



Application Note AN-T-086

Vitamin C in orange juice

Photometric titration according to ISO 6557-2

Vitamin C, also known as ascorbic acid or L-ascorbic acid, is an essential nutrient involved in the repair of tissues and the enzymatic production of certain neurotransmitters. It is required for the functioning of several enzymes and immune performance, and is also an important antioxidant. This nutrient is found in many foods and is often used as a dietary supplement.

This Application Note describes the photometric determination of ascorbic acid according to the standard ISO 6557-2. To increase the objectivity on the determined equivalence point and the reproducibility of the results, an autotitrator equipped with a photometric sensor, the Optrode, is used. The titrant 2,6-Dichlorophenol-indophenol (DCIP or DPIP) simultaneously serves as titrant and indicator.

SAMPLE AND SAMPLE PREPARATION

The method is demonstrated for orange and blood orange juice.

First, oxalic acid is added to the sample.

EXPERIMENTAL

This photometric analysis is carried out on a 907 Titrand system equipped with a magnetic stirrer and an Optrode for indication purposes.

An aliquot of the prepared sample is added to the titration beaker, followed by oxalic acid. Then, the solution is titrated using standardized 2,6-Dichlorophenol-Indophenol (DPIP) until after the first equivalence point.

Afterwards, the sample is centrifuged to remove any pulp.



Figure 1. 907 Titrand with tiamo. Example setup for the photometric determination of vitamin C.

RESULTS

The analysis demonstrates acceptable and reproducible results and well-defined titration

curves. The results are summarized in **Table 1**. An example titration curve is displayed in **Figure 2**.

Table 1. Mean vitamin C content of orange juices determined by titration (n = 3).

Sample	Mean / mg/L	SD(rel) in %
Orange juice	363.5	1.28
Blood orange juice	570.8	1.29

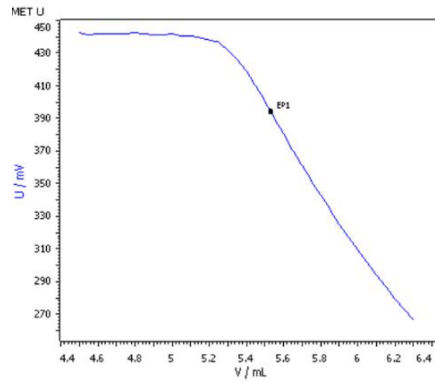


Figure 2. Example titration curve of the vitamin C determination in blood orange juice.

CONCLUSION

After sample extraction and centrifugation, the vitamin C content in orange juices is easily assessed according to **ISO 6557-2** by using DPIP as titrant and a photometric sensor for indication. In this manner, the salmon pink coloration of the endpoint can be reproducibly

and objectively determined regardless of the operator and sample color. Furthermore, using a photometric sensor enables the use of an automated system and with that, increased sample throughput.

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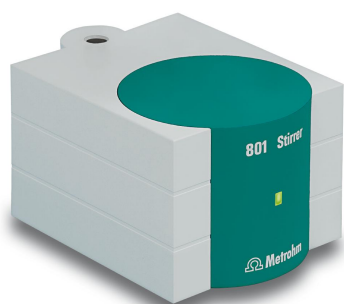
CONFIGURATION



907 Titrandos

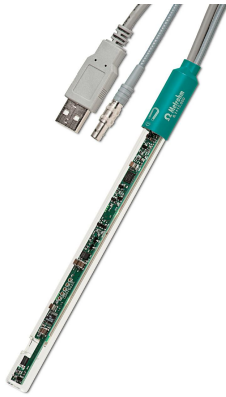
測定インターフェースと Dosino トーシングユニットを備えた、カールフィッシャー電位差滴定、および容量滴定のためのハイエンド滴定装置。

- タイプ 800 Dosino のトーシングテハイスシステムが 4 つまで
- 変動滴下量当量点滴定 (DET)、等量滴下当量点滴定 (MET)、終点滴定 (SET)、酵素滴定および pH STAT 滴定 (STAT)、カールフィッシャー滴定 (KFT)
- イオン選択性電極を用いた測定 (MEAS CONC)
- インテリシエント電極「iTrode」
- モニタリング、LQH を備えたトーシング機能
- 追加のスターラーまたはトーシングテハイスシステムのための 4 つの MSB コネクタ
- USB コネクタ
- OMNIS Software、*tiamo* ソフトウェアもしくは Touch Control を適用
- GMP/GLP 基準および FDA 基準 21 CFR Part 11 の要件を満たしています(必要な場合)



801 Stirrer with stand

Magnetic stirrer including base plate, support rod and electrode holder for supplementing the Titrino plus, Dosimat plus, Titrandos, Sample Processors, 805 Dosimat and 780/781 pH meters as well as the 856 and 867 measuring modules. With permanently attached cable for MSB (Metrohm Serial Bus).



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) またはマクネットにて実行できます。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。