Import and distribution for Serbia: Farmadria DOO
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Product Name: Fructan

INCI Name: Fructan

CAS: 37382-13-3

Chemical Classification: Polysaccharide (carbohydrate, fructose polymer)

Functional Category: Humectant; skin conditioning agent; prebiotic ingredient; film-former

IUPAC Name: Poly[β-D-fructofuranosyl-(2 1)]

Description: Fructan is a naturally derived plant polysaccharide composed of fructose units linked by β-(2 1) glycosidic bonds. In cosmetic formulations, it is primarily valued for its pronounced hydrating, conditioning, and protective properties. It most commonly appears in the form of inulin or fructo-oligosaccharides and is naturally present in plants such as chicory, agave, and artichoke, where it serves as a storage carbohydrate. When applied to the skin, fructan acts as a humectant capable of binding water and supporting optimal hydration levels of the stratum corneum, while forming a light, non-occlusive hydrophilic film on the skin surface. Due to its polymeric structure and high skin compatibility, fructan enhances softness and smoothness, reduces the subjective sensation of tightness, and improves overall formulation tolerability, particularly for sensitive and dehydrated skin. It is especially appreciated in modern cosmetics for its prebiotic potential, as it selectively supports the balance of the skin microbiota and strengthens the natural barrier function without disturbing physiological equilibrium. This makes it suitable for formulations intended for long-term care, barrier repair, and reduction of skin reactivity. Fructan is chemically stable across a wide pH range typical of skin care products. It is water-soluble and easily incorporated into serums, gels, emulsions, and emulgel systems without negatively affecting texture or stability. It does not clog pores and does not create a heavy skin feel, making it suitable for formulations intended for combination and oily skin. Due to its mild and physiologically compatible profile, it is frequently used in daily care formulations and in products intended for sensitive areas, such as the area around the eyes.

Difference Between Fructan and Inulin: Fructan encompasses all polysaccharides

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whose fundamental structural unit is fructose, regardless of whether the structure is linear or branched and regardless of origin. Inulin represents a specific, well-defined subgroup within this chemical category.

Physicochemical Properties: In cosmetic raw materials, fructan most commonly appears as a white to slightly creamy powder, odorless or with a barely perceptible neutral scent, making it organoleptically suitable for a wide range of formulations. It is readily soluble in water, forming clear to slightly opalescent solutions depending on the degree of polymerization and concentration, while being practically insoluble in oils. Aqueous solutions exhibit low to moderate viscosity and do not significantly thicken systems; instead, fructan primarily contributes to the formation of a light hydrophilic film on the skin surface. It is chemically stable within the pH range typical of cosmetic skin care products, generally from slightly acidic to neutral values, without a tendency toward hydrolysis or degradation under standard storage and use conditions. It does not react with common cosmetic emollients, surfactants, preservatives, or active ingredients, allowing easy compatibility with various formulation types, including gels, serums, emulsions, and emulgel systems. It is thermally stable within temperature ranges used in standard cosmetic manufacturing; however, it is most commonly added during the cold-process phase in order to fully preserve its structure and functional properties. Due to its polymeric, hydrophilic nature, fructan does not penetrate deeply into the skin but acts primarily on the surface of the stratum corneum, where it binds water and improves the hydration profile without causing stickiness or heaviness. It does not clog pores, does not negatively affect emulsion stability, and does not alter the color or odor of the finished product. From a safety and handling perspective, fructan has a low irritation potential, is non-volatile, and presents no flammability risk, making it a stable and reliable raw material for professional and commercial cosmetic use.

Benefits:

- Provides long-lasting hydration by binding water at the skin surface without a heavy feel.
- Improves skin softness and smoothness through the formation of a light, non-occlusive hydrophilic film.
- Enhances formulation tolerability and reduces the subjective sensation of tightness.
- Supports skin microbiota balance through prebiotic activity.

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• Strengthens the skin barrier and helps reduce reactivity.
• Does not clog pores and is suitable for combination and oily skin.
• Does not alter the odor, color, or texture of the product and integrates easily into various formulations.
• Safe for daily use and suitable for sensitive areas, such as the area around the eyes.

Method of Application: Fructan is incorporated into cosmetic formulations as part of the aqueous phase, where it is pre-dispersed or fully dissolved under gentle stirring, without the need for heating. Owing to its good solubility and chemical stability, it is suitable for addition during the cold-process phase, thereby preserving its hydrating and prebiotic properties. In finished formulations, it does not require specific pH adjustments, as it does not significantly influence system pH within the usual cosmetic range. In lightweight hydrating gels and serums, fructan is typically used at concentrations of approximately 0.2–1%, where it contributes to water binding, improved skin feel, and enhanced application comfort without altering product viscosity. In emulsions, creams, and emulgel systems, concentrations most commonly range from 0.5–2%, where fructan acts as a conditioning and barrier-supporting component suitable for dry, dehydrated, and sensitive skin formulations. In products for sensitive areas, such as the area around the eyes, and in daily-use formulations, recommended concentrations are generally lower, most often up to 1%, to ensure maximum tolerability. In facial and body cleansing products, such as mild gels and foams, fructan is used at lower concentrations, typically 0.1–0.5%, where it helps reduce the drying effect of surfactants and supports maintenance of skin hydration after rinsing. In specialized prebiotic formulations and barrier-repair products, concentrations are adjusted according to the targeted effect but in practice rarely exceed 2%, in order to maintain optimal stability and sensory properties of the finished product.

Comparative Advantages: Fructan provides effective hydration without stickiness or heaviness, distinguishing it from classic humectants such as glycerin at higher concentrations. Unlike low-molecular-weight moisturizers, it acts predominantly at the surface level and does not disturb the physiological balance of the skin, demonstrating better tolerability for sensitive and reactive skin. Compared to hyaluronic acid, fructan is more stable in formulations with a broader pH range and less prone to altering the sensory profile of the product. Its particular advantage lies in its prebiotic effect, which most standard moisturizing ingredients do not possess, as it selectively supports beneficial

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skin microbiota rather than acting solely as a humectant. In comparison to synthetic film-formers, fructan forms a light hydrophilic film that does not clog pores and does not negatively affect skin respiration. It does not significantly influence system viscosity, making it more formulation-flexible than many polysaccharides that simultaneously function as thickeners. Compared to numerous active ingredients, fructan has a highly favorable safety profile with low irritation and sensitization potential, enabling its use in daily care products and in formulations intended for sensitive areas, such as the area around the eyes.

Natural or Synthetic Ingredient: Fructan (inulin) is a naturally derived polysaccharide, most commonly isolated from plant sources such as chicory root, agave, and artichoke. In cosmetics, it is used in its natural or minimally processed form without alteration of its fundamental molecular structure. Chemically modified derivatives, such as carboxymethyl inulin or stearoyl inulin, are derived from natural inulin and are classified as semi-synthetic derivatives of a natural raw material.

Animal Testing: In accordance with current European regulation (Regulation (EC) No 1223/2009 on cosmetic products), the substance has not been tested on animals. The safety assessment of the raw material is based on available toxicological data, scientific literature, and validated alternative testing methods (in vitro and in silico). The term in silico refers to testing and assessment methods conducted using computer models and simulations rather than in vivo (on living organisms) or in vitro (on cell cultures). This statement confirms compliance with the ban on animal testing and is provided for informational purposes regarding further use of the raw material in cosmetic formulations.

GMO: Not GMO

Vegan: Does not contain components of animal origin