# Mulberry Leaf Extract Application Fields & Addition Method Operating Guide

## I. Preface

Based on the physical and chemical properties, stability rules and industry application scenarios of mulberry leaf extract (with 1-Deoxynojirimycin (DNJ), total flavonoids, mulberry leaf polysaccharides and other core active ingredients), this guide standardizes its addition principles, processes, dosage, operating points and quality control in six major fields: food, feed, medicine, cosmetics, agriculture and industry, providing standardized operating basis for large-scale production.

### 1.1 Basic Properties of Mulberry Leaf Extract

- **Form**: Yellowish-green to brown powder (conventional extract), microcapsule/microemulsion dosage form (stabilized modification), concentrated liquid (liquid extract).
- **Solubility**: Conventional powder is soluble in hot water and ethanol, slightly soluble in cold water; microcapsules/microemulsions are water-dispersible and compatible with various systems; concentrated liquid can be directly dissolved in aqueous phase without additional solubilization.
- **Stability**: Sensitive to heat (>80 °C prone to degradation) and strong light; most stable at pH 5.0–7.0; microcapsule embedding improves stability against high temperature, acid and alkali, and reduces loss of active ingredients; avoid long-term contact with strong oxidants and alkaline substances.
- **Core activities**: Hypoglycemic, antioxidant, anti-inflammatory, antibacterial, anti-glycation, immune regulation, with certain flavor-modifying effects.

### 1.2 General Addition Principles

1. **Dosage form matching**: Use microcapsules/microemulsions/concentrated liquid for water-soluble systems (beverages, oral liquids, aqueous phase of skin care products); use conventional powder pre-dissolved in ethanol or oil-soluble modified extract for oil-soluble systems (oils, oil phase of creams); use conventional powder or microcapsules for solid systems (feed, bakery products, powders).
2. **Temperature control**: Conventional addition temperature ≤60 °C; for high-temperature processes (frying, baking, high-temperature sterilization), microcapsule dosage forms are preferred, or low-temperature supplementation at the later stage of the process to reduce degradation of DNJ, flavonoids and other active ingredients.
3. **pH adaptation**: Prioritize addition in systems of pH 5.0–7.0; stability pre-tests are required for strong acid (pH<4.0) and strong alkali (pH>8.0) systems, and buffers

may be added for adjustment if necessary.

4. **Compatibility contraindications**: Avoid direct mixing with strong oxidants and high-concentration alkaline substances; easy browning when contacting metal ions (iron, copper), so stainless steel or plastic equipment shall be used.
5. **Flavor masking**: At high addition levels, embed with β-cyclodextrin or sodium octenylsuccinate starch, or compound with sweeteners (erythritol, steviol glycosides) or fruit juice extracts to mask natural bitter and astringent taste.
6. **Quality traceability**: Use extracts conforming to GB 2760 and feed/medicine/cosmetics grade standards; keep batch inspection reports (DNJ, total flavonoids and polysaccharide contents, microorganisms, heavy metals, pesticide residues).

## II. Operating Guide for Addition in Food Field

### 2.1 Applicable Categories & Core Functions

- **Functional beverages (mulberry leaf tea, compound fruit and vegetable drinks, sugar-control beverages)**: Hypoglycemic, antioxidant, supplement plant active ingredients, focusing on healthy sugar-control concept.
- **Baked foods (pastries, biscuits, bread, meal replacement bars)**: Antioxidant, delay staling; functional products can enhance sugar-control and intestinal health effects.
- **Meat products / oils (sausages, marinated foods, vegetable oils, fried foods)**: Antioxidant, antibacterial, delay oil rancidity and extend shelf life.
- **Dairy products / condiments (yogurt, milk powder, sauces, soy sauce)**: Functional enhancement (sugar control, immune regulation), flavor modification, replacing part of synthetic additives.

### 2.2 Dosage Form Selection & Addition Methods

**(1) Conventional Mulberry Leaf Extract Powder (DNJ 0.5%–8%, total flavonoids ≥1.0 g/100 g)**

- **Application**: Baked foods, dairy products, condiments, solid beverages, for medium and low functional demand scenarios.
- **Addition methods**:

  - Solid systems (bakery, milk powder): Premix with flour, maltodextrin, whey protein and other powder raw materials (sieved through 80–100 mesh), then add to formula to ensure uniform distribution.
  - Liquid systems (sauces, yogurt): Dissolve in purified water at 50–60 °C at a solid-liquid ratio of 1:5–1:10, stir for 30 minutes until fully dispersed, filter to remove impurities, then add and mix evenly.
  - Process nodes: Dough mixing stage for baking, before yogurt fermentation, late sauce cooking stage (≤60 °C); avoid high-temperature baking (≤180 °C, time ≤20 minutes).
- **Reference dosage**: Baked foods 0.02%–0.5%; dairy products 0.1%–2%; condiments 0.05%–0.3%; solid beverages 1%–5%.

**(2) Mulberry Leaf Extract Microcapsules / Microemulsions (embedding rate ≥85%)**

- **Application**: High-temperature processed foods (frying, high-temperature sterilized beverages), water-soluble beverages, frozen foods, scenarios requiring improved stability and dispersibility.
- **Addition methods**:
  - Beverages / oral liquids: Directly add to aqueous phase, stir for 15–20 minutes without additional solubilization; resistant to short-term sterilization at 80–100 °C.
  - Fried foods: Premix with oil or spray after frying (spray temperature ≤50 °C) to reduce damage to active ingredients by high temperature.
  - Process nodes: Beverage blending stage, cooling stage after frying, before forming frozen foods; temperature controlled ≤60 °C throughout.
- **Reference dosage**: Functional beverages 0.05%–0.5% (target DNJ content ≥15 mg per serving); fried foods 0.01%–0.1%; frozen foods 0.05%–0.2%. Dosage can be reduced by 10%–20% compared with conventional powder.

**(3) Mulberry Leaf Extract Concentrated Liquid (DNJ ≥1%)**

- **Application**: Liquid beverages, oral liquids, sauces, scenarios requiring rapid dissolution and simplified processes.
- **Addition method**: Directly add to aqueous phase or sauce system, stir for 10–15 minutes until uniform; can be added simultaneously with sweeteners and acidity regulators.
- **Reference dosage**: Beverages 0.1%–1%; oral liquids 0.5%–2%; sauces 0.1%–0.5%.

### 2.3 Operating Points & Quality Control

1. **Temperature control**: Conventional addition temperature ≤60 °C; microcapsules preferred for high-temperature processes; baking temperature ≤180 °C, time ≤20 minutes; fried foods avoid direct contact with extract above 180 °C.
2. **Uniformity**: Powder must be sieved before premixing; liquid systems require sufficient stirring to avoid excessive local concentration causing bitter taste or uneven efficacy.
3. **Antioxidant synergy**: Compound with vitamin C and citric acid to enhance antioxidant effect and prevent browning of extract, dosage 0.01%–0.03%.
4. **Flavor balance**: When addition >0.3%, compound with sweeteners or fruit juice extracts to mask bitterness and astringency and improve palatability.
5. **Compliance**: Strictly follow GB 2760; as a homologous medicine-food material, mulberry leaf extract shall be used appropriately according to production needs; functional addition shall comply with health food regulations, with DNJ content labeled.

## III. Operating Guide for Addition in Feed Field

### 3.1 Applicable Categories & Core Functions

- **Livestock and poultry feed (pigs, chickens, ducks)**: Improve immunity, intestinal health, antibacterial and anti-diarrheal effects, replace part of antibiotics, improve meat quality.
- **Aquafeed (fish, shrimp)**: Anti-stress, antibacterial, promote growth, reduce feed coefficient, improve survival rate of aquatic animals.
- **Ruminant feed**: Regulate rumen microbial balance, improve feed conversion rate and production performance.

### 3.2 Dosage Form Selection & Addition Methods

**(1) Feed-Grade Mulberry Leaf Extract Powder (DNJ ≥0.5%, total flavonoids ≥1.0 g/100 g)**

- **Application**: Formula feed, premix, concentrated feed, for conventional livestock, poultry and aquafeed scenarios.
- **Addition methods**:
    - Adopt stepwise dilution (10× → 100× → 1000×); first mix with vitamin and mineral premix (premix ratio 1:5–1:10), then add to basic feed.

  - Process nodes: Feed mixing stage (room temperature, ≤35 °C); avoid high-temperature pelleting (pelleting temperature ≤70 °C, post-spraying preferred).
- **Reference dosage**: Suckling pigs 0.05%–0.1%; finishing pigs 0.03%–0.08%; broilers/layers 0.04%–0.09%; aquaculture 0.05%–0.12%.

**(2) Mulberry Leaf Extract Microcapsules (embedding rate ≥85%)**

- **Application**: High-temperature pelleted feed, water-resistant aquafeed, scenarios requiring improved high-temperature stability and utilization.
- **Addition method**: Directly add to mixer or spray after pelleting (spray temperature ≤50 °C) to avoid degradation of active ingredients by pelleting heat.
- **Reference dosage**: Same as conventional powder; higher utilization rate of active ingredients in microcapsules allows 10%–20% dosage reduction.

### 3.3 Operating Points & Quality Control

1. **Uniformity**: Strict stepwise dilution is mandatory; direct addition of high-concentration extract to bulk feed is prohibited to prevent excessive local concentration affecting palatability or animal discomfort.
2. **Temperature control**: Pelleting temperature ≤70 °C; post-spraying used if exceeded; storage temperature ≤25 °C, sealed and protected from light to prevent active ingredient degradation.
3. **Compatibility safety**: Synergize with probiotics and enzyme preparations to improve intestinal health; avoid direct mixing with strong alkaline additives (quicklime) to prevent inactivation.
4. **Effect verification**: Regularly detect DNJ residue in feed, livestock intestinal flora and growth performance; for aquafeed, test survival rate and feed coefficient to optimize dosage.
5. **Compliance**: Use feed-grade mulberry leaf extract conforming to the *Catalogue of Feed Additive Varieties*; keep manufacturer qualifications and batch inspection reports.

## IV. Operating Guide for Addition in Pharmaceutical / Health Care Products Field

### 4.1 Applicable Categories & Core Functions

- **Medicines**: Adjuvant diabetes drugs, anti-inflammatory preparations, topical ointments, exerting core hypoglycemic, anti-inflammatory and antibacterial effects.
- **Health care products**: Sugar-control, weight management, antioxidant, immune-regulating products (capsules, tablets, powders, oral liquids).

### 4.2 Dosage Form Selection & Addition Methods

**(1) Pharmaceutical-Grade Mulberry Leaf Extract Powder (DNJ ≥3%, purity ≥95%)**

- **Application**: Capsules, tablets, granules, topical ointments, for pharmaceutical preparations and high-end health products.
- **Addition methods**:
  - Capsules / tablets: Mix with microcrystalline cellulose, lactose, magnesium stearate, dry/wet granulation (granulation temperature ≤50 °C), tableting or capsule filling.
  - Topical ointments: Mix with petrolatum and lanolin, prepare by low-temperature emulsification (≤45 °C) to ensure uniform dispersion.
  - Process nodes: Preparation mixing stage, late emulsification stage; avoid high temperature and strong light to prevent active ingredient degradation.
- **Reference dosage**: 300–750 mg mulberry leaf extract per capsule (DNJ ≥3 mg); 200–500 mg extract per tablet; topical ointment 1%–5%.

**(2) Pharmaceutical-Grade Mulberry Leaf Extract Concentrated Liquid (DNJ ≥5%)**

- **Application**: Oral liquids, injections (auxiliary raw materials), scenarios requiring rapid dissolution and high active ingredient content.
- **Addition methods**:
  - Oral liquids: Dissolve in warm water (40–50 °C), add sweeteners and stabilizers (xanthan gum), adjust pH to 5.0–6.0, sterile filtration before filling.
  - Injections: Solubilize with ethanol (ethanol concentration 30%–50%), adjust pH to 5.0–6.0, sterile filtration, complying with GMP specifications.
- **Reference dosage**: Daily oral liquid intake 10–20 mL (containing 0.5%–2% extract); injection added according to prescription (per pharmacopoeia).

**(3) Stabilized Mulberry Leaf Extract (DNJ ≥2%, embedded modification)**

- **Application**: Long-term health products, high-temperature sterilized preparations (canned health products), with excellent stability and no obvious bitter taste.
- **Addition method**: Same as water-soluble powder; resistant to short-term sterilization at 100 °C, high bioavailability, no additional flavor masking required.
- **Reference dosage**: Daily extract intake 500–1000 mg, converted according to product specifications.

### 4.3 Operating Points & Quality Control

1. **GMP specifications**: Production environment cleanliness Grade D or above, dedicated equipment to avoid cross-contamination; operators shall meet pharmaceutical production requirements.

2. **Stability**: High-purity extracts stored under shading, sealing and low temperature (2–8 °C); stabilized dosage forms can be stored at room temperature, shelf life ≥24 months.
3. **Content control**: DNJ and total flavonoid contents tested per batch, deviation ≤±5%; pharmaceutical-grade extracts tested for heavy metals (Pb ≤2 mg/kg, As ≤1 mg/kg), microorganisms (sterility/limit test), solvent residues (ethanol ≤0.5%).
4. **Safety**: Avoid excessive combined use with hypoglycemic drugs (metformin, insulin) to prevent hypoglycemia; specify unsuitable groups (pregnant women, lactating women, hypoglycemic patients).
5. **Efficacy verification**: Health products require animal tests and human feeding trials to ensure sugar-control, immune regulation and other effects; pharmaceuticals must comply with pharmacopoeia standards and complete clinical verification.

## V. Operating Guide for Addition in Cosmetics Field

### 5.1 Applicable Categories & Core Functions

- **Skin care products**: Anti-glycation, antioxidant, soothing sensitivity, anti-aging (creams, essences, masks, toners), improve dullness and roughness.
- **Hair care products**: Scalp nourishment, antibacterial oil control, hair loss reduction (shampoos, conditioners, scalp essences), improve hair smoothness.
- **Makeup**: Natural antioxidant and preservative (lipsticks, foundations), extend shelf life and reduce chemical preservatives.

### 5.2 Dosage Form Selection & Addition Methods

**(1) Cosmetic-Grade Mulberry Leaf Extract Powder (DNJ ≥0.5%, non-irritating modification)**

- **Application**: Creams, lotions, shampoos, conditioners, for medium and low-end skin and hair care products.
- **Addition methods**:
  - Oil-phase systems (creams, lotions): After oil phase preparation, cool to 45–50 °C, add extract dissolved in aqueous phase, homogenize for 3–5 minutes.
  - Aqueous phase systems (shampoos, toners): Pre-dissolve with propylene glycol and glycerin, add to aqueous phase (≤40 °C), stir for 20 minutes until uniform.
  - Process nodes: Late emulsification and batching stages; avoid high temperature (>50 °C) causing active degradation.
- **Reference dosage**: Skin care products 0.1%–3% (anti-glycation essence ≥2%); shampoos 0.5%–2%; mask essence 0.1%–2%.

**(2) Mulberry Leaf Extract Microemulsion / Nanoemulsion (water-soluble, easily absorbed)**

- **Application**: Essences, toners, masks, high-end hair care products, scenarios requiring improved skin absorption efficiency.
- **Addition method**: Directly add to aqueous phase and stir evenly without additional solubilization; highly stable, compatible with hyaluronic acid and ceramide.
- **Reference dosage**: Same as conventional powder; higher bioavailability of microemulsion allows 20%–30% dosage reduction.

### 5.3 Operating Points & Quality Control

1. **Irritation control**: Cosmetic-grade extracts shall remove bitter and irritating components, or control addition ≤3% to avoid mucosal irritation; sensitive skin products ≤0.5%, with pre-skin irritation test.
2. **Compatibility safety**: Avoid direct mixing with high-concentration vitamin C and fruit acids to prevent oxidative decomposition; compound with niacinamide and vitamin E to enhance anti-glycation and antioxidant effects.
3. **Stability**: Add antioxidants (vitamin E, BHT); products stored sealed and protected from light to prevent oxidation and browning of active ingredients.
4. **Compliance**: Comply with *Cosmetic Safety Technical Specifications*; test heavy metals, microorganisms, irritation, no prohibited ingredients; label “mulberry leaf extract” and addition amount (active ingredient content labeled if efficacy claimed).
5. **Efficacy verification**: Complete in vitro antioxidant, anti-glycation and cytotoxicity tests to ensure safety and effectiveness.

## VI. Operating Guide for Addition in Agricultural Field

### 6.1 Applicable Scenarios & Core Functions

- **Pesticides**: Control bacterial and fungal diseases (citrus canker, cucumber powdery mildew, rice sheath blight), natural antibacterial agent, reduce chemical pesticide use.
- **Fertilizer / soil treatment**: Improve soil, inhibit soil-borne diseases, promote crop root growth, enhance crop stress resistance (drought, disease and pest resistance).
- **Seed treatment**: Sterilize, promote germination, improve emergence rate, enhance seedling stress resistance.

## 6.2 Dosage Form Selection & Addition Methods

**(1) Mulberry Leaf Extract Microemulsion (5%, complying with agricultural industry standards)**

- **Application**: Foliar spray, root irrigation, soil treatment, for disease control and growth regulation of various crops.
- **Addition methods**:
  - Foliar spray: Dilute 600–1000 times, spray at early onset, evenly cover leaf backs and stems, interval 7–10 days, apply 2–3 times consecutively.
  - Root irrigation: Dilute 400–800 times, irrigate 500–1000 mL per plant to control soil-borne diseases such as bacterial wilt and root rot.
  - Soil treatment: Dilute 300–500 times, apply with irrigation water or mix with soil and broadcast, dosage 40–50 mL per mu.
- **Reference dosage**: Foliar spray 40–50 mL 5% microemulsion per mu; dosage can be increased appropriately for root irrigation and soil treatment.

**(2) Mulberry Leaf Extract Powder / Granules**

- **Application**: Soil treatment, seed dressing, for large-scale agricultural production.
- **Addition methods**:
  - Seed dressing: Mix powder with seeds at 1:50–1:100, air-dry before sowing to improve germination rate.
  - Soil broadcasting: Mix granules with fine soil, broadcast evenly and tillage, dosage 1–2 kg per mu to inhibit soil-borne diseases.
- **Reference dosage**: Seed dressing 0.5%–1%; soil broadcasting 1–2 kg per mu.

## 6.3 Operating Points & Quality Control

1. **Application timing**: Prevention-oriented, apply at early onset; avoid application under high temperature (>35 °C) and strong light; best time is early morning or evening to reduce active ingredient degradation.
2. **Synergistic compounding**: Compounding with kasugamycin and copper preparations can reduce chemical pesticide dosage by 30%–50% and improve control effect by over 20%.
3. **Safety interval**: 7–10 days for vegetables, 15 days for fruit trees to avoid excessive pesticide residues.
4. **Compliance**: Use registered pesticide-grade mulberry leaf extract complying with *Regulations on Pesticide Administration*; keep registration certificates and batch inspection reports.

5. **Storage**: Microemulsion sealed and stored in cool place away from direct sunlight; powder/granules protected from moisture and caking, shelf life ≥12 months.

## VII. Operating Guide for Addition in Industrial Field

### 7.1 Applicable Scenarios & Core Functions

- **Water treatment**: Sterilization and algae removal for industrial circulating water and heating pipe networks, inhibit microbial growth, replace part of chemical fungicides.
- **Leather / papermaking / textile**: Anti-mold, antiseptic, antibacterial, extend shelf life and improve durability.
- **Coatings / plastics**: Natural antioxidant and antibacterial, improve weather resistance, reduce chemical additives.

### 7.2 Dosage Form Selection & Addition Methods

**(1) Mulberry Leaf Extract Preservative Liquid (oil-soluble / water-soluble)**

- **Application**: Leather tanning, papermaking pulp, textile dyeing and finishing, coating formulations, core antiseptic and antibacterial effects.
- **Addition methods**:
  - Leather: Add to tanning liquid, dosage 0.1%–0.5%, soak for 24–48 hours to improve antibacterial property.
  - Papermaking: Add to pulp, dosage 0.1%–1%, stir evenly before papermaking to prevent mold.
  - Coatings: Add to formula, dosage 0.1%–0.5%, mix at room temperature to improve weather resistance and antibacterial property.
- **Reference dosage**: Leather 0.1%–0.5%; papermaking 0.1%–1%; coatings 0.1%–0.5%.

**(2) Mulberry Leaf Extract Antioxidant (powder / oily)**

- **Application**: Plastics, rubber, grease industry, replace part of synthetic antioxidants, delay product aging.
- **Addition method**: Premix with raw materials, add during extrusion/injection molding/refining, stir evenly to ensure dispersibility.
- **Reference dosage**: 0.01%–0.5%, adjusted according to product antioxidant demand.

**(3) Mulberry Leaf Extract Water Treatment Agent**

- **Application**: Industrial circulating water, heating pipe networks, sterilization and algae removal, inhibit microbial growth.
- **Addition method**: 30–100 g per ton of water, dissolve in warm water and add to system at one time; supplement proportionally during water replenishment to maintain stable concentration.
- **Operating points**: Sealed operation to avoid direct inhalation; stored in cool and ventilated place to prevent leakage.

### 7.3 Operating Points & Quality Control

1. **Concentration control**: Precisely add according to process requirements to avoid excessive residue or cost increase, or insufficient dosage affecting antiseptic and antioxidant effects.
2. **Equipment protection**: Use stainless steel and plastic equipment, avoid contact with copper, iron and other metals to prevent browning and inactivation.
3. **Environmental requirements**: Industrial wastewater discharged after treatment complying with environmental standards; leather, papermaking and other industries ensure extract residue meets industry specifications.
4. **Stability**: Industrial extracts stored in cool and dry place, sealed and moisture-proof, away from high temperature and strong light, shelf life ≥12 months.

## VIII. Storage & Transportation Specifications

1. **Storage conditions**: Sealed, shaded, cool and dry place, temperature ≤25 °C, humidity ≤60%; high-purity pharmaceutical-grade extracts require refrigeration at 2–8 °C; microcapsule and microemulsion dosage forms can be stored at room temperature. Shelf life of conventional powder ≥24 months, concentrated liquid and microemulsion ≥12 months.
2. **Packaging requirements**: Powder packed in aluminum foil bags and cardboard drums lined with polyethylene bags for moisture and leakage prevention; concentrated liquid and microemulsion in fluorinated barrels and aluminum cans; industrial preservative liquid in corrosion-resistant plastic or iron drums.
3. **Transportation requirements**: Avoid exposure, rain and high temperature; liquid extracts (concentrated liquid, microemulsion) transported per liquid cargo specifications to prevent leakage; no mixed transport with toxic and hazardous substances.
4. **Batch management**: Each batch marked with production date, shelf life, active ingredient content and batch number; implement first-in-first-out principle, keep

usage records per batch.

## IX. Quality Inspection & Abnormality Handling

### 9.1 Mandatory Inspection Items

- **Content detection**: DNJ (HPLC), total flavonoids (UV spectrophotometry), mulberry leaf polysaccharides (phenol-sulfuric acid method), implemented per corresponding industry standards.
- **Physicochemical indicators**: Moisture, ash, pH, solubility, heavy metals (Pb, As, Hg), solvent residues, pesticide residues (food/medicine/agricultural grade).
- **Microbiological indicators**: Total bacterial count, mold, yeast, pathogenic bacteria (food/medicine/cosmetics grade), complying with corresponding national/industry standards.
- **Stability**: Accelerated test (40 °C, 75% RH), detect active ingredient retention rate to ensure stable efficacy within shelf life.

### 9.2 Abnormality Handling

1. **Active ingredient degradation**: Causes (high temperature, light, unsuitable pH, mixing with contraindicated substances); solutions (adjust addition temperature, shaded storage, adjust pH to 5.0–7.0, switch to stabilized dosage form, avoid contact with contraindicated substances).
2. **Poor uniformity**: Causes (no premixing, improper dilution, insufficient stirring); solutions (stepwise dilution after powder sieving, extend stirring time, use emulsifiers or dispersants).
3. **Abnormal flavor/odor (bitterness, off-odor)**: Causes (excessive dosage, no masking, insufficient extract purity); solutions (reduce dosage, microcapsule embedding, compound with sweeteners/flavors, use high-purity extract).
4. **Compatibility failure**: Causes (mixing with strong oxidants, alkaline substances); solutions (adjust formula addition sequence, add contraindicated ingredients separately, replace compatible raw materials).
5. **Product browning**: Causes (contact with metal ions, high temperature, light); solutions (use stainless steel/plastic equipment, lower processing temperature, shaded storage, add antioxidants).

## X. Supplementary Provisions

1. This guide is a professional operating specification. Enterprises may optimize dosage and process parameters according to their product characteristics, process equipment and regulatory requirements, combined with laboratory and pilot tests.
2. The optimal addition range of mulberry leaf extract shall be determined through laboratory tests, and stability and efficacy verified by pilot tests before large-scale production to avoid batch quality problems.
3. Matters not covered herein shall be implemented with reference to relevant national standards, regulations and product instructions of mulberry leaf extract manufacturers.