

Status and Applications of Echinoid (Phylum Echinodermata) Toxicity Test Methods

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ABSTRACT: The use of echinoderms for toxicity testing has focused primarily on sea urchins and sand dollars (*Strongylocentrotus purpuratus*, *Arbacia punctulata*, *Lytechinus pictus*, and *Dendraster excentricus*, for example). The status and relative sensitivity of various test methods are described. The most frequently used test methods consist of short-term exposures of sea urchin sperm or embryos; these tests can be easily conducted at all times of the year by using species with complementary spawning cycles or laboratory conditioned populations of a single species. Data from reference toxicant and effluent toxicity tests are summarized. Information on the precision and sensitivity of echinoid test methods are limited and preclude rigorous comparisons with other test methods. The available data indicate that the sensitivity and precision of these methods are comparable to short-term chronic methods for other marine invertebrates and fish. Recent application of the sperm test in toxicity identification evaluations (TIEs) and studies of effluent toxicity decay and sediment toxicity illustrate the versatility of this rapid (10 to 60 min exposure) test method. Embryo tests typically use a 48 to 96 h exposure period and measure the occurrence of embryo malformations. Most recent applications of the embryo test have been for the assessment of sediment elutriate toxicity. Adult echinoderms are not frequently used to assess effluent or receiving water toxicity. Recent studies have had success in using the adult life stage of urchins and sand dollars to assess the effects of contaminated sediment on growth, behavior, and bioaccumulation.

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