



Application Note AN-T-222

# Sulfur dioxide content in traditional Chinese medicines

Reliable and accurate photometric determination of the SO<sub>2</sub> content in TCM according to ISO 22590

Traditional Chinese medicine (TCM) remedies are gaining popularity in other cultures.

In some TCM, sulfur dioxide (SO<sub>2</sub>) is used as a preservative, antioxidant, and disinfectant. The products are treated by sulfurization with SO<sub>2</sub> gas. This prevents the browning or discoloration of ingredients and can increase the product's shelf life.

However, sulfur dioxide is a very poisonous gas.

Global health authorities have set strict limits for the content of SO<sub>2</sub> in products. It is therefore of crucial importance to determine the sulfur dioxide content to comply with these limits.

In this well-suited method, the SO<sub>2</sub> content in different natural TCM products are analyzed reliably and accurately according to ISO 22590 using the Eco Titrator equipped with an Optrode and sodium hydroxide as titrant.

# SAMPLE & SAMPLE PREPARATION

This application is demonstrated on caterpillar fungus (*dong chong xia cao*), earthworm (*di long*), seaweed (*hai zao*), arabian pea (*bu gu zhi*), turtle shell (*gui ban*), and a sodium sulfite

standard.  
Before testing, the sample must be dried and pulverized.

# EXPERIMENTAL

In the first step, an appropriate amount of sample is digested with boiling hydrochloric acid, and the resulting released sulfur dioxide is added into a solution of hydrogen peroxide by means of a nitrogen stream. The sulfur dioxide is oxidized to sulfuric acid via the following reaction mechanism:

$SO_2 + H_2O_2 \rightarrow H_2SO_4$   
In the second step, the formed sulfuric acid is titrated with sodium hydroxide to determine the sulfur dioxide content.  
The determination is carried out with an Eco Titrator equipped with an Optrode.

**Table 1.** Summarized results for SO<sub>2</sub> in TCM samples and for the sodium sulfite standard

| Sample                          | SO <sub>2</sub> (mg/kg) |
|---------------------------------|-------------------------|
| Caterpillar fungus              | 4.4                     |
| Earthworm                       | 4.6                     |
| Seaweed                         | 6.1                     |
| Arabian pea                     | 6.2                     |
| Turtle shell                    | 26.3                    |
| Standard                        | Recovery (%)            |
| Na <sub>2</sub> SO <sub>3</sub> | 98.9                    |

# CONCLUSION

Titration is an accurate and precise method to accurately determine the SO<sub>2</sub> content in different natural TCM products.  
Using the Eco Titrator equipped with an Optrode allows a reliable determination. The system

offers low-priced analyses and user-friendly handling. The Optrode is completely maintenance-free, easy to use, and robust in daily laboratory work.

## CONTACT

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## CONFIGURATION

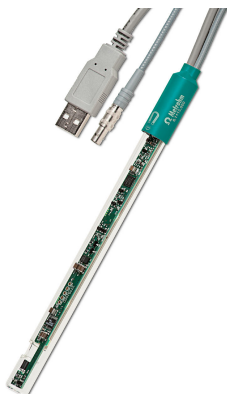


### Eco Titrator

ビルトインのマグネチックスターラおよびタッチセンサーユーザーインターフェース付きのコンパクトな Eco Titrator は、ルーチン分析に理想的です。これは、いかなるときもGLPに適合した結果を、最小限のスペース要件 (およそ DIN A4) にて提供します。

ほぼすべての電位差滴定にて汎用的に使用可能。たとえば

- 食品: 酸性度、塩化物、ビタミンC、油脂のヨウ素価および過酸化価
- 水質分析: 炭酸塩硬度およびCa/Mg硬度、塩化物、硫酸、過マンガン酸塩指数
- 石油化学: 酸/塩基価、硫酸塩およびメルカプタン、塩化物、臭素価
- 電気めっき: 総酸価、金属含有量、塩化物
- 界面活性剤分析: 陰イオン、陽イオン、および非イオン界面活性剤
- Optrodeを用いた測光: p値およびm値、金属、水硬度



## Optrode

使用可能な8つの波長を有する光度滴定のための光学センサー。波長の切り替えは、ソフトウェア制御 (tiamo 2.5以降) またはマグネットで行えます。ガラスシャフトは完全な耐溶剤性を有し、洗浄が簡単です。省スペースのセンサーは以下のような用途に適しています:

- USPまたはEPに則した非水滴定
- カルボキシル末端基の測定
- ASTM D974に則したTAN/TBN
- 硫酸塩の測定
- セメント中のFe、Al、Ca
- 水の硬度
- USPに則したコンドロイチン硫酸

センサーは、色の強度の測定 (比色法) による濃度の測定には適していません。