Specification Sheet of Aloe Vera Extract

Product Definition

Aloe Vera Extract is a natural plant extract produced from the fresh leaf gel of *Aloe barbadensis Miller* (Asphodelaceae, Aloe) through standardized industrial processes including selection, washing, peeling, crushing, enzymatic hydrolysis, extraction, filtration, purification, concentration, drying and pulverization. It is rich in active ingredients such as aloe polysaccharides, acemannan, aloin, amino acids and vitamins, retaining the original nutritional and physiological activities of aloe. It complies with industry standards for food, dietary supplements, cosmetics and pharmaceutical raw materials, and can be widely used in various fields.

1. Basic Product Information

- Product Name: Aloe Vera Extract
- English Name: Aloe Vera Extract
- Botanical Name: *Aloe barbadensis Miller*
- INCI Name: Aloe Vera Leaf Extract
- CAS No.: 85507-69-3
- Plant Source: *Aloe barbadensis Miller* (Asphodelaceae, Aloe)
- Part Used: Fresh leaf gel (peeled, mesophyll preferred)

2. Core Specifications

- Aloe Polysaccharides (UV/HPLC): 5%, 10%, 15%, 20%, 98% (customizable)
- Acemannan: ⩾37500 ppm, ⩾50000 ppm, ⩾75000 ppm
- Aloin (HPLC): ⩽5 mg/kg, ⩽7 mg/kg, ⩽10 mg/kg
- Extraction Ratio: 10:1, 20:1, 50:1, 100:1 (customizable)
- Total Flavonoids (calculated as Rutin, UV): 0.5% – 2%

3. Physicochemical Properties

- Appearance: White to pale yellow fine powder, no visible foreign impurities, characteristic faint aloe aroma, no off-odor or caking
- Particle Size: ⩾95% passes 80-mesh sieve; 100 – 200 mesh available upon request
- Loss on Drying: ⩽5.0%
- Residue on Ignition: ⩽5.0%
- Bulk Density: 0.3 – 0.6 g/mL
- Solubility: Fully water-soluble, freely soluble in warm water and dilute ethanol, insoluble in petroleum ether and diethyl ether

4. Hygienic Specifications

- Total Heavy Metals: ⩽20 ppm
- Lead (Pb): ⩽5 ppm; Arsenic (As): ⩽2 ppm; Cadmium (Cd): ⩽1 ppm; Mercury (Hg): ⩽0.1 ppm
- Microbiological Limits:

Total Plate Count < 1000 cfu/g; Yeast & Mold < 100 cfu/g;

E. coli, *Salmonella*: Not Detected

- Residual Solvents: Ethanol ⩽0.5%, no other harmful solvent residues, compliant with European Pharmacopoeia and Chinese Pharmacopoeia

5. Applications

.♣ **Functional Foods**: Solid drinks, compressed tablets, oral liquids, meal replacements, dietary supplements – mainly for moisturizing, intestinal soothing and immune support

.♣ **Dietary Supplements**: Raw material for immune regulation, anti-oxidation, gastrointestinal protection and anti-fatigue products.

.♣ **Cosmetics**: Essences, creams, masks, gels, toners for moisturizing, repairing, soothing, anti-sensitivity and anti-aging.

.♣ **Pharmaceutical Intermediates**: Raw material for topical anti-inflammatory, wound repair, mucosal care and skin ointments.

.♣ **Others**: Pet health products, feed additives, oral care products.

6. Packaging

- 0.5 – 5 kg aluminum foil bags
- 25 kg fiber drums (double sterile inner bags; customizable per customer requirements)

7. Storage

Store in a cool, dry, sealed and light-proof area, away from direct sunlight, high temperature and humidity to prevent moisture absorption and oxidation.

8. Shelf Life

24 months

Nutritional Composition Table of Aloe Vera Extract

This table is compiled based on test data of mainstream Aloe Vera Extract (Aloe Polysaccharides ⩾10%). It is applicable for quality control and labeling of food and dietary supplement raw materials, in compliance with relevant requirements of the National Health Commission of China.

1. Basic Nutrition (per 100 g)

Item	Value	NRV%
Energy	315 kJ / 75 kcal	3.7%
Protein	2.1 g	3.5%
Fat	0.3 g	0.5%
— Saturated Fat	0.1 g	0.5%
— Trans Fat	0 g	—
Carbohydrate	16.5 g	5.5%
— Total Sugars	8.2 g	—
— Dietary Fiber	4.2 g	16.8%
Sodium	5 mg	0.2%

2. Core Active Components (per 100 g)

(1) Aloe Polysaccharides

- Total Aloe Polysaccharides: 5.0 – 20.0 g
- Acemannan: 3.75 – 7.5 g
- Glucomannan: 1.0 – 3.0 g

(2) Anthraquinones & Phenolic Acids

Component	Content
Aloin	⩽0.007 g
Aloe Emodin	0.01 – 0.05 g
Total Polyphenols (calculated as Gallic Acid)	1.0 – 3.0 g
Chlorogenic Acid	0.05 – 0.15 g

(3) Amino Acids

- Total 18 Amino Acids: 6.0 – 10.0 g
- Essential Amino Acids: 2.0 – 4.0 g

(4) Vitamins (per 100 g)

Vitamin	Content
Vitamin C	100 – 300 mg
Vitamin E	50 – 200 mg
Vitamin B2	1 – 5 mg

(5) Minerals (per 100 g)

Mineral	Content
Potassium (K)	800 – 1600 mg
Calcium (Ca)	200 – 800 mg
Magnesium (Mg)	100 – 500 mg
Iron (Fe)	5 – 30 mg
Zinc (Zn)	2 – 15 mg

3. Safety Limits (per 100 g)

Item	Limit
Pb	⩽0.1 mg
Cd	⩽0.05 mg
As (inorganic)	⩽0.1 mg
Hg	⩽0.01 mg
Total Plate Count	⩽1000 CFU/g
Yeast & Mold	⩽100 CFU/g
Coliforms	⩽10 MPN/g
Salmonella	0/25g

4. Label Compliance & Application Value Summary

.♣ **Compliance**: Fully meets GB 28050, QB/T 2489-2018, Chinese Pharmacopoeia and US CTFA standards, with complete, accurate and standardized labeling items.

.♣ **Differentiated Value**: High aloe polysaccharides as core selling point; low aloin, low heavy metals and high activity as quality advantages, highlighting technical barriers and superior quality.

.♣ **Application Adaptability**: Covers food, dietary supplements, cosmetics and pharmaceutical raw materials. Label data can be directly used for product filing, promotion, customs declaration and customer quality audits with high practicality and authority.

Manufacturing Process & Flowchart of Aloe Vera Extract

This process adopts international mainstream industrial production standards, combining enzymatic pretreatment, low-temperature microwave/ultrasonic-assisted extraction and membrane separation purification.

The core objective is to maximize retention of aloe polysaccharides, acemannan, aloin and other active ingredients, complying with EU, US FDA and Chinese Pharmacopoeia GMP standards, suitable for large-scale production of various specifications.

Whole process: low temperature, light protection and low oxygen to avoid degradation of active components.

Ⅰ. Core Process Principles

1. **Activity Priority**: Whole process ⩽50° C, stabilizes aloe polysaccharides, retention rate ⩾95%.
2. **Green Extraction**: Purified water/food-grade ethanol as solvent, non-toxic, recyclable.
3. **Fine Purification**: Membrane separation + resin purification to remove pigments, pectin and macromolecular impurities.
4. **Full Process Control**: Full coverage of Critical Control Points (CCP), GMP compliant, fully traceable.

Ⅱ. Detailed Process Steps

1. Raw Material Pretreatment (CCP1)

Fresh leaves of *Aloe barbadensis Miller* aged ⩾3 years; manually de-thorned, washed, peeled; only mesophyll gel retained.

Chopped and pulped; moisture and microbiology controlled; no rotten or pesticide-contaminated raw materials.

2. Gradient Temperature-Controlled Enzymolysis

Solid-liquid ratio 1:6 − 10; complex enzyme system (cellulase + pectinase) 0.2% − 0.4%.

- 35° C pretreatment: 20 − 30 min
- 45° C main enzymolysis: 4 − 6 h
- Enzyme inactivation: 85° C for 10 min

Breaks cell walls; extraction rate increased by 15% − 25%.

3. Low-Temperature Ultrasonic/Microwave-Assisted Extraction (CCP2)

Solvent: purified water or 30% − 70% ethanol; solid-liquid ratio 1:5 − 10.

- Temperature: 40 − 50° C
- Power: 300 − 400 W
- Time: 6 − 15 min

Extracted 1 − 2 times; extracts combined.

Low temperature & high efficiency; polysaccharide retention ⩾95%.

4. Filtration & Clarification (CCP3)

Plate & frame filtration → centrifugation (3000 r/min) → ultrafiltration (1000 Da)

Removes residues, protein, pectin and suspended solids; obtains clear extract.

5. Resin/Membrane Separation & Purification

Adjust pH to 4.0 – 6.0; enrich aloe polysaccharides via macroporous resin or nanofiltration.

Removes pigments, small-molecule impurities and heavy metals; improves purity and color.

6. Vacuum Concentration (CCP4)

Dual-effect low-temperature concentration:

- Temperature ⩽55° C
- Vacuum 0.15 – 0.25 MPa

Solvent recovered; concentrated to fluid extract; residual solvent ⩽0.5%.

7. Drying (CCP5)

- **Freeze Drying** (high-end pharma/health): pre-freezing at −40° C → low-temperature sublimation; moisture ⩽5%, maximum activity retention.
- **Spray Drying** (food/cosmetics): inlet 170 – 190° C, outlet 70 – 85° C; uniform and stable powder.

8. Pulverization, Sieving & Blending

Pulverized to 80 – 100 mesh; 3D blending for 15 – 20 min to ensure content uniformity.

9. Semi-Finished Testing → Finished Product Testing → Packaging → Warehousing

Full inspection: polysaccharides, anthraquinones, physicochemical properties, microbiology, heavy metals, residual solvents.

Qualified products packaged and stored in cool & dry conditions for 24 months.

Ⅲ. Critical Control Points (CCP)

CCP	Control Index	Requirement
Raw Material Pretreatment	Freshness, microbes, pesticides	No rot; qualified colony count
Enzymolysis	Temperature, time, enzyme dosage	Improved extraction rate
Extraction	Temp ⩽50° C, power, time	No active degradation
Concentration	Temp ⩽55° C, solvent residue	Ethanol ⩽0.5%
Drying	Moisture ⩽5.0%, activity retention	Polysaccharide retention ⩾95%
Finished Inspection	Assay, microbes, heavy metals	Complies with specification

Ⅳ. Process Quality Control Nodes

1. Raw material: no rot, no pesticide residues, qualified microbes
2. Enzymolysis: sufficient cell wall breakage, higher yield
3. Extraction: low temperature protects active ingredients
4. Concentration: controlled solvent residue
5. Drying: moisture ⩽5%, polysaccharide retention ⩾95%
6. Semi-finished/finished: no non-conforming products into warehouse
7. Warehousing: regular re-testing to ensure 24-month stability

V . Manufacturing Flowchart

