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.

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.

Internal reference: AW TI CH-1319-042021

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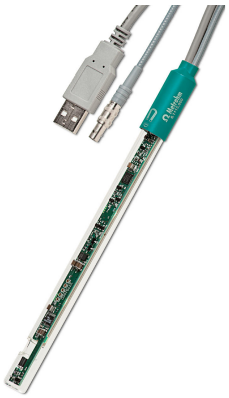
CONFIGURATION

Eco Titrator

型 Eco Titrator 具有内置磁力拌器和触摸感式用界面,可以足日常分析需求。其始提供符合 GLP 准的果。

普遍用于几乎所有位分析式滴定,例如:

- 食品:脂肪的酸度、化物、生素 C、和化物
- 水分析:酸和 Ca/Mg 硬度、化物、硫酸、高酸指数
- 石化:酸/、硫化物和硫醇、化物、
- :酸度、金属含量、化物
- 表面活性分析:子、子和非子表面活性
- 光度与光度:p 和 m 、金属、水硬度



Optrode

有 8 可用波的光度滴定用光学感器。可以通件控制(tiamo 2.5 及以上版本)或通磁来行波切。玻璃鞘溶耐受,并且易于清。省空的感器用于,例如:

- 按照 USP 或 EP 的非水溶性滴定
- 基端基的定
- TAN/TBN 根据 ASTM D974
- 硫酸定
- 混凝土中的 Fe、Al、Ca
- 水硬度
- 根据 USP 的硫酸骨素

感器不合通量色度(比色法)来定度。