

## TECHNICAL DATA SHEET

**Product Name:** Dibutyl Adipate

**Raw Material Name:** Dibutyl Adipate

**INCI Name:** Dibutyl Adipate

**CAS:** 105-99-7

**Synonyms:** Dibutyl Adipate; Di-n-butyl adipate; Dibutyl hexanedioate; Adipic acid dibutyl ester; Hexanedioic acid, dibutyl ester.

**Trade Names:** Cetiol DB (BASF); Saboderm DBA (SABO S.p.A); Tegosoft DBA (Evonik); DUB ESTER DBA (Stearinerie Dubois); Esterol DBA (IOI Oleo).

**Chemical Classification:** Esters - diester of adipic acid.

**Functional Category:** Skin-conditioning agent - emollient; plasticizer; solvent.

**IUPAC Name:** Dibutyl hexanedioate

**Molecular Formula:** C<sub>14</sub>H<sub>26</sub>O<sub>4</sub>

**Molecular Weight:** 258.35 g/mol

**Description:** Dibutyl Adipate is a cosmetic emollient belonging to the group of esters of adipic acid and butyl alcohol, and is used in formulations as a lightweight oil component with very low greasiness. Due to its chemical structure, it has a favorable sensory profile and fits well into products intended for daily skin care, particularly day creams, lotions and fluid emulsions. On the skin, Dibutyl Adipate provides a smooth, even and pleasant feel without a pronounced greasy film. It spreads quickly and evenly over the skin surface, contributing to a lightweight and sophisticated texture of the finished product. After application, it leaves the skin soft and smooth, with a subtle emollient effect that does not feel heavy, sticky or greasy. Due to its good spreadability, Dibutyl Adipate improves product application and facilitates spreading, particularly in fluid and lightweight emulsion systems. It is often used to soften the sensory profile of the oil phase, as it reduces the heavy feel that may be caused by more viscous oils or richer emollients. In this way, it enables the formulation of products with a balanced texture suitable for normal, combination and oilier skin. From a formulation perspective, Dibutyl Adipate shows good compatibility with other lipid and active ingredients and stable behavior in emulsions. Its chemical stability and neutral effect on formulation color and odor make it a reliable choice when the aim is to achieve a light, unobtrusive and aesthetically pleasant finish on the skin.

**Physicochemical Properties:** Dibutyl Adipate is a clear, colorless to slightly yellowish

## TECHNICAL DATA SHEET

oily liquid with low viscosity and a very mild odor, making it suitable for formulations in which it is important that the raw material does not affect the fragrance profile of the finished product. At room temperature it remains liquid and fluid, which facilitates processing and storage. Its relatively low density and fluidity allow easy dosing and rapid homogenization in the oil phase of a formulation. Chemically, Dibutyl Adipate is a lipophilic ester compound with very limited solubility in water, but it mixes well with most cosmetic oils, esters, silicones and other lipophilic ingredients. It shows good solvent capacity for compatible lipophilic active substances and certain UV filters, making it useful as a carrier in more complex formulations. Its chemical structure provides good stability under normal cosmetic conditions and it does not show the tendency toward rancidity characteristic of unsaturated vegetable oils. Low viscosity contributes to easy processing and good spreadability on the skin. It does not form a sticky film or create a heavy feel, but instead contributes to a silky product texture. It is stable within the normal temperature range used in cosmetic manufacturing and tolerates standard processing conditions well, including heating during preparation of the oil phase.

**Mechanism of Action:** The mechanism of action of Dibutyl Adipate is based on its ester and lipophilic structure, which allows it to spread evenly over the skin surface and form a thin emollient film. After application, the molecules spread quickly due to the low viscosity, reducing friction on the skin and providing a smooth, silky feel. The film formed is light and flexible. As an emollient, Dibutyl Adipate may contribute to reducing the feeling of dryness and maintaining a pleasant surface condition of the skin, but it is not a classical humectant or a strongly occlusive ingredient. After application, the skin remains soft and smooth without a pronounced greasy shine. Due to its pronounced lipophilicity, Dibutyl Adipate also acts as a carrier for other compatible lipophilic ingredients in the formulation. It enables their even distribution within the oil phase, which is particularly useful in lightweight emulsions and fluids where good functionality with minimal heaviness is desired. Overall, the mechanism of action of Dibutyl Adipate is primarily physical and sensory. It does not alter biological processes in the skin, but improves its surface properties, formulation texture and after-feel following application.

### Benefits:

- Improves product spreadability and allows even and easy application to the skin.
- Provides a smooth and silky skin feel without a pronounced greasy film.
- Reduces the feeling of heaviness in formulations with a higher oil-phase content.
- Contributes to skin softness and smoothness by forming a thin emollient film.
- May contribute to reducing the feeling of skin dryness.

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## TECHNICAL DATA SHEET

- Improves the sensory profile of the product during use.
- Allows even distribution of compatible lipophilic ingredients within the formulation.

**Usage:** Dibutyl Adipate is added to the oil phase, where it mixes easily with other oils, esters and lipid components. It can be incorporated during the heating phase or during cooling, as it is chemically stable and does not require special processing conditions. Its low viscosity facilitates homogenization and contributes to the uniform texture of the finished product. In skin-care creams and lotions, it is most commonly used at concentrations of 2 to 10%, where it improves spreadability, reduces greasiness and provides a light, silky finish. In lightweight day creams and fluid emulsions it is often used in the lower part of this range in order to achieve a non-greasy and fast-absorbing profile. In body-care products such as milks and lotions, the concentration may be increased up to 15% when the aim is a more pronounced emollient effect and improved skin smoothness without creating a heavy or sticky film. In body oils and specialized formulations with an emphasized sensory profile, it may also be used as part of a combination with other esters to achieve the desired texture. In hair-care products such as conditioners, masks and leave-in formulations, Dibutyl Adipate is typically used at concentrations of 1 to 5%. Within this range, it contributes to softness and shine of the hair, improves product distribution over the hair and reduces the feeling of heaviness without causing sticking or weighing the hair down. The stated ranges are formulation guidelines and should be adapted to the specification of the specific product and the desired sensory profile of the finished formulation.

**Safety of Use:** The safety of Dibutyl Adipate has been reviewed in detail by the Cosmetic Ingredient Review (CIR) Expert Panel. In the amended final safety report published in 2006, the Panel evaluated available toxicological, dermatological, clinical and chemical data relevant to its use in cosmetic products. Available toxicological data indicated low acute oral and dermal toxicity. In dermal irritation studies, Dibutyl Adipate showed no to minimal irritation potential. In a guinea-pig maximization test at a concentration of 25%, it did not show sensitizing potential. The undiluted substance produced minimal eye irritation in an experimental model, while a concentration of 0.1% was non-irritating. Clinical patch tests also did not show significant skin irritation, and available clinical phototoxicity studies were negative. In the available studies, Dibutyl Adipate did not show genotoxicity in bacterial or mammalian test systems. CIR also reviewed reproductive and developmental toxicity data. Effects were observed at high intraperitoneal exposure under experimental conditions, whereas such effects were not observed at the lower tested dose; the Panel considered these findings in the context of realistic cosmetic exposure. In the available clinical comedogenicity test, no comedogenic effect was observed. Based on the totality of the available data, including

## TECHNICAL DATA SHEET

data on acute toxicity, irritation, sensitization, genotoxicity and clinical use, the CIR Expert Panel concluded that Dibutyl Adipate is safe as a cosmetic ingredient under the practices and concentrations of use covered by the assessment. The safety of a specific finished product nevertheless depends on ingredient concentration, site of application, method of use and the overall composition of the formulation.

**Natural or Synthetic Ingredient:** Dibutyl Adipate is considered a synthetic ingredient because it is obtained by chemical synthesis through esterification of adipic acid and butyl alcohol under controlled industrial conditions. Although the starting materials may originate from different sources, the final ingredient is not naturally present in plants or other biological systems, but is the result of controlled chemical processing. For this reason, it is classified in cosmetic practice as a synthetic ester emollient.

**Animal Testing:** Animal-testing status should be stated according to the documentation of the specific manufacturer. Compliance of the finished cosmetic product with Regulation (EC) No 1223/2009 does not in itself constitute proof that a particular raw material has never been subject to animal testing.

**GMO:** Non-GMO

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

**Raw Material Origin:** EU

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