

ARG-DHA

Dihydroxyacetone(DHA) is currently the most popular way of gaining a tan-like appearance without sun exposure. It is extremely safe for use, and to date is the only active ingredient approved by the US Food & Drug Administration (FDA) for sunless tanning.

DHA works by reacting with the amino acids and amino groups of skin keratin forming brown colored compounds. The process takes place in the outer layers of the epidermis. Upon reaction of the DHA with the amino groups of skin protein, melanoidine like chromophores are formed. They are polymeric compounds which are linked by lysine side chains to the proteins of the stratum corneum.

DHA can be used in various cosmetic formulations. Emulsions of the O/W and W/O types are appropriate for this purpose as well as aqueous lotions and gels. Use levels are adjusted depending on the desired browning intensity. Depending on the type of the formulation and skin type a tanning effect appears on the skin about 2 to 3 hours after use.

INCI Name:	Dihydroxyacetone
CAS Number:	96-26-4(Monomer), 62147-49-3(Dimer)
EINECS Number:	202-494-5
Typical Use Levels:	2-5%,

PROPERTIES

Appearance/Form	White to off-white, crystalline powder; slightly hygroscopic
Odor	Faint characteristic odor
Assay(periodatometric titration)	≥98.0%
Identity	IR spectrum and TLC
pH(5% in water)	4.5—5.5
Heavy metals	≤ 0.001%
Iron	≤ 0.002%
Glycerol(TLC)	≤ 0.5%
Protein (colorimetric, USP)	≤0.1% (Absorbance at 595nm < 0.400)

FORMULATION CONSIDERATIONS

Precautions should be carefully taken into consideration when new formulations containing dihydroxyacetone are developed.

- During product storage, the pH of a DHA-containing formulation will drift over time to ca.3-4 at which DHA is particularly stable. Use of buffers to maintain the pH of a formulation above 4.5 is not recommended. The pH of the formulation may be adjusted to approximately 3-4 by using citric acid. Phosphate buffers are not recommended. At pH values above 7, brown-colored compounds are produced via isomeration and condensation reactions and product effectiveness is reduced.
- Heating DHA to above 40 °C for long periods of time should be avoided. During manufacture involving heating processes, as in the case of emulsions, dihydroxyacetone should not be added until the formulation has been cooled down to below 40°C. If this not possible, the formulation must be cooled as rapidly as possible to below 40°C to keep thermal stress on DHA to a minimum.
- Collagen, urea derivatives, amino acids, proteins etc. should be avoided when formulating with DHA as they will react and can lead to gradual breakdown of the active substance.
- Discoloration is also observed in formulations containing polyacrylic acid derivatives. Cellulose ethers and xanthan gum are recommended gallants.
- A tan achieved with DHA alone does not offer the sun protection resulting from natural melanin production during sunbathing. It is, however, possible to combine DHA with non-nitrogen-containing UV filters to achieve a product with additional sun protection effect.

The information provided is to our best present knowledge correct and complete and is given in good faith but without warranty. It remains the user's own responsibility to make sure that the information is appropriate and complete for his special use of this product.