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TECHNICAL DATA SHEET

Product Name: Sodium Gluconate

INCI Name: Sodium Gluconate

CAS Number: 527-07-1

Chemical Classification: Organic compound – salt

Functional Category: Chelating agent / sequestrant

IUPAC Name: Sodium (2R,3S,4R,5R)-2,3,4,5,6-pentahydroxyhexanoate

Description: Sodium gluconate is an organic salt derived from gluconic acid, which is obtained through the oxidation of glucose. In cosmetic products, it is primarily used as a chelating agent, meaning it binds metal ions (e.g., iron, calcium, magnesium), preventing them from negatively impacting the stability and appearance of the formulation. This function is particularly important in water-based products, as traces of heavy metals present in water or other raw materials can cause discoloration, precipitation, oxidation, or degradation of active ingredients. Sodium gluconate is mild and biodegradable, which makes it a safe and eco-friendly alternative to traditional chelators such as EDTA. Its key advantage lies in its high compatibility with a wide range of formulations - from shampoos and shower gels to creams and emulsions. In addition to its primary function, it can contribute to pH stability and prolong product shelf life, especially when combined with preservatives. Due to its gentle profile, it is suitable for formulations intended for sensitive areas, such as the region around the eyes, and is generally well-tolerated by the skin. It is stable across a broad pH range, highly water-soluble, and does not negatively affect the texture or color of the product. These properties make sodium gluconate an important functional ingredient in modern cosmetic formulations that aim for both efficacy and sustainability.

Mechanism of Action: The action of sodium gluconate in cosmetics is based on its ability to form stable complexes with metal ions through multiple functional groups, mainly hydroxyl (–OH) and carboxylate (–COO) groups. When introduced into a formulation, these functional groups spatially extend and surround metal ions such as iron (Fe^{3}), copper (Cu^{2}), calcium (Ca^{2}), and magnesium (Mg^{2}), which may be present as trace elements in water or other ingredients. Instead of allowing these ions to participate in

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unwanted reactions (oxidation, discoloration, degradation of components), sodium gluconate binds them into inactive complexes. Once isolated, the metal ions can no longer catalyze degradation processes, such as oxidation of fats and oils, breakdown of actives (e.g., vitamin C), or cause color changes or precipitates in products. In this way, sodium gluconate indirectly protects the product's stability, color, and scent, thus extending shelf life. Thanks to its high water solubility and its ability to form chelates over a wide pH range (most effective between pH 4 and 9), this ingredient works efficiently in a variety of cosmetic products, from water-based lotions and shampoos to emulsions and serums.

Benefits:

- Prevents oxidation of sensitive ingredients.
- Stabilizes product color and scent over time.
- Extends product shelf life.
- Enhances preservative efficacy in the presence of hard water.
- Improves pH stability of the formulation.
- Reduces the risk of sediment formation and texture changes.
- Suitable for formulations designed for sensitive skin.
- Environmentally friendly and readily biodegradable.
- Compatible with a wide range of cosmetic ingredients.
- Does not clog pores and does not cause irritation.

Usage: Sodium gluconate is a water-soluble additive used during the water phase preparation, typically before heating or emulsification, to ensure full dispersion and chelating activity. Since it is stable across a wide pH range and does not interact with common emulsifiers, preservatives, or actives, its integration into formulations is straightforward and does not require special handling. Recommended usage concentrations vary depending on the product type and purpose. In general, it is used between 0.1% and 1%, where lower levels suffice for routine chelation in standard creams, lotions, and gels, and higher concentrations are applied in formulas containing highly sensitive or oxidation-prone components (such as vitamin C, botanical extracts, or natural oils). In shampoos, bath products, and cleansers, sodium gluconate may support foam stability and preservative performance, especially in hard water conditions. When used in complex buffered systems or formulations with high levels of metal ions (e.g., with botanical raw materials or untreated water), lab testing is advised to optimize dosage, though it

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rarely exceeds 2% of the total formulation. The ingredient integrates easily and does not affect the viscosity, fragrance, or color of the final product, making it technically suitable for broad use.

Natural or Synthetic Origin: Sodium gluconate is of natural origin but is most commonly used in a biotechnologically produced form in cosmetics - obtained via fermentation of glucose by microorganisms (typically Aspergillus niger or Gluconobacter species). Although not directly extracted from plants, it is created through a natural fermentation process, qualifying it as a naturally derived and biodegradable ingredient with low ecotoxicological impact. It can be labeled as “nature-identical” and is often accepted in natural and ecological cosmetics, including standards such as COSMOS and Ecocert.

Animal Testing: Not tested on animals

GMO: Non-GMO

Vegan: Does not contain ingredients of animal origin