Iron	4.20mg	1.11mg	28%
Magnesium	215mg	57.03mg	72%
Phosphorus	480mg	127.32mg	48%
Potassium	520mg	137.93mg	26%
Zinc	3.05mg	0.81mg	20%

2. Nutritional Label Specification for Pure Quinoa Flakes

2.1 Executive Standards

- Domestic Labeling Basis: GB 28050-2011 General Principles for Nutrition Labeling of Prepackaged Foods
- International Reference Basis: USDA Food Nutrient Database, complying with cross-border export and foreign trade nutritional calibration specifications
- Product Definition: Original-flavor pure dried quinoa flakes without added sucrose, essence, non-dairy creamer, dairy products, cereal ingredients and additives, belonging to high-end coarse grain raw materials processed from original whole grains.

2.2 Measurement Unit & Labeling Rules

- Basic Measurement Standard: Uniformly marked based on per 100 grams of dry products, conforming to common food labeling habits at home and abroad.
- Dual Energy Marking: Mark both kilojoule (kJ) and kilocalorie (kcal); kilojoule is mainly used domestically while kilocalorie is universally adopted internationally to meet labeling demands for domestic and export sales.
- Additional Nutrient Content per 100 kcal: Satisfy accurate reference needs for overseas dietary calculation, food formula preparation, calorie control and fitness diet planning.
- NRV% (Nutrient Reference Value Percentage): Calculated in accordance with national standard recommended daily dietary intake, intuitively reflecting the proportion of daily human nutritional demands satisfied by single serving ingredients.

2.3 Core Nutrient Interpretation

- **Energy**: Quinoa is a natural cereal with moderate calories, categorized as high-end coarse grain featuring low glycemic index, strong satiety and low physical burden. The listed calorie value refers to original calorific value of uncooked dry products; calorie density naturally decreases after water absorption during cooking.
- **Protein**: Contains complete high-quality plant protein covering nine essential amino acids for human body with amino acid ratio fitting human physiological demands, possessing far higher nutritional value than common cereals and coarse grains.
- **Fat**: Dominated by unsaturated fatty acids with extremely low saturated fat content, achieving low-fat and light-burden characteristics in line with healthy dietary concepts.
- **Carbohydrate**: Mainly composed of complex carbohydrates with gentle glycemic response and lasting satiety. All contained sugar is natural endogenous grain sugar without artificially added sucrose and fructose.
- **Dietary Fiber**: Rich in both soluble and insoluble dietary fiber, facilitating intestinal peristalsis, regulating intestinal flora and delaying sugar absorption, ideal for crowds pursuing sugar control, fat reduction and health preservation.
- **Sodium**: Natural low-sodium cereal free of edible salt and artificial sodium salt additives, suitable for people on low-sodium diet and blood pressure management.
- **Minerals & B Vitamins**: Abundant in magnesium, phosphorus, calcium, iron, zinc and various B vitamins with complete and diversified trace elements, serving as high-quality nutritional supplements for daily diet.
- **Cholesterol**: Pure plant-based coarse grain food with zero cholesterol content, complying with relevant labeling specifications and suitable for cardiovascular health maintenance crowds.

2.4 Notes on Label Application

- The above data are authoritative universal typical average values in the industry. Slight normal numerical fluctuations exist among quinoa flakes from different producing areas, planting batches and processed by different technologies, which belong to reasonable industry ranges rather than index deviations.
- Moisture content increases after brewing and cooking, leading to natural reduction of unit weight calorie and nutritional density. All labeled data in this table are only applicable to dry quinoa flakes.
- This set of data cannot be directly applied to deep-processed products such as flavored quinoa flakes, mixed quinoa crisps and fruit quinoa products, which require separate calculation and labeling.
- NRV percentage is only for daily dietary reference and shall not replace professional dietary nutrition diagnosis and treatment suggestions.