Toxicity of Corexit 9500 and Its Major Components to Early Life Stage Sheepshead Minnows

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Use of dispersants to mitigate the effects of spilled oil requires a thorough understanding of the potential toxicity of dispersants and their breakdown products, and the interaction of these chemicals with petroleum hydrocarbons. In our study, we are using early life stages of sheepshead minnows (*Cyprinodon variegatus*) to assess the relative toxicity of dispersants, their components and breakdown products in the presence and absence of oil. Results obtained to date demonstrate that yolk sac larvae are more sensitive to Corexit 9500 than embryos, with 48hr LC 50s of 79 and 192 mg/L respectively. Toxicities of both Corexit 9527 and Corexit 9500 are almost equivalent, with LC50s of 63 mg/L and 56 mg/L respectively. Evaluation of the major components of Corexit showed that Tween 80 and 85, Span 80, 2-butoxyethanol, petroleum distillates and dipropylene glycol butyl ether (DPGBE) are not acutely toxic to yolk sac larvae (48hr LC50>200 mg/L), while DOSS was much more toxic than Corexit 9500 (48hr LC50 of 8 mg/L). These results indicate that DOSS is a major contributor to the toxicity observed with Corexit 9500. LC-MS analysis demonstrated both DOSS and DPGBE were relatively stable during 48 hr incubations while all other components analyzed showed rapid degradation, which might be limiting their potential toxicity. Interestingly, in the presence of sheepshead embryos and larvae, Corexit 9500 stimulated microbial growth in a time and concentration dependent manner. The genotoxic potential of Corexit 9500 and 9527 and all its components were also assessed using the Comet assay. While both Corexit 9500 and 9527 were found to induce equivalent genotoxicity, DOSS, DPGBE and 2-butoxyethanol were found to induce genotoxicity higher than the two Corexits, while petroleum distillates induced genotoxicity at equivalent levels. Dose –response analysis of the above components as well as Corexit 9500 were performed and NOECs and LOECs for their genotoxicities were established. Future work will examine interactions between these components and fresh and weathered oil as it relates to acute mortality and genotoxicity in sheepshead larvae.