Application Note AN-V-240

用法定甲状腺片中的含量

Polarography in pharmaceutical analysis: indirect determination of iodine after dry ashing in a muffle furnace

Thyroid hormones are made by the thyroid gland and play an important role in regulating metabolism and growth. Iodine acts as a building block and the specific number of iodine atoms determines the type of the hormone: four for thyroxine (T4) and three for triiodothyronine (T3). The number of iodine atoms is critical for the functionality of thyroid hormones. Levothyroxine and liothyronine (synthetic forms of thyroid hormones T4 and T3) are essential components of thyroid tablets. T4 is less active and needs to convert to the more active T3 to be fully effective. Accurate iodine determination in thyroid tablets is a crucial quality control measure, ensuring the effectiveness and safety of thyroid treatments.

A robust method is introduced for indirect determination of total iodine content in thyroid tablets as iodate, according to United States Pharmacopeia (USP) guidelines using the 884 Professional VA and the Multi-Mode Electrode pro.

SAMPLE

Commercially available thyroid tablet containing 100 g levothyroxine and 20 g liothyronine.

EXPERIMENTAL

Sample preparation and the determination of iodine is carried out according to the USP monograph «Thyroid Tablets». The process involves dry ashing of the tablets, where organically bound iodine is released and later converted to iodate. The iodate content is determined with the 884 Professional VA (**Figure 1**) by differential pulse polarography.

Figure 1. 884 Professional VA.

ELECTRODES

- Working electrode: Multi-Mode Electrode pro
- Reference electrode: Ag/AgCl/KCl (3 mol/L) reference electrode with electrolyte vessel. Bridge electrolyte: KCl (3 mol/L)
- Auxiliary electrode: Platinum rod electrode

Table 1. Parameters for IO3 determination

Parameter	Setting
Working electrode	DME
Mode	DP – Differential Pulse
Start potential	-0.8 V
End potential	-1.5 V
Potential step	0.005 V
Potential step time	1 s
Pulse amplitude	0.05 V
Peak potential Iodate	-1.18 V

RESULTS

Calculation of the results was carried out according to the USP monograph «Thyroid Tablets».

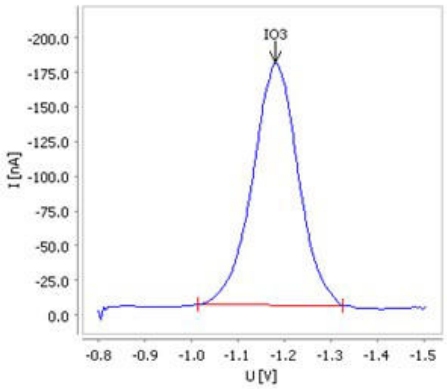


Figure 2. Determination of iodate in a thyroid tablet by differential pulse polarography with the 884 Professional VA and the Multi Mode Electrode pro.

Table 2. Results of iodine determination with the 884 Professional VA and the Multi-Mode Electrode pro.

Sample	Iodine in g / tablet	Recovery rate
Tablet	70.59	92.3%
Tablet spiked with 72.55 g	144.58	101.9%

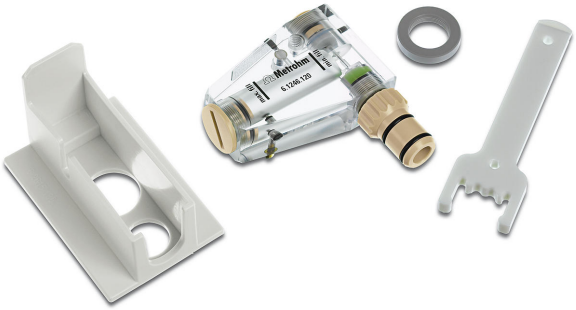
Internal reference: AW VA CH-0633-042024

CONTACT

117702
100085

marketing@metrohm.com.cn

CONFIGURATION



(MME) 884 Professional VA manual

(MME) 884 Professional VA manual pro scTRACE Gold / viva ,,

,«»(CVS)«»(CPVS)(CP),

viva

MME() 884 Professional VA manual , pro **viva**

Multi-Mode-Electrode pro

DMESMDE HMDE