

## TECHNICAL DATA SHEET

**Product Name:** Konjac Gum

**INCI Name:** Amorphophallus Konjac Root Extract

**CAS:** 37220-17-0

**Chemical Classification:** Polysaccharide (glucomannan from konjac flour)

**Functional Category:** Viscosity modifier, emulsion stabilizer

**Description:** Konjac gum is a natural glucomannan polysaccharide derived from the root of the Amorphophallus konjac plant, long used in traditional Asian phytotherapy and nutrition. It is extracted from konjac flour and chemically composed of linear chains of D-mannose and D-glucose in a specific ratio, with additional acetyl groups randomly distributed along the molecular chain. These acetyl groups confer unique rheological properties to konjac gum, enabling it to effectively retain water and form a stable three-dimensional network in aqueous systems. Upon contact with water, konjac gum swells extensively, absorbing large amounts of liquid and forming a viscous, elastic gel. This gel exhibits a high degree of plasticity—spreading easily under mechanical pressure, while maintaining its shape and viscosity at rest. This makes it suitable for formulations that require pronounced texture, resistance to spreading, and high stability, such as hair styling gels, shaving gels, and products with film-forming effects. On the skin, konjac gum-based gels provide a refreshing and pleasant sensation without stickiness or tightness. The gel structure helps retain moisture on the skin's surface, improving hydration and reducing transepidermal water loss. Due to this property, konjac gum also functions as a humectant and is often included in skincare products intended for dry or dehydrated skin. Additionally, it is used as a delivery system for active particles in exfoliating gels and masks, contributing to even dispersion and formulation stability. Konjac gum is also notable for its high biodegradability and safety profile. It contains no GMO components, is not tested on animals, and is suitable for vegan formulations. As a food-grade material, it offers high purity and stability. Its compatibility with a wide pH range and both soluble and insoluble ingredients allows use in emulsions, gels, aqueous solutions, and anhydrous formulations. Thanks to its natural origin, excellent gelling and thickening capabilities, and mild, neutral sensory profile, konjac gum is an ideal ingredient for modern, high-performance cosmetic products that require excellent stability, purity, and a pleasant skin feel.

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**Physicochemical Properties:** Konjac gum is a fine white to light yellowish powder, nearly odorless and tasteless. It is highly hydrophilic and swells rapidly in contact with water, forming a dense, viscous dispersion. It is water-soluble but insoluble in alcohol, oils, and most organic solvents. Upon hydration, it forms a stable, elastic, transparent gel resistant to degradation across a wide pH range. A 1% solution has a viscosity ranging from 20,000 to over 40,000 cP, depending on temperature and mixing speed. It is thermally stable under standard cosmetic processing conditions and does not degrade at moderate temperatures. The gel also displays high plasticity—easily spreadable under pressure while maintaining structure at rest. It retains its gel structure in the presence of ions and electrolytes, without coagulation or phase separation, ensuring long-term stability in complex formulations.

**Mechanism of Action:** Konjac gum's mechanism of action in cosmetic formulations is based on its ability to form highly viscous, stable gels in aqueous media due to its glucomannan polysaccharide structure. When added to water, konjac gum absorbs liquid and hydrates, forming a three-dimensional network between its D-glucose and D-mannose chains. This network physically retains water, forming a gel. The acetyl groups enhance water-binding capacity and contribute to the gel's elasticity and stability. This structure results in a gel that spreads easily under mechanical force but remains firm and stable at rest. This behavior is particularly valuable in products requiring thick consistency, such as styling gels and shaving gels, by preventing run-off and enabling precise application. Furthermore, the gel forms a thin film on the skin that reduces water evaporation and acts as a barrier to transepidermal water loss. The film is non-sticky and non-tightening, delivering a smooth, refreshing after-feel. Konjac gum also helps stabilize particle suspensions and improves emulsion texture by preventing sedimentation and phase separation. Due to this functional flexibility, it can be used synergistically with other polymers, enhancing formulation homogeneity, clarity, and sensory performance.

### Benefits:

- Increases viscosity and enables the creation of stable, dense textures in gels and emulsions
- Acts as a natural film-former that retains moisture on the skin
- Provides a smooth, pleasant feel without stickiness or tightness

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- Stabilizes suspensions and prevents sedimentation of particles
- Compatible with a broad pH range and thermally stable
- Offers high plasticity—spreads easily, retains shape at rest
- Does not affect the color, odor, or clarity of the formulation
- Vegan, biodegradable, and suitable for natural cosmetics

**Usage Instructions:** Konjac gum is used in various cosmetic formulations, with the concentration depending on the desired viscosity and texture. In lightweight gels and serums, it is used at lower concentrations (typically 0.1–0.3%) as a mild thickener and humectant that does not affect clarity. For more structured formulations like hair styling gels, shaving gels, or face masks, concentrations range from 0.5–1%, allowing the formation of firmer, more elastic gels. It should be added to the water phase, ensuring even powder dispersion through low to medium-shear mixing. Hydration can be accelerated by gently heating the water (up to ~40–50 °C), although it fully hydrates at room temperature. The gels reach maximum viscosity after several hours of standing, which should be considered when evaluating final product texture. If needed, small amounts of electrolytes or other hydrophilic thickeners can be added to fine-tune the rheological profile.

**Natural or Synthetic:** Konjac gum is a natural, plant-derived ingredient obtained through mechanical processing of the *Amorphophallus konjac* root, without chemical modification or synthesis. It is fully biodegradable, GMO-free, and suitable for natural, vegan, and environmentally friendly cosmetic formulations.

**Animal Testing:** Not tested on animals

**GMO Status:** Non-GMO

**Vegan:** Contains no animal-derived components

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