Import and distribution for Serbia: Farmadria DOO
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TECHNICAL DATA SHEET

Product Name: Benzophenone 3

INCI Name: Benzophenone-3

CAS: 131-57-7

Synonyms: Oxybenzone, 2-hydroxy-4-methoxy-benzophenone, (2-hydroxy-4-methoxy-phenyl)-phenylmethanone

Chemical Classification: Benzophenone

Functional Category: Stabilizer ~ Light Stabilizer, Sunscreen Agent

IUPAC Name: 2-Hydroxy-4-methoxybenzophenone

Chemical-Physical Properties: Benzophenone-3 (2-Hydroxy-4-methoxybenzophenone) is an organic compound with a chemical structure containing a benzophenone core, meaning it has two benzene rings connected by a carbonyl group (C=O). The key functional groups in this structure are hydroxy (-OH) and methoxy (-OCH_3) groups, which are located on the benzene rings. The hydroxy group is positioned at the second position of one benzene ring, while the methoxy group is at the fourth position of the same ring. These functional groups play a crucial role in absorbing UV radiation. The hydroxy group increases the molecule's polarity and enables the formation of hydrogen bonds, which improves its binding to the skin and effectiveness as a UV filter. The methoxy group influences electron distribution within the molecule, enhancing UV radiation absorption and light stability. The combination of these functional groups allows benzophenone-3 to efficiently absorb a broad spectrum of UV radiation, protecting the skin from the harmful effects of sun exposure. Benzophenone-3 is a crystalline powder ranging from white to light yellow in color, with a faint odor similar to roses. It has a relatively low melting point, allowing for easy blending with other components in cosmetic products. It is poorly soluble in water but dissolves well in organic solvents such as ethanol and propylene glycol, enabling formulation flexibility. Its stability to light and heat makes it suitable for use in products exposed to sunlight. These properties, combined with its ability to absorb UV radiation, make benzophenone-3 an effective and reliable ingredient in sunscreens.

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Description: Benzophenone 3 belongs to the group of UVA and UVB filters, primarily a UVB filter. It is characterized by moderate absorption with two maxima: at 289nm and another in the UVA part of the spectrum at 324nm. It is rarely used as the sole organic UV filter because, when applied alone, it cannot provide 100% protection from UVB rays, thus it needs to be combined with other UV filters (e.g., octocrylene, homosalate, ethylhexyl salicylate, octinoxate) to achieve effective UVB protection. It enhances the activity of homosalate, octyl salicylate, OM-cinnamate, and octinoxate. It is very stable, does not degrade under sunlight, and protects other agents from UV-induced degradation.

Benefits:

- ***UV Protection:*** Benzophenone-3 is a UV filter that absorbs UVB and partially UVA rays. It provides broad-spectrum protection from sunburn, photodamage, and premature skin aging, thereby helping prevent skin cancer and other harmful effects of sun exposure.
- ***Product Stability:*** Adding benzophenone-3 to cosmetic formulations improves product stability in light. It prevents the degradation of other active ingredients when exposed to UV light, thus extending the product's shelf life and maintaining its effectiveness.
- ***Formulation Flexibility:*** Benzophenone-3 is compatible with various cosmetic ingredients. Its good solubility in organic solvents such as ethanol and propylene glycol allows for easy incorporation into different formulations.
- ***Color Protection:*** In hair care products, benzophenone-3 helps preserve hair color, preventing fading caused by sunlight. It also protects colors and pigments in makeup and other cosmetic products from degradation.
- ***Synergistic Effects:*** When used in combination with other UV filters, benzophenone-3 can enhance overall UV protection, providing a synergistic effect and better efficacy in sun protection products.

Usage Instructions: In sunscreen products, such as creams and lotions, benzophenone-3 is typically used in concentrations between 2% and 6%. This concentration is sufficient to provide broad-spectrum UV protection, absorbing UVB and partially UVA rays, thus reducing sunburn and skin damage. In hair care formulations, such as shampoos and conditioners, benzophenone-3 is added in lower concentrations, usually below 1%. This concentration is sufficient to protect hair color and prevent UV-induced damage with-

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out affecting the product's texture or performance. In decorative cosmetics, such as powders, blushes, and lipsticks, benzophenone-3 is used in similarly low concentrations. Its presence helps preserve the color and quality of products when exposed to light, extending their shelf life and maintaining their aesthetic appearance. In daily creams and moisturizers, benzophenone-3 can be used in concentrations between 0.5% and 3%, providing daily UV protection. During formulation, it is important to ensure that benzophenone-3 is evenly distributed in the product to provide uniform protection. Its good solubility in organic solvents such as ethanol and propylene glycol facilitates its inclusion in various cosmetic products. Additionally, it is important to adhere to regulatory guidelines and limits regarding the maximum allowable concentrations of benzophenone-3 in cosmetic products to ensure the product's safety and efficacy.

Source Raw Materials: Benzoyl chloride and 3-hydroxyanisole

Production Method: Oxybenzone is synthesized by reacting benzoyl chloride with 3-hydroxyanisole. The product is subjected to a recrystallization process from water/-methanol and dried.

Animal Testing: The substance has not been tested on animals.

GMO: Not GMO

Vegan: Does not contain animal-derived components