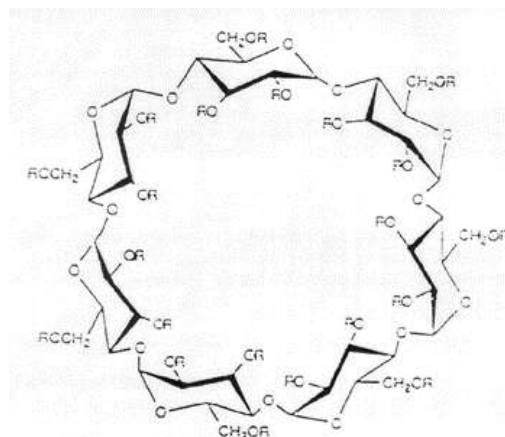


2-Hydroxypropyl-β-cyclodextrin

HPBCD

Product No. A0367

Formula:	$(C_{42}H_{70-n}O_{35}) \cdot (C_3H_7O)_n$
CAS-No.:	[128446-35-5]
HS-No.:	29400000
Assay (HPLC):	min. 97 %
Melting point:	278°C (dec.)
Heavy metals (as Pb):	max. 0.001 %
Loss on drying:	max. 7.5 %
As:	max. 0.0003 %
Storage (dry substance):	RT
(solutions):	+4°C



Comment

Hydroxypropyl-β-Cyclodextrin (HPBCD) is a partially substituted poly(hydroxypropyl) ether of β-cyclodextrin (BCD). The empirical formula is $(C_{42}H_{70-n}O_{35}) \cdot (C_3H_7O)_n$. It contains not less than 10.0 % and not more than 45.0 % hydroxypropoxy ($-OCH_2CHOHCH_3$) groups. The structure is shown above where R represents either hydrogen or a hydroxypropoxy group. The hydroxypropyl groups are randomly substituted onto the hydroxyl groups of the cyclodextrin and the amount of substitution is reported as average Degree of Substitution or number of hydroxypropyl groups per cyclodextrin and is the preferred manner of describing the substitution. Therefore, an exact formula cannot be given.

Functionality: HPBCD, like BCD and other derivatives of BCD are suitable for molecular encapsulation of a variety of sparingly water soluble compounds to enhance the aqueous solubility of the encapsulated compounds. In addition to increase the solubility, the stability of the guest compound can be enhanced and the volatility can be reduced. This product is chemically stable and does not contribute significantly to viscosity until very high concentrations (>50%) are reached. The basic closed circular structure of BCD is maintained in HPBCD. The glycosidic oxygen forming the bond between the adjacent glucose monomers and the hydrogen atoms lining the cavity of the cyclodextrin impart an electron density and hydrophobic character to the cavity. Organic compounds interact with the walls of the cavity to form inclusion complexes. The hydroxyl groups and the hydroxypropyl groups are on the exterior of the molecule and interact with water to provide the increased aqueous solubility of the HPBCD and the complexes made with the HPBCD.

Solubility / Stability

HPBCD is itself very soluble in water (greater than 500 mg/ml at room temperature compared to 18 mg/ml for β-Cyclodextrin). When making aqueous solutions of HPBCD or HPBCD/drug complexes, a significant volume expansion must be accounted for. While the volume expansion is around 1.0 ml/gram at low (5 % w/v) concentrations, the magnitude of the effect levels off at about 0.7 ml/gram at concentrations greater than 20 % (w/v).

Strong acids, such as hydrochloric or sulfuric acids, hydrolyze HPBCD. The rate of hydrolysis is dependent upon the temperature and concentration of the acid. The higher the temperature or concentration of the acid, the more rapid is the rate of hydrolysis. Weak acids, such as organic acids do not hydrolyze HPBCD. HPBCD is stable in bases. HPBCD is synthesized under basic conditions without opening of the BCD ring.