HUNTSMAN

Subject: Environmental Effects of JEFFSOL® Propylene Carbonate

Biodegradation/disposal

Recent studies in the literature indicate that Propylene Carbonate is very readily biodegradable according to EU Criteria. Values of up to 90% of Theoretical Oxygen Demand (ThOD) are obtained after 15 days at typical concentrations normally observed in waste water treatment plants and higher levels (250-2500 mg/l). These study results also clearly implied very low bacterial toxicity. Other recent studies to OCED/EU protocols indicate biodegradation of >90% after 26 days. These studies add weight to the results obtained from tests carried out earlier by Huntsman which also indicated that PC was likely to be readily biodegradable according to EU Criteria. The products also did not show any adverse effects during a 7 day limit test at 200 ppm on activated sludge bacteria taken from a waste water treatment plant.

The above results would therefore indicate that the products would, at typical concentrations, be degraded rapidly in waste water treatment plants containing activated sludge, with short residence times and no adverse effects on the degradative activity of the activated sludge bacteria.

Acute toxicity, aquatic species

No acute fish, algae, or daphia toxicity information has currently been established by Huntsman however we are looking at the possibility of establishing this. Work on Butylene Carbonate, a product of similar structure indicates that toxicity is likely to be low, EC50 values for Butylene Carbonate are 480 mg/l (fish 96 hours) and >1,000 mg/l (daphia 48 hours). A recent EU Protocol study result on Propylene Carbonate available in literature indicates very low algeal "acute" toxicity with a 72h NOEC (No Observed Effect Concentration) of >>500 mg/l.

Bioaccumulation

The Log Pow of Butylene Carbonate was determined experimentally to be -0.00533 indicating very low potential to bioaccumulate according to EU criteria. As Propylene Carbonate is more polar we would expect the Log Pow to be more negative indicating an even lower potential to bioaccumulate.

Conclusion

Available information on Propylene Carbonate or products of similar structure storingly indicates that Propylene Carbonate;

i) Is readily degradable in waste water treatment plant,
ii) Possesses a very low acute ecotoxic effect,
iii) Possesses a very low potential to bioaccumulate.