TOXICITY TEST FACT SHEET #5 – Marine

Chronic Toxicity Test With Sea Urchin fertilisation test

Sea urchins and other echinoderms constitute a diverse and widely distributed group of marine animals. and are both ecologically and economically important. Toxicity tests utilising the short-term exposure of gametes are of comparable or greater sensitivity to many contaminants than other marine test species and life stages.

This test is commonly used throughout North America using USEPA protocols and is an important test in US effluent discharge licensing programme. In Australia, gametes of the sea urchin Heliocidaris tuberculata has also become widely used in toxicity assessment programs.

In summary, this test involves exposing urchin gametes (both sperm and eggs) to the test material for 1hour 20min. The test is usually undertaken on a range of concentrations of a test material, eg 100, 50, 25, 12.5 and 6.3% effluent. At the end of the exposure period, the percentage of fertilised egg is determined.

Statistical analyses are then applied to the test data to determine for example, the concentration of the test material causing 50% inhibition fertilisation rate in the test population (EC50 estimate). The test data can then be used to estimate concentrations of the test material likely to cause chronic toxicity in the environment.

The Urchin Fertilisation test may be used to assess the toxicity of:
▸ Chemicals
▸ Effluents
▸ Leachates and groundwater
▸ Sediments

If toxicity is detected using the chronic Urchin Fertilisation test, a Toxicity Identification Evaluation (TIE) programme can be initiated to identify the cause of the observed toxicity.

Chronic Toxicity Test With the Urchin fertilisation test	
Test type	Chronic static
Test end-point	Fertilisation rate
Test duration	1hr20min
Test Temperature	25 ± 1ºC
Sample volume required	1 litre for full EC50 determination
Test availability	24hrs notice requested
Test turnaround time	Advised within 72 hours of test initiation