

Biodegradability is one of the most important parameters for the environmental fate of a substance. There are three types of biodegradation process:

- **Primary biodegradation** is the measurement of conversion of an organic substance into different products by biological system. This is the first step in biodegradation.
- **Readily biodegradation** occurs when biodegradation performance is greater than certain relative fixed percentage of ultimate biodegradation.
- **Ultimate biodegradation** is the complete conversion of the original substance into carbon dioxide, water and new microbial biomass. This process is also referred to as mineralisation.

The replacement of mineral oils by biodegradable products is one of the ways to reduce environmental effects on ecosystem. The biodegradability of poorly water-soluble materials, e.g. bio-lubricant, can be tested via standardised biodegradability test methods such as the Organisation for Economic Co-operation and Development (OECD) standard methods and the International Organisation for Standardisation (ISO) standard methods. A chemical substance that gives a positive result in 'ready biodegradability' test (Table 1) is able to rapidly biodegrade in the environment, releasing non-toxic products such as carbon dioxide and water.

BIODEGRADATION TEST METHODS

Due to their low solubility in water, only respirometric methods are suitable for testing poorly water-soluble materials. The Manometric Respirometry Test (TG 301 F) involves a measurement and interpretation of the biological oxygen consumption rate under well-defined experimental conditions (Figure 1).

TABLE 1. THE OECD READY BIODEGRADABILITY TESTS

Test No.	Test Method
OECD 301 A	DOC Die-Away Test
OECD 301 B	CO ₂ Evolution Test
OECD 301 C	Modified MITI Test (I)
OECD 301 D	Closed Bottle Test
OECD 301 E	Modified OECD Screening Test
OECD 301 F	Manometric Respirometry Test

Note: OECD - Organisation for Economic Co-operation and Development.
 DOC - dissolved organic carbon.
 MITI - Ministry of International Trade and Industry, Japan.

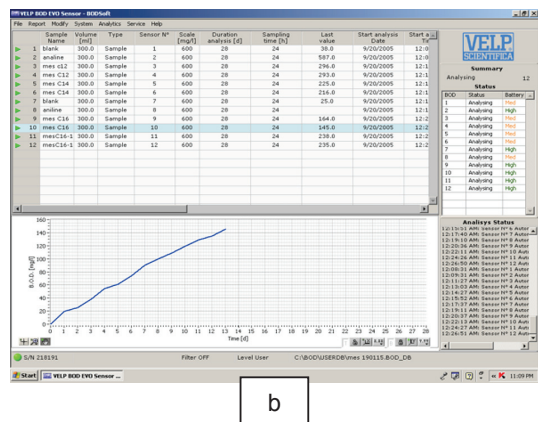
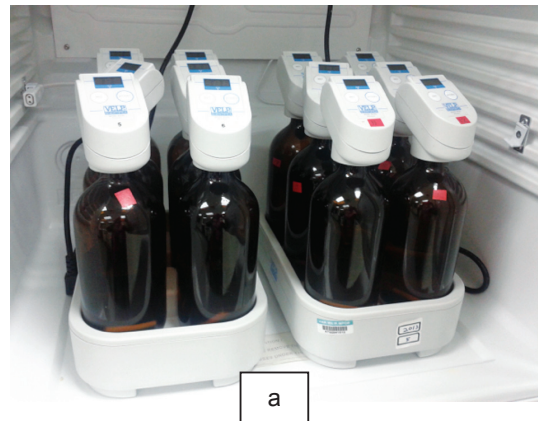


Figure 1. The Manometric Respirometry Test with (a) Velp BOD EVO system and (b) the biological oxygen consumption rate.

BENEFITS

The data obtained not only can be used for the purpose of chemical safety handling, but also in the determination of the risk posed by poorly water-soluble substances to the environment. The data can also be used for product registration.

SERVICE OFFERED

Evaluation of biodegradability of poorly water-soluble substance using TG OECD 301F Manometric Respirometry Test method.

COST OF THE SERVICE

The indicative price for the service in 2015 is as below:

Service	Cost / Sample	
	Local (RM)	Overseas (USD)
Biodegradation Test (TG OECD 301F Manometric Respirometry Test)	2000*	2000*

Note: * Subject to change.

Minimum amount of sample required: 250 ml or 50 g.

Sample must be sent together with its molecular formula or carbon, hydrogen, nitrogen and sulphur (CHNS) report analyses. The biodegradation test report can be expected within six weeks.

For more information, kindly contact:

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