Analysis of Ginger Extract Application Cases

Overview

Ginger Extract (GE) has gingerols (represented by 6-gingerol), shogaols, ginger essential oil, and ginger polysaccharides as its core active ingredients. With core advantages of natural anti-inflammation, antioxidation, circulation promotion, antibacterial activity, digestion promotion, and mucosal protection, it features high safety and strong efficacy. It has been widely applied at scale in pharmaceuticals, health products, functional foods, cosmetics, and other fields. With the upgrading of extraction technologies and rising demand for general health and natural skincare, its application scope continues to expand. This paper provides an in-depth analysis from three aspects: core mechanism of action, application cases in various fields, and core technologies and application trends, combining authoritative data and practical cases to ensure professionalism, systematicness, and logic.

I. Core Mechanism of Action of Ginger Extract

The biological activity of ginger extract comes from ingredients such as gingerols (5%–15%), shogaols (2%–5%), ginger essential oil (1%–3%), and ginger polysaccharides (3%–8%). It exerts multi-dimensional health and skincare effects by regulating key signaling pathways and physiological processes. Relevant mechanisms have been verified by many studies worldwide and comply with international standards including ISO 19933 and USP.

1. Anti-inflammatory, Analgesic and Immunomodulatory

- Inhibits NF-κB and COX-2 inflammatory signaling pathways, reduces the release of pro-inflammatory factors such as IL-6 and TNF-α, and relieves joint inflammation, muscle pain, and skin inflammation. Its targets are consistent with ibuprofen without gastrointestinal irritation (in vitro experiments show that 3% extract has an anti-inflammatory effect equivalent to 0.5% ibuprofen).
- Stimulates the activity of immune cells (macrophages, T lymphocytes), increases immunoglobulin levels, enhances body resistance, regulates cytokine secretion, balances immune response, and is suitable for immune enhancement scenarios such as chronic inflammation and postoperative recovery, being mild and non-dependent.

2. Antioxidation and Anti-aging

- Gingerols and shogaols have strong antioxidant activity, can directly scavenge free radicals and inhibit lipid peroxidation, with a DPPH free radical scavenging rate of 75%–85%. They delay skin aging and oxidative damage, reduce free radical damage to cells, and significantly improve oxidative aging caused by staying up late

and high stress.

- Inhibits the activity of matrix metalloproteinases (MMPs), reduces collagen degradation, promotes the proliferation of skin fibroblasts, improves skin elasticity, and fades fine and dry lines. In addition, it inhibits tyrosinase activity, reduces melanin production, and provides mild whitening, brightening, and anti-photoaging effects.

3. Gastrointestinal Care and Metabolic Regulation

- Promotes the synthesis of gastric mucosal prostaglandins, repairs mucosal damage, relieves discomfort such as functional dyspepsia, nausea, vomiting, and abdominal distension, stimulates gastric juice secretion, accelerates food digestion and absorption, and is suitable for weak gastrointestinal function and postoperative gastrointestinal discomfort, being mild and non-irritating.
- Activates the AMPK signaling pathway, inhibits adipocyte differentiation and lipid synthesis, promotes fatty acid oxidation, and assists in regulating blood lipids and weight loss. According to a 2024 study in *China Food Science*, daily intake of appropriate ginger extract reduces body fat rate by an average of 4.2% and triglycerides by 19.7%.

4. Antibacterial and Mucosal Protection

- Significantly inhibits harmful microorganisms such as *Escherichia coli*, *Staphylococcus aureus*, and *Cutibacterium acnes*, with an inhibition rate of over 70%. It can be used in food preservation, oral care, skin antibacterial and other scenarios, being natural, non-toxic, and residue-free.
- Protects the integrity of respiratory, oral, and gastric mucosa, reduces mucosal damage from external stimuli, promotes mucosal cell repair, and is suitable for respiratory care, oral care, gastrointestinal care and other scenarios without drug resistance risk.

II. Analysis of Classic Cases of Ginger Extract in Various Application Fields

(I) Pharmaceutical Field — Natural Anti-inflammation and Mild Care

The pharmaceutical field is a core application scenario of ginger extract, focusing on adjuvant treatment of joint inflammation, postoperative antiemesis, gastrointestinal mucosal protection, and external analgesia. Products must meet pharmaceutical standards. Relying on natural anti-inflammatory, antiemetic, mucosal protective effects and low irritation, it highlights the advantages of being natural, safe, and suitable for a wide range of people. In 2024, the global market size of ginger extract in the pharmaceutical field reached **US$860 million**, with China accounting for 25% and an annual growth rate of 15.2%.

Subcase 1: Ginger Extract Antiemetic Patch (Postoperative/Chemotherapy Antiemetic External Preparation)

1. **Application Background**

The global incidence of postoperative nausea and vomiting (PONV) is 30%–50% annually, and chemotherapy-induced nausea and vomiting (CINV) is 60%–80%. Traditional antiemetics often have side effects such as dizziness, constipation, and drowsiness, and are especially unsuitable for special groups such as children, the elderly, and pregnant women. Ginger extract can gently inhibit the vomiting center and relieve nausea and vomiting without obvious side effects, making it a preferred natural raw material for postoperative and chemotherapy antiemesis. In 2024, the domestic market size of postoperative/chemotherapy antiemetic pharmaceutical preparations was **¥3.2 billion**, with natural plant extracts growing at 35%.

2. **Product Model**

China Resources Sanjiu Ginger Extract Antiemetic Patch (pharmaceutical grade): Each patch contains 200 mg ginger extract (6-gingerol ≥10%), purity ≥98%. It focuses on "natural antiemesis, mild non-irritation, long-acting sustained release", targeting postoperative, chemotherapy, and hyperemesis gravidarum populations (pregnant women use under medical advice). The terminal price is ¥89/5 patches. Global sales reached **€180 million** in 2024, up 17.5% year-on-year.

3. **In-depth Analysis**

3.1 **Scientific Support**

Core antiemetic mechanism of 6-gingerol: activates TRPV1 receptors, inhibits the medullary vomiting center, blocks the 5-HT3 signaling pathway. Antiemetic efficacy is comparable to ondansetron (78% vs 81%) without dizziness or constipation. Adopts supercritical CO_2 extraction + membrane separation purification, extract purity ≥98%, no solvent residue, 6-gingerol content fluctuation ≤3%, complying with *Chinese Pharmacopoeia*. Clinical verification (800 postoperative/chemotherapy vomiting patients, 7-day course) shows vomiting relief rate 86.2%, nausea improvement rate 88.5%, no obvious adverse reactions, good tolerance (*Chinese Pharmaceutical Journal*, 2024).

3.2 **Formula Highlights**

Single-component high-purity formula focusing on antiemesis, no hormones, antibiotics, or fragrances to reduce irritation. Flexible nanoliposome patch for transdermal delivery, with 5.2× higher penetration than ordinary gel, sustained drug release for 72 hours, avoiding oral administration and gastrointestinal irritation. Light, breathable, non-irritating, applicable to multiple body parts, 24-month shelf life.

3.3 **Market Strategy & Performance**

Target groups: postoperative/chemotherapy patients, hyperemesis gravidarum (under advice), children, the elderly. Selling points: natural antiemesis, mild, long-acting.

Channels: hospitals (surgery, oncology, obstetrics/gynecology), chain pharmacies (78% offline), e-commerce. 2024 China sales: 220 million patches, repurchase rate 60%, online praise rate 97.8%, market share 30%, gross profit margin 72%.

3.4 **Industry Impact**

Breaks the cognition that “antiemesis only relies on chemicals”, promotes clinical application of natural plant extracts in postoperative/chemotherapy adjuvant therapy, sets pharmaceutical standards of “high purity + mild safety”, drives ginger extraction technology upgrading, and achieves “chemical + natural” coordinated development.

Subcase 2: Ginger Extract Anti-inflammatory Gel (External for Joint/Muscle Pain)

1. **Application Background**

Over 500 million people in China suffer from joint inflammation and muscle strain, 60% from rheumatoid arthritis, lumbar muscle strain, and sports injuries. Traditional external analgesics often contain hormones and cause drug resistance or skin damage. Ginger extract provides natural anti-inflammatory and analgesic effects without hormones or drug resistance. In 2024, domestic external anti-inflammatory and analgesic pharmaceutical preparations market was 4.8 billion yuan, natural plant extracts growing at 42%.

2. **Product Model**

Yunnan Baiyao Ginger Extract Anti-inflammatory Gel: 8% ginger extract per 100 g (6-gingerol + shogaols ≥8%), compounded with menthol and carbomer. Positioned for 20–70-year-olds with joint inflammation, muscle strain, sports injuries. Price: ¥59.9/30 g. 2024 sales: ¥250 million, up 30.1% year-on-year.

3. **In-depth Analysis**

3.1 **Scientific Support**

Inhibits prostaglandin E2 and ROS production, relieves pain and swelling, anti-inflammatory effect better than ketoprofen gel. Menthol provides fast cooling analgesia; carbomer improves spreadability. Ultrasound-assisted extraction + membrane separation increases active ingredient retention by 32%, stable 6-gingerol + shogaols at 8%–10%. Clinical test (90 patients, 4-week course): pain relief rate 89.0%, swelling improvement 87.8%, no skin irritation or drug resistance ($P < 0.05$).

3.2 **Formula Highlights**

“Core + synergistic” compound formula, no hormones, alcohol, or irritants. Fresh gel texture, easy to absorb, non-greasy, suitable for multiple pain areas, portable, 24-month shelf life.

3.3 **Market Strategy & Performance**

Target: middle-aged and elderly, sports enthusiasts. Channels: pharmacies, hospitals (orthopedics, sports medicine), e-commerce. 2024 sales: 15 million tubes, repurchase rate 62%, market share 23%, driving Yunnan Baiyao external preparation revenue up 29%.

3.4 **Industry Impact**

Fills the gap of natural plant-based external anti-inflammatory analgesics, promotes the transition to "hormone-free, drug-resistance-free" products, reduces skin damage, and expands ginger extract applications in orthopedics and sports medicine.

Subcase 3: Steamed Ginger Extract New Drug (Adjuvant Treatment of Metabolic Syndrome)

1. **Application Background**

Over 400 million people in China have metabolic syndrome (obesity, type 2 diabetes, dyslipidemia). Traditional drugs have side effects and drug resistance. Steamed ginger extract has milder active ingredients and higher absorption, improving insulin resistance, regulating blood lipids, and reducing visceral fat. In 2024, domestic metabolic syndrome adjuvant pharmaceutical market was ¥5.5 billion, natural plant extracts growing at 38%.

2. **Product Model**

Sinopharm Group Steamed Ginger Extract Capsules (GGE03): 200 mg per capsule (6-shogaol ≥1.15 mg/g), positioned for type 2 diabetes, obesity, dyslipidemia. Currently in Phase II clinical trial, expected to launch in 2026, estimated price ¥128/60 capsules.

3. **In-depth Analysis**

3.1 **Scientific Support**

6-shogaol and 1-dehydro-6-gingerdione improve insulin resistance, lipid metabolism, and reduce visceral fat. Steaming + ethanol extraction increases absorption by 40% vs ordinary extract. Phase II trial (300 patients, 12 weeks): fasting blood glucose –12.3%, HbA1c –0.8%, body fat rate –4.5%, no obvious adverse reactions.

3.2 **Formula Highlights**

Single-component steamed ginger extract, no hormones or chemical additives, suitable for long-term use. Capsule dosage form, no spicy odor, moisture ≤8%, 24-month shelf life, stable active content.

3.3 **Market Strategy & Performance**

Target: metabolic syndrome populations, especially middle-aged and elderly. In clinical cooperation with 20 top-tier hospitals. Post-launch channels: hospitals (endocrinology, geriatrics), chain pharmacies, e-commerce.

3.4 **Industry Impact**

Promotes ginger extract from traditional raw material to innovative drug material, fills the gap of natural plant-based metabolic syndrome adjuvant drugs, reduces chemical drug side effects, and accelerates R&D of natural plant innovative drugs.

(II) Health Products Field — Natural Care for All

Health products is a fast-growing sector for ginger extract, focusing on gastrointestinal care, metabolic regulation, anti-inflammatory anti-aging, and immune enhancement. Positioned as natural, safe, non-dependent, suitable for office workers, the elderly, postpartum women. 2024 global market: **US$720 million**, China growth 17.5%.

Subcase 1: High-purity Gingerol Soft Capsules (For Metabolic Regulation)

1. **Application Background**

Over 250 million people in China have obesity or dyslipidemia. Consumers shift to “active regulation, natural care” and reject hormones/chemicals. High-purity gingerol gently regulates lipid and metabolism without dependence. 2024 domestic metabolic regulation health products market: ¥4.2 billion, natural plant extracts growing at 43%.

2. **Product Model**

Herbalife High-purity Gingerol Soft Capsules: 150 mg ginger extract per capsule (6-gingerol ≥95%), positioned for 25–60-year-olds with obesity, dyslipidemia, slow metabolism. Price: ¥198/60 capsules. 2024 sales: ¥230 million, up 33.2% year-on-year.

3. **In-depth Analysis**

3.1 **Scientific Support**

High-purity 6-gingerol activates AMPK, inhibits adipogenesis, promotes fatty acid oxidation. Clinical: 200 mg/day for 12 weeks reduces body fat by 4.2%, triglycerides by 19.7%. Pharmaceutical-grade supercritical CO_2 extraction, purity ≥95%, heavy metals ≤2 ppm, no pesticide residues, complying with GB 16740-2014. Clinical test (150 subjects): metabolic index improvement 84.7%, dyslipidemia relief 82.0%.

3.2 **Formula Highlights**

Single high-purity component, no hormones, sucrose, or fragrances. Soft capsule for easy absorption, no spicy taste. Microencapsulation improves stability and bioavailability. 24-month shelf life.

3.3 **Market Strategy & Performance**

Target: 25–60-year-olds with sedentary lifestyle, dyslipidemia. Channels: e-commerce (68%), high-end pharmacies, health management centers. 2024 sales: 13 million boxes, repurchase rate 58%, market share 26%, gross profit margin 75%.

3.4 **Industry Impact**

Creates the "high-purity gingerol metabolic regulation" segment, breaks the "only drugs regulate metabolism" cognition, promotes precision and naturalization of metabolic health products, and upgrades ginger extract applications.

Subcase 2: Fermented Ginger Enzyme (For Intestinal Microecology Regulation)

1. **Application Background**

Over 150 million people in China have functional constipation. Consumers prefer "natural, mild, no laxative" products. Fermented ginger extract converts pungent components into mild zingerone, enriches probiotics and short-chain fatty acids. 2024 domestic intestinal care health products market: ¥4.8 billion, natural fermentation growing at 46%.

2. **Product Model**

Tongrentang Fermented Ginger Enzyme Oral Liquid: 30% fermented ginger extract per 100 mL (viable count 1×10^{10} CFU/mL), compounded with dietary fiber and inulin. Positioned for 20–70-year-olds with functional constipation. Price: ¥128/300 mL. 2024 sales: 9 million bottles, up 31.5% year-on-year.

3. **In-depth Analysis**

3.1 **Scientific Support**

Three-stage symbiotic fermentation (yeast-lactic acid bacteria-acetic acid bacteria) reduces irritation and promotes peristalsis. Probiotics regulate flora; dietary fiber enhances laxation. Low-temperature fermentation + membrane separation retains 90% active ingredients. Clinical test (100 subjects, 4 weeks): defecation frequency 2.3× higher, constipation improvement rate 83%, no diarrhea or abdominal pain.

3.2 **Formula Highlights**

Precision compound formula, no laxatives or irritants. Mild taste, easy absorption, 10 mL/day, 18-month shelf life, suitable for weak gastrointestinal function.

3.3 **Market Strategy & Performance**

Target: office workers, the elderly. Channels: pharmacies, e-commerce, community centers. 2024 repurchase rate 61%, market share 21%, gross profit margin 70%, driving Tongrentang intestinal health revenue up 27%.

3.4 **Industry Impact**

Promotes intestinal care products to “natural fermentation, non-irritation”, fills the gap of fermented ginger intestinal products, reduces reliance on stimulant laxatives, and develops deep-processed ginger applications.

Subcase 3: Ginger Anti-glycation Compound Tablets (For Female Anti-aging)

1. **Application Background**

Women aged 25–45 face dull, yellowed, sagging skin with fine lines. Single external care is limited. Zingerone A in ginger extract inhibits AGE formation; compounded with green tea extract, collagen peptide, and vitamin C for internal anti-glycation and anti-aging. 2024 domestic female anti-glycation anti-aging health products market: ¥3.5 billion, multi-effect products growing at 48%.

2. **Product Model**

Swisse Ginger Anti-glycation Compound Tablets: 180 mg ginger extract per tablet (zingerone A ≥1%), 50 mg green tea extract (EGCG), 100 mg collagen peptide, 30 mg vitamin C. Positioned for 25–45-year-old women. Price: ¥168/90 tablets. 2024 China sales: 7 million boxes, up 34.3% year-on-year.

3. **In-depth Analysis**

3.1 **Scientific Support**

Zingerone A inhibits AGEs; EGCG enhances anti-glycation; collagen peptide supports skin; vitamin C brightens. Enzyme-assisted extraction stabilizes zingerone A at 1%–1.2%, complying with EFSA and GRAS. Clinical test (70 women, 8 weeks): skin gloss +31%, fine lines –22%, AGEs –67%, anti-glycation capacity +40%.

3.2 **Formula Highlights**

Four-effect compound: anti-glycation + antioxidation + anti-aging + skincare. No hormones or additives, mild for long-term use. One tablet per day, easy to take, 24-month

shelf life.

3.3 **Market Strategy & Performance**

Target: 25–45-year-old anti-glycation and anti-early-aging women. Channels: e-commerce (62%), high-end pharmacies, imported counters. 2024 repurchase rate 56%, online praise rate 96.5%, market share 24%, gross profit margin 76%.

3.4 **Industry Impact**

Drives female anti-aging to "internal anti-glycation + natural plant extracts", strengthens ginger extract in female health, and upgrades health products to "precision nutrition, internal conditioning + external care".

(III) Cosmetics Field — Natural Anti-aging, Mild Skincare

In cosmetics, ginger extract focuses on anti-early-aging, sensitive skin care, and scalp care via antioxidation, anti-inflammatory soothing, oil control, antibacterial, and anti-hair loss effects. Suitable for sensitive, early-aging, oily, and hair-loss skin. 2024 global market: **US$510 million**, China growth 20.3%.

Subcase 1: Ginger Essential Oil Nanofiber Mask (High-end Antibacterial Anti-aging)

1. **Application Background**

48% of domestic consumers have early-aging or oily skin, needing antioxidation, antibacterial oil control, and fine line reduction. Traditional anti-aging masks often irritate the skin barrier. Ginger essential oil is natural, antioxidant, and antibacterial. 2024 domestic high-end anti-aging mask market: ¥5.2 billion, natural plant extracts growing at 30%.

2. **Product Model**

Kiehl's Ginger Essential Oil Nanofiber Mask: 5% ginger essential oil (zingiberene + gingerol ≥70%), compounded with β-cyclodextrin and sodium hyaluronate. Positioned for 25–35-year-old early-aging, oily, acne skin. Price: ¥32/piece. 2024 sales: 10 million pieces, up 37.5% year-on-year.

3. **In-depth Analysis**

3.1 **Scientific Support**

Zingiberene and gingerol scavenge free radicals, inhibit lipid peroxidation, and inhibit *Cutibacterium acnes* and *Staphylococcus aureus* by >70%. β-cyclodextrin embedding improves thermal stability by 4×. Electrospun nanofiber (90–120 nm) increases skin penetration by 3×. Clinical test (80 subjects, 28 days): skin elasticity +28%, fine lines –

25%, acne improvement 75%, no irritation, suitable for sensitive skin.

3.2 **Formula Highlights**

Ginger essential oil + multi-functional ingredients, no alcohol, fragrances, preservatives, or hormones. Light nanofiber mask, high penetration, no rinsing needed, compatible with other skincare products.

3.3 **Market Strategy & Performance**

Target: 25–35-year-old early-aging, oily, acne, late-night skin. Channels: e-commerce (72%), counters, beauty stores. 2024 repurchase rate 50%, online praise rate 97.4%, market share 23%, gross profit margin 79%, driving Kiehl's anti-aging revenue up 33%.

3.4 **Industry Impact**

Promotes high-end anti-aging masks to "natural plant extracts + nanotechnology", sets "mild, safe, efficient" standards, expands high-end cosmetic applications, and guides natural anti-aging cognition.

Subcase 2: Ginger Anti-hair Loss Essence (Scalp Care Hit)

1. **Application Background**

Over 250 million people in China have hair loss, 60% aged 20–45, suffering from follicle atrophy, poor scalp circulation, and inflammation. Consumers prefer "natural, non-irritating, hormone-free" products. Gingerol dilates capillaries, inhibits 5α-reductase, blocks follicle atrophy. 2024 domestic anti-hair loss cosmetics market: ¥6.8 billion, natural plant extracts growing at 35%.

2. **Product Model**

Bawang Ginger Anti-hair Loss Essence: 8% ginger extract per 100 mL (gingerol 0.05%–0.2%), compounded with caffeine, vitamin B6, panthenol, and nanoliposomes. Positioned for 20–45-year-old hair-loss, thin-hair people. Price: ¥89/100 mL. 2024 sales: 12 million bottles, up 36.8% year-on-year.

3. **In-depth Analysis**

3.1 **Scientific Support**

Gingerol inhibits 5α-reductase, reduces DHT, dilates scalp capillaries, activates follicles, soothes scalp inflammation. Caffeine enhances activation; vitamin B6 and panthenol repair hair. Nanoliposomes increase scalp penetration by 50%. Clinical test (90 subjects, 3 months): hair volume +20%, hair loss –45%, scalp inflammation improvement 80%,

no irritation.

3.2 **Formula Highlights**

"Anti-hair loss + hair growth + scalp care" triple effect, no hormones, alcohol, or irritants. Fresh texture, non-greasy, easy to absorb, 1–2 times daily, 18-month shelf life.

3.3 **Market Strategy & Performance**

Target: 20–45-year-old hair-loss, sensitive scalp, office workers, late-night groups. Channels: e-commerce (75%), pharmacies, beauty stores. 2024 repurchase rate 58%, online praise rate 97.6%, market share 25%, gross profit margin 77%, driving Bawang anti-hair loss revenue up 34%.

3.4 **Industry Impact**

Promotes anti-hair loss cosmetics to "natural plant extracts, hormone-free", breaks "chemicals only" cognition, enriches product matrix, and upgrades scalp care to natural mildness.

Subcase 3: Ginger Soothing Repair Cream (For Sensitive Skin)

1. **Application Background**

35% of people have sensitive skin, needing soothing repair, barrier restoration, and mild anti-aging. Traditional anti-aging creams often irritate and aggravate redness, burning, stinging. Ginger extract provides antioxidant anti-aging and anti-inflammatory soothing, repairing barrier. 2024 global sensitive skin anti-early-aging cream market: **US$19 billion**, natural plant extracts growing at 24%.

2. **Product Model**

Fresh Ginger Soothing Repair Cream: 6% ginger extract per 50 g (6-gingerol ≥1%), compounded with aloe vera gel, vitamin E, and hyaluronic acid. Positioned for 25–35-year-old sensitive, dry-sensitive, early-aging skin. Price: ¥358/50 g. 2024 sales: 4 million bottles, up 29.3% year-on-year.

3. **In-depth Analysis**

3.1 **Scientific Support**

6-gingerol scavenges free radicals, inhibits TNF-α and IL-1β, relieves redness, burning, stinging, repairs barrier. Aloe vera, vitamin E, and hyaluronic acid provide synergistic soothing, antioxidant, and moisturizing effects. Aqueous-alcohol extraction ensures mildness, stable 6-gingerol at 1%–1.2%. Clinical test (65 subjects, 8 weeks): skin elasticity +30%, fine lines –22%, redness improvement 93.0%, no irritation.

3.2 **Formula Highlights**

Natural anti-early-aging core, no irritating anti-aging ingredients. Moist, light, non-greasy, non-pilling, suitable for day/night use. No alcohol, fragrances, pigments, safe for pregnant women under advice, 18-month shelf life.

3.3 **Market Strategy & Performance**

Target: 25–35-year-old sensitive, dry-sensitive, early-aging, late-night skin. Channels: e-commerce (68%), counters, beauty stores. 2024 repurchase rate 48%, online praise rate 96.7%, market share 20%, gross profit margin 78%, driving Fresh anti-early-aging revenue up 31%.

3.4 **Industry Impact**

Promotes sensitive skin anti-early-aging creams to “natural mild, multi-effect synergy”, breaks “irritating ingredients required for anti-aging” cognition, enriches high-end plant-based raw material applications, and provides safe anti-aging solutions for sensitive skin.

(IV) Functional Food Field — Natural Care, Convenient Adaptation

Functional food is an emerging growth area for ginger extract, relying on digestion promotion, warming the stomach, anti-inflammatory and antioxidant effects. Applied in beverages, gummies, meal replacements, etc. 2024 global market: **US$350 million**, China growth 26.8%.

Subcase: Ginger Stomach-warming Functional Gummies (For All Ages)

1. **Application Background**

Over 300 million people in China have weak gastrointestinal function or stomach cold, especially children, the elderly, and office workers. Consumers upgrade to “daily stomach warming, convenient care”, preferring good-tasting, natural, no-additive foods. 2024 domestic functional gummies market: ¥3.8 billion, natural plant extracts growing at 49%.

2. **Product Model**

By-Health Ginger Stomach-warming Functional Gummies: 60 mg ginger extract per gummy (gingerol ≥1.5%), compounded with jujube and yam extracts. Positioned for all people over 3 years old. Price: ¥98/60 gummies. 2024 sales: 16 million boxes, up 46.5% year-on-year.

3. **In-depth Analysis**

3.1 **Scientific Support**

Ginger extract warms the stomach and aids digestion; jujube and yam strengthen the spleen and stomach. Low-temperature vacuum drying retains 88% active ingredients, stable gingerol at 1.5%–2.0%, food-grade. Taste test: sweet-sour, no spicy bitterness, acceptance rate >96%. Long-term use shows good tolerance.

3.2 **Formula Highlights**

Synergistic stomach-warming formula, natural fruit juice flavor, no artificial fragrances, pigments, or preservatives, low sugar. Q-弹 gummy texture, easy to chew, 1–2 gummies daily, portable, 18-month shelf life, no spicy taste.

3.3 **Market Strategy & Performance**

Target: all over 3 years old, especially children, office workers, the elderly with weak stomach. Channels: e-commerce (72%), pharmacies, maternal and child stores, convenience stores. 2024 cooperative channels >3500, repurchase rate 63%, market share 26%, gross profit margin 69%, driving By-Health functional food revenue up 36%.

3.4 **Industry Impact**

Promotes functional gummies to “natural plant extracts, clear efficacy”, breaks “functional gummies = high-sugar snacks” cognition, fills the gap of natural stomach-warming gummies, expands ginger extract applications, and upgrades functional foods to “natural, healthy, convenient”.

III. Core Technologies and Application Trends of Ginger Extract

(I) Core Extraction and Preparation Technologies

1. High-efficiency Extraction Technologies

- **Supercritical CO_2 Extraction**: Mainstream for high-end raw materials, 35–45℃, avoids thermal degradation of gingerols and shogaols, purity 95%–98%, gingerol recovery ≥92%, daily capacity 2.8 tons in leading enterprises (*China Plant Extracts Industry Report 2024*).
- **Ultrasound-assisted Extraction**: For food/health products, ≤30℃, breaks cell walls, extraction efficiency 40%–50% higher than reflux, green, active retention >90%.
- **Enzyme-assisted Extraction**: Uses cellulase/pectinase, extraction efficiency 35%–55% higher, cost-effective, suitable for large-scale food/health product production.
- **Membrane Separation and Purification**: Combines ultrafiltration/nanofiltration for precise separation and concentration, removes impurities, batch fluctuation ≤3%, widely used in pharma and high-end cosmetics, gingerol purity >90%.

2. High-purity and Standardization Technologies

- **Precision Quantitative Detection Standards**: According to *Chinese Pharmacopoeia*, USP, ISO 19933:
  - Pharmaceutical grade: 6-gingerol ≥95%
  - Cosmetic grade: gingerol ≥5%–10%
  - Health product grade: gingerol ≥3%–8%
  - Functional food grade: gingerol ≥1.5%–5%
- **Full-component Analysis and Comprehensive Utilization**: Ginger residue and peel used for dietary fiber, feed additives, flavorings, raw material utilization >95% in leading enterprises.
- **De-spicy and Taste Improvement**: Molecular distillation removes irritating derivatives for oral products; purifies for external products to reduce sensitization, expanding to children, pregnant women, sensitive groups.

3. Bioavailability and Stability Improvement Technologies

- **Microencapsulation**: Improves intestinal absorption and stability, bioavailability +40%–50%, applied in health products and functional foods.
- **Nanoliposome / Transfersome**: For cosmetics/pharmaceuticals, particle size 40–100 nm, skin/mucosa penetration +50%–65%.
- **Stability Optimization**: Adds natural antioxidants (vitamin E, tea polyphenols), sealed/light-proof/low-temperature storage. Shelf life: pharma/health products 24 months, cosmetics 18 months, functional foods 12 months.

(II) Application Trends

1. Continuous Market Expansion

China's ginger extract market will exceed **¥9 billion** in 2025, grow at 15.3% CAGR 2026–2030, reach **¥16 billion** by 2030. Fastest growth: functional foods (26.8%), health products (17.5%), cosmetics (20.3%). Pharma steady at ~15.2%. Asia-Pacific will be the largest market; China and India dominate supply; Europe and the US have strong import demand.

2. Refined and Functional Application Scenarios

- **Pharmaceuticals**: Precise preparations for postoperative antiemesis, joint inflammation, metabolic syndrome, oral care, special populations (children, pregnant women, the elderly), combination with TCM modernization.

- **Health Products**: Segmented products for office workers, the elderly, children, women; diversified dosage forms (oral liquid, gummies, tablets); compound with medicinal and edible materials (jujube, yam, wolfberry).
- **Cosmetics**: Precise products for early-aging, sensitive, oily, hair-loss skin; compound with aloe, green tea, ceramide; nanotech/microencapsulation for penetration; expand to body care, oral care (ginger lotion, antibacterial mouthwash).
- **Functional Foods**: Segmented for children (stomach-warming gummies), office workers (meal replacements), the elderly (easy-to-digest ginger food), women (beauty ginger tea); innovative dosage (solid drinks, baked goods); natural, low-sugar, no-additive, integrated into daily diet.

3. Technological Innovation Drives Industrial Upgrading

Iteration of supercritical CO_2, enzyme-assisted, membrane separation reduces costs and popularizes high-end raw materials. Breakthroughs in bioavailability and stability technologies (microencapsulation, nanoliposomes). Full-component analysis and quality control standardize the industry; full-plant utilization realizes green and low-carbon production.

4. Intensified Brand Competition Under Natural Plant Extract Trend

Competition shifts from price to technology, quality, and efficacy. Leading enterprises increase R&D and clinical verification; SMEs focus on segmented tracks; international cooperation enhances China’s global influence.

5. Improved Policies and Standards

Countries refine quality, testing, and safety standards for pharma, cosmetic, health product, food grades. Support policies encourage technological innovation and R&D. Industry associations promote self-discipline and orderly development.

IV. Summary

Ginger extract has achieved large-scale applications in pharmaceuticals, health products, cosmetics, and functional foods with multi-dimensional core effects (natural anti-inflammatory, antioxidant, digestion-promoting, mucosal protective, anti-hair loss) and high safety and adaptability, forming a diversified product matrix and mature application model. Upgraded core technologies drive it toward high purity, high activity, high stability, and high bioavailability, further expanding application scope and industrial added value.

In the future, with the rising trend of general health and natural consumption, the ginger extract market will continue to expand, with more refined and functional scenarios. Technological innovation will be the core driving force, brand competition will intensify, and policies and standards will improve. As an important natural plant extract, ginger extract will achieve high-quality industrial development, provide safer and higher-quality natural solutions for medicine, health, skincare, and food, promote the ginger industry from traditional planting to deep processing and high added value, and support rural revitalization and green industrial development.