

[P-35]**Initial Risk Assessment of Benzoyl peroxide in Environment**

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Benzoyl peroxide is a High Production Volume Chemical, which is produced about 1,375 tons/year in Korea as of 2001 survey. The substance is mainly used as initiators in polymerization, catalysts in the plastics industry, bleaching agents for flour and medication for acne vulgaris. In this study, Quantitative Structure-Activity Relationships (QSAR) is used for getting information on the physical-chemical properties of this chemical. In addition, hydrolysis in water, acute toxicity to aquatic and terrestrial organisms were studied. The physical-chemical properties of benzoyl peroxide were estimated as followed. ; vapor pressure ; 0.00929 Pa, Log Kow ; 3.43, Henry's Law constant = 3.54×10^{-6} atm-m³/mole at 25 °C, the half-life of photodegradation ; 3 days and bioconcentration factor (BCF); 92. Hydrolysis half-life of benzoyl peroxide in water was estimated as 5.2 hr at pH 7 at 25 C and hydrolysis product was expected to benzoic acid according to the structure of this substance. Benzoyl peroxide has toxic effects on the aquatic organisms. 72 hr-ErC50 (growth rate) for algae was 0.07 mg/L, 48 hr-EC50 for daphnia was 0.07 mg/L and the 96 hr-LC50 of acute toxicity to fish was 0.24 mg/L. Acute toxicity to terrestrial organisms (earth worm) of benzoyl peroxide was low (14day-LC50 = >1,000 mg/kg). Although benzoyl peroxide is high toxic to aquatic organisms, the substance is not bioaccumulated because of rapid removal by hydrolysis (half-life is 5.2 hr at pH 7 at 25 C) and biodegradation (83 % by BOD after

21 days). The toxicity observed is assumed to be due to benzoyl peroxide rather than benzoic acid, which shows much lowertoxicity to aquatic organisms. One can assume that effects occur before hydrolysis takes place. From the acute toxicity values of aquatic organisms, the predicted no effect concentration (PNEC) of 0.7ug/L was derived using an assessment factor of 100.