Import and distribution for Serbia: Farmadria DOO
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TECHNICAL DATA SHEET

Product Name: Urea

INCI Name: Urea

CAS: 57-13-6

Chemical Classification: Amide

Functional Category: Skin conditioning agent ~ Humectant, pH regulator / pH balancing agent

IUPAC Name: 1,1,3,3-Tetradeuterourea.

Description: Urea is an organic compound from the amide class, chemically known as carbamide, and is widely used in cosmetics as a highly effective humectant and keratolytic agent. Naturally present in the upper layers of the skin as part of the Natural Moisturizing Factor (NMF), it is highly compatible with the epidermal barrier, making it suitable for dermocosmetic formulations. It acts by binding and retaining water in the stratum corneum, thereby improving hydration, elasticity, and skin smoothness. This effect is particularly noticeable on dry, thickened, and dehydrated skin, where urea helps alleviate tightness and flaking. At concentrations up to about 10%, it functions primarily as a moisturizer, while at higher concentrations (typically between 20-40%), it exhibits keratolytic activity-breaking down intercellular bonds in the stratum corneum, softening thickened skin, and promoting physiological desquamation. Due to this dual action, urea is used in formulations for the treatment of hyperkeratosis, keratosis pilaris, rhagades, psoriasis, and calluses, as well as in foot, elbow, and hand care products. Additionally, it enhances the absorption of other active ingredients through the epidermal barrier, making it commonly combined with AHA, BHA, and other exfoliants. Chemically stable, non-comedogenic, non-irritating, and non-drying, urea is suitable for use on sensitive skin, including areas such as the eye contour and perioral region, provided that concentrations are carefully adjusted. Pharmaceutical and cosmetic grade urea is available as a white crystalline powder with a mild ammonia-like odor. It is fully water-soluble, partially soluble in glycerin (up to 500 g/L), and sparingly soluble in ethanol (10 g/L in 95% ethanol; 167 g/L in methanol). The commercial label “Urea Pure” denotes a high level of purity but is not part of the official INCI designation, which remains simply "Urea".

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Mechanism of Action: Urea's mechanism of action is based on its hygroscopic and keratolytic properties, which enable multiple effects within the epidermis. As a hygroscopic agent, urea attracts and binds water molecules from both deeper skin layers and the environment, increasing water content in the stratum corneum and improving skin elasticity, softness, and overall hydration. Simultaneously, it weakens hydrogen bonds between corneocytes and softens the intercellular cement substance, facilitating physiological desquamation and reducing thickening of the stratum corneum. At higher concentrations, urea disrupts the structural integrity of keratin proteins, making them more soluble and easier to degrade, leading to keratolysis and accelerated removal of thickened, rough skin. Additionally, urea increases the permeability of the epidermal barrier, enhancing the penetration of other active ingredients and thus synergistically boosting formulation efficacy. This complex mechanism-balancing hydration and keratin breakdown-makes urea a unique active for the care of dry, thickened, and sensitive skin.

Benefits:

- Hydrates the skin by attracting and retaining moisture in the outer layers.
- Helps remove dead skin cells and improves smoothness.
- Softens thickened skin by breaking down excess keratin.
- Strengthens the skin's natural barrier and increases resilience.
- Relieves itching and discomfort associated with conditions like eczema and psoriasis.
- Stable and compatible with other cosmetic ingredients.
- Hydrates nails and cuticles, preventing dryness and brittleness.

Usage: Urea is used across a wide range of cosmetic and dermocosmetic formulations, with concentrations carefully tailored to product type and intended use. In daily moisturizers and lotions, it is typically used at 2-5%, acting as a humectant to increase water content in the stratum corneum and improve skin softness. In formulations targeting very dry, flaky, or thickened skin, such as heel or elbow creams or hyperkeratosis treatments, concentrations are raised to 10-20% to provide more intense softening and promote natural exfoliation. Dermatological products for psoriasis, calluses, or keratosis pilaris may contain 30-40% urea, where it acts as a keratolytic agent, breaking down excess keratin and promoting skin renewal. For nail and cuticle care, as well as in softening treatments, urea is used at 10-20% to hydrate and increase the elasticity of keratin structures.

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Urea should be added during the final production phase at temperatures below 40°C due to its thermal sensitivity and potential degradation at higher temperatures, which could reduce its efficacy. In formulations containing active acids or retinoids, urea can enhance the penetration of actives and should therefore be precisely dosed to maintain skin tolerance.

Natural or Synthetic Origin: In cosmetics, urea is of synthetic origin, although it naturally occurs in human skin as part of the NMF. It is synthetically produced by reacting ammonia and carbon dioxide under high pressure. This synthetic form is chemically identical to natural urea but is not derived from biological sources, ensuring high purity, controlled quality, and ethical acceptability (not of animal origin). Therefore, in regulatory and labeling contexts, it is classified as a synthetic ingredient, but with high dermal biocompatibility due to its mimicry of an endogenous skin component.

Source Materials: Ammonia and carbon dioxide

GMO: Non-GMO

Vegan: Does not contain ingredients of animal origin