Application Note AN-T-222

Sulfur dioxide content in traditional Chinese medicines

Reliable and accurate photometric determination of the SO2 content in TCM according to ISO 22590

Traditional Chinese medicine (TCM) remedies are gaining popularity in other cultures.
In some TCM, sulfur dioxide (SO_2) is used as a preservative, antioxidant, and disinfectant. The products are treated by sulfurization with SO_2 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_2 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_2 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 SO2 in TCM samples and for the sodium sulfite standard

Sample	SO_2 (mg/kg)
Caterpillar fungus	4.4
Earthworm	4.6
Seaweed	6.1
Arabian pea	6.2
Turtle shell	26.3
Standard	**Recovery (%)**
Na_2SO_3	98.9

CONCLUSION

Titration is an accurate and precise method to accurately determine the SO_2 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.

CONCLUSION

Internal reference: AW TI CH-1319-042021

CONTACT

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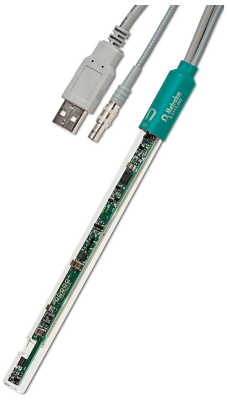
CONFIGURATION

Eco Titrator

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

ほほすへての電位差滴定にて汎用的に使用可能。たとえは

- 食品: 酸性度、塩化物、ヒタミンC、油脂のヨウ素価および過酸化物価
- 水質分析: 炭酸塩硬度およびCa/Mg硬度、塩化物、硫酸、過マンカン酸塩指数
- 石油化学: 酸/塩基価、硫酸塩およびメルカフタン、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) またはマクネットて実行てきます。カラスシャフトは完全な耐溶剤性を有し、洗浄か簡単てす。省スヘ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
- カルホ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に則したコントロイチン硫酸

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。