

Surfactants are widely used in household cleaning detergents, personal care products, textiles, paints, polymers, pesticides, pharmaceuticals, mining, oil recovery and paper industries. The world production of synthetic surfactants is about 13 million tonnes annually. Because of their widespread use, surfactants can be potential toxins when large quantities enter environment. Surfactants mainly enter the environment via wastewaters, as such aquatic toxicity and aquatic behaviour of surfactants are important parameters. Aquatic toxicity tests using test species such as fish, invertebrates or algae are usually single-species tests in which the toxicity of a chemical is measured through mortality, decreased growth rate or lowered reproductive capacity, either by an acute toxicity test or a chronic toxicity test. These tests have been standardised by organisations such as Organisation for Economic Co-operation and Development (OECD), International Organisation for Standardisation (ISO) and American Society for Testing and Materials (ASTM), and were applied to a selected group of organisms. Algae are the primary producers in the aquatic food chain. Disruptions in algae population would cause effects at higher trophic levels. Algae have been recommended as a test species in ecotoxicity test due to its fast growth and more sensitive than other test species *i.e.* fish and daphnia.

ECOTOXICITY TEST METHOD

Exponentially-growing cultures of green algae, *Pseudokirchneriella subcapitata*, cultured in OECD media are exposed to various concentrations of the test substance (maximum 100 mg litre⁻¹) (Figure 1). The inhibition of algae growth in relation to a control culture is determined over a period of 72 hr or 96 hr (OECD 201, 2011). The concentration that caused 50% inhibition of growth rate (EC₅₀) is determined using probit analysis with Statisti-

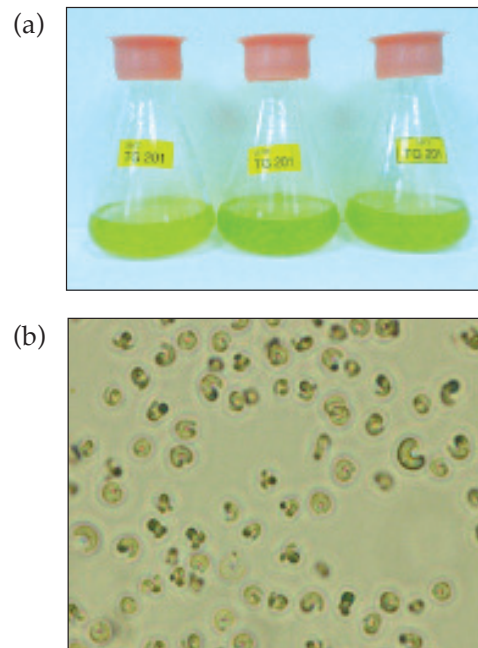


Figure 1. Culture of green algae, *P. subcapitata* (a) in mineral medium and (b) under microscope (enlargement 100X).

cal Package for the Social Sciences (SPSS) software based on the dose response curves.

BENEFITS

The purpose of ecotoxicity testing is not only to protect individuals in nature, but rather the whole population and ecosystems. It is assumed that if most of the species are protected, the ecosystem is protected. Ecotoxicity data are required by the European - Registration, Evaluation, Authorisation and Restriction of Chemicals (EU-REACH) Regulation and Registration of Products at the European Chemical Agency (ECHA) for export market.

SERVICE OFFERED

Ecotoxicity test using TG OECD 201 algae growth inhibition test.

COST OF THE SERVICE

The indicative price for the service in 2016 is in *Table 1*.

TABLE 1. COST OF THE SERVICE

Service	Cost per sample	
	Malaysia (RM)	Overseas (USD)
Ecotoxicity Test (TG OECD 201 algae growth inhibition test)	2000*	2000*

Note: * Subject to change.

Minimum amount of surfactant sample required: 250 ml or 50 g. Sample must be soluble in water. Ecotoxicity test report will be ready within six weeks. This service is also applicable to other water-soluble chemical compounds.

REFERENCE

OECD 201 (2011). *OECD Guidelines for the Testing of Chemicals. Freshwater Alga and Cyanobacteria, Growth Inhibition Test*. Updated guideline, adopted 28 July 2011. OECD, Paris, France. p.1-25.

For more information, kindly contact:

Director-General
MPOB

6 Persiaran Institusi, Bandar Baru Bangi,
43000 Kajang, Selangor, Malaysia.

Tel: 03-8769 4400

Fax: 03-8925 9446

www.mpob.gov.my