

DETERMINATION OF TITANIUM DIOXIDE IN SOAP NOODLES

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Titanium dioxide (TiO_2) is a white powder with high opacity, excellent whiteness, excellent covering power and resistance to colour change. These properties make it an excellent pigment for a broad range of applications – paints, plastic goods, inks and paper. In cosmetic and skin care products, TiO_2 is used both as a pigment and thickener, because of its high refractive index and resistance to discolouration under ultraviolet light. It is used as a whitening agent in virtually all industries including in the manufacture of soap noodles (Fairhurst and Mitchnik, 1997). For soap noodles, whiteness is often associated with quality – the whiter the product, the better it is, whether it is indeed so technically or not. Some manufacturers, therefore, add TiO_2 to their products merely to ‘improve’ them.

Although there is no maximum permissible limit for TiO_2 in cosmetic products (FMM-MCTIG, 2001), it is known to cause pulmonary irritation in chronically exposed workers. Workers exposed to TiO_2 during its manufacture have shown ‘slight’ fibrosis (Hathaway *et al.*, 1991). It has also caused mild irritation to the skin with just intermittent contact over three days. Human skin penetration studies showed that it can penetrate hair follicles up to 50 μm (Hostynek and Maibach, 2002).

TITANIUM DIOXIDE TESTING SERVICE

TiO_2 can improve the whiteness of soap noodles, and, therefore, its ‘quality’. However, it is more perception than fact, and low quality soap whitened by TiO_2 will darken over time. To monitor the quality of soap noodles, the content of TiO_2 has to be determined.

ANALYTICAL AND CONSULTANCY SERVICE

MPOB offers the service of determining the TiO_2 concentration in soap noodles using a new method, on the following conditions:

- cost of analysis: RM 100/sample;

- samples (about 25 g) to be delivered with a written request for the test required;
- all samples received will be checked to ensure that they are in good condition for the analysis;
- the results, in a certificate of analysis (COA), will be ready in three days; and
- the invoice will be sent together with the COA.

The companies can use the results of analysis to monitor the level of TiO_2 in soap noodles, as one of the important parameters to indicate that their soap noodles are of high quality - if they do not contain titanium dioxide.

DETECTION OF TITANIUM DIOXIDE BY AAS

A new method for detecting the TiO_2 concentration in soap noodles has been developed in MPOB. The sample is digested in a mixture of concentrated sulphuric acid and ammonium sulphate. As the solution remains warm (about 35°C), it is diluted with a solvent, and the mixture then injected into a graphite furnace atomic absorption spectrometer (AAS) (Figure 1).

The method was developed by using soap noodles spiked with TiO_2 at concentrations 0.25% and 0.50%. The recovery of TiO_2 was 88.8% to 90.4%. The results are summarized in Table 1.

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Figure 1. Graphite furnace atomic absorption spectrometer for determination of TiO_2 in soap noodles.

TABLE 1. RECOVERY OF TiO_2 FROM SOAP NOODLES SPIKED WITH 0.25% AND 0.50% TiO_2

Concentration of TiO_2 in spiked soap noodles	Recovery (%)		
	Mean	s.d.	C.V.
0.25% (2500 ppm)	90.4	1.5	1.6
0.50% (5000 ppm)	88.8	2.3	2.5

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