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Estimation of Environmental Distribution for Benzoyl peroxide Using EQC Model

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Benzoyl peroxide is a high production volume chemical, which was produced about 1,375 tons/year in Korea as of 2001 survey. Most of them are used as initiators in polymerization, catalysts in the plastics industry, bleaching agents for flour and medication for acne vulgaris. The substance is one of the sever chemicals of which human and environmental risks are being assessed by National Institute of Environmental Research under the frame of OECD SIDS Program. It has a melting point of 104-106 ° C and has solubility of 9.1 mg/l in water at 25 ° C. The substance was readily biodegradable (83 % after 21days) and had toxic effects to aquatic organisms. The range of 72 hr-EbC50 (biomass) for algae was 0.07-0.44 mg/l and 48 hr-EC50 for daphnia was 0.07-2.91 mg/l. The LC50 of acute toxicity to fish was 0.24-2.0 mg/l. Although the toxic effects of benzoyl peroxide to aquatic organisms were investigated, environmental monitoring data were not studied. In this study, distribution of the chemical among multimedia environment was estimated using EQC model based on the physical-chemical properties to evaluate the risk of benzoyl peroxide in environment. In level I, II calculation the chemical was distributed to soil

(68.3 %) and water (28.7 %). In level III calculation it was primarily distributed to soil (99.9 %) and overall residence time of 3.4 years was estimated. Benzoyl peroxide could be persistent in environment.

Key words : Benzoyl peroxide, EQC model, Multimedia environmental distribution