DETERMINATION OF TITANIUM (ORGANIC) IN FATTY ACIDS

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Titanium dioxide is used primarily in the production of paints, printing inks and paper products. It is also widely used in cosmetics and personal care products as sunscreen and whitening agent. It can be used as a whitening agent in solid fatty acids and soap noodles (Fairhurst and Mitchnik, 1997).

For solid fatty acids and soap noodles, whiteness is often associated with quality – the whiter the product, the better the quality. Some manufacturers may add titanium dioxide to their products to make them whiter, giving an impression of better quality.

IMPORTANCE OF DETERMINATION OF TITANIUM DIOXIDE IN FATTY ACIDS

- When used as a whitening agent, titanium dioxide does not really improve the quality of the product. Its function is to mask the inferior quality of the product.
- There is no limit for titanium dioxide in cosmetics products (FMM-MCTIG, 2001). However, it has been found to cause pulmonary irritation in chronically exposed workers. Workers exposed to it in the production of titanium dioxide have shown signs of fibrosis although described as *slight* (Hathaway *et al*., 1991).
- It also causes mild irritation to skin with intermittent contact for three days. Human skin penetration studies have shown that titanium dioxide can penetrate hair follicles up to 50 microns deep (Hostynek and Maibach, 2002).

TITANIUM (organic) TESTING SERVICES

- Currently, there is no official method for the determination of titanium (organic) in fatty acids.
- A new method of detecting titanium (organic) in fatty acids has been developed with direct injection of the sample into an atomic absorption spectrometer (AAS) without any sample pre-treatment required.

PRINCIPLE OF THE TEST

- The sample is dissolved in methyl iso-butyl ketone and injected into a graphite furnace AAS (*Figure 1*).
- Recoveries at 0.2 ppm, 0.4 ppm, 3.0 ppm, 5.0 ppm, 10.0 ppm and 20.0 ppm titanium (organic) in fatty acids are good, ranging from 90% to 112% (*Table 1*).

SERVICE OFFERED

- MPOB offer the detection of titanium (organic) in fatty acids using the new method as a service to the industry at RM 50 per sample.
- Those needing this service can send their samples (about 25 g) with a written request for the test.
- The results will be ready in three days, and will be sent with the invoice for payment.

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Figure 1. Graphite furnace atomic absorption spectrometer for the detection of titanium (organic) in fatty acids.

TABLE 1. RECOVERY OF TITANIUM (organic) IN FATTY ACIDS

Spiked titanium (organic) (ppm)	Recovery		
	Mean (%)	Standard deviation	Coefficient of variation (%)
0.2	90.0	6.9	7.6
0.4	104.5	6.3	6.0
3.0	110.7	2.4	2.2
5.0	111.3	3.7	3.3
10.0	108.5	2.2	2.0
20.0	112.0	2.0	1.8

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