



Application Note AN-T-196

维生素 C 的化验

Fast and accurate analysis according to USP <580>

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.

USP general chapter <580> describes a titration technique to determine the assay of Vitamin C as

ascorbic acid, sodium ascorbate, and calcium ascorbate dehydrate, or their mixture in finished dosage forms as capsules, tablets, and oral suspensions.

This Application Note demonstrates the Vitamin C determination in water-soluble vitamin tablets. The methodology can also be applied for oil-soluble vitamin or mineral tablets, as well as oil- and water-soluble vitamin or mineral capsules.

SAMPLE AND SAMPLE PREPARATION

The method is demonstrated for water-soluble vitamin tablets.

Several tablets are accurately weighed and then ground into a fine powder. A portion is

transferred into a volumetric flask, to which metaphosphoric and acetic acid are added. After dissolution, the volumetric flask is filled up to the mark with carbon dioxide-free water.

EXPERIMENTAL

This bivalentametric analysis is carried out on a 905 Titrando system equipped with a magnetic stirrer and a double Pt sheet electrode for indication.

To a reasonable amount of prepared sample, metaphosphoric acid, acetic acid, and carbon dioxide-free water are added. The vitamin C content is then titrated against dichlorophenol-indophenol until the first equivalence point.

A blank analysis is performed in the same way.



Figure 1. 905 Titrando with tiemo. Example setup for the determination of vitamin C.

RESULTS

The analysis demonstrates acceptable and reproducible results and well-defined titration curves. For the tested water-soluble vitamin tablet, a vitamin C content of 97.7% ($n = 6$,

$SD(\text{rel}) = 0.23\%$) is obtained, which is within the given USP criteria of 90–150%. An example titration curve is displayed in **Figure 2**.

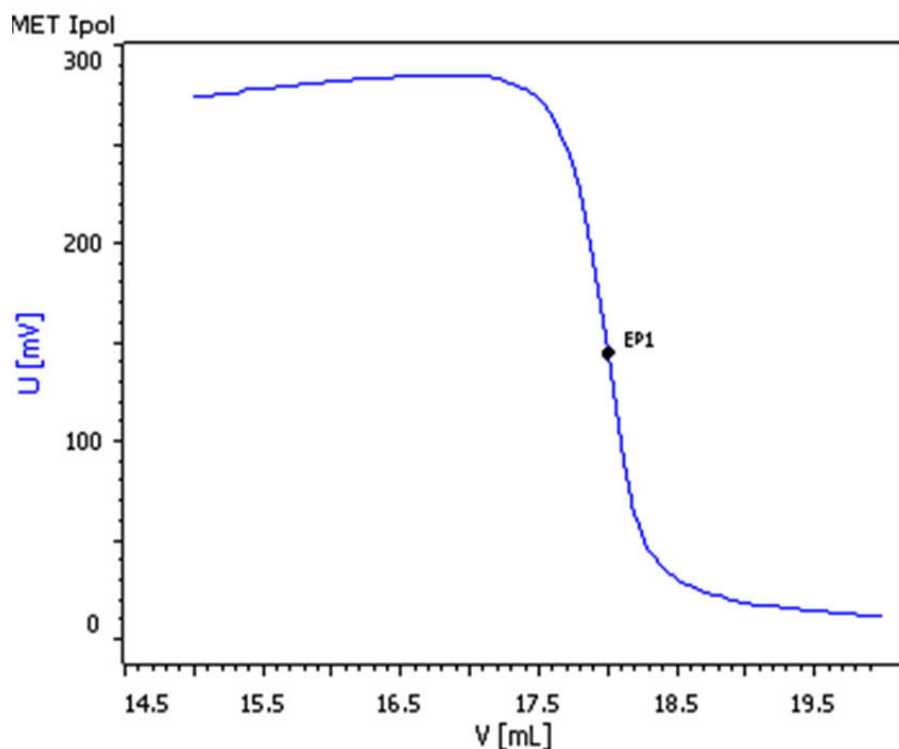


Figure 2. Example titration curve for vitamin C determination.

CONCLUSION

After sample preparation, the determination of vitamin C in vitamin capsules or tablets can efficiently be carried out by using a Metrohm

autotitrator. Fast and precise determination according to **USP <580>** is possible.

REMARKS

This method is also suitable for samples such as:

- Oil- and water-soluble vitamins capsules
- Oil- and water-soluble vitamins oral solution
- Oil- and water-soluble vitamins tablets
- Oil- and water-soluble vitamins with minerals capsules
- Oil- and water-soluble vitamins with minerals oral solution
- Oil- and water-soluble vitamins with minerals tablets
- Water-soluble vitamins capsules
- Water-soluble vitamins tablets
- Water-soluble vitamins with minerals capsules
- Water-soluble vitamins with minerals tablets

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CONFIGURATION



OMNIS Advanced Titrator

创新型、模块式电位分析 OMNIS Titrator 滴定仪,适于独立运行或作为 OMNIS 滴定系统的核心元件运行,用于使用 OMNIS Sample Robot 进行终点和等当点滴定(单一/动态)。由于采用 3S 试剂瓶适配器技术,处理化学品很安全。可以使用测量模块和计量管单元自由配置滴定仪,并在需要时扩展一台螺旋搅拌器。在需要时可以通过相应的软件功能许可证为平行滴定升级 OMNIS Advanced Titrator。

- 通过计算机或本地网络控制
- 可以为其他应用或辅助溶液另外连接四个滴定模块或加液模块
- 螺旋搅拌器的连接方式
- 可提供不同大小的计量管:5、10、20 或 50 mL
- 采用 3S 技术的试剂瓶适配器:安全处理化学品,自动传输生产商的原始试剂数据

测量模式和软件选项:

- 终点设定滴定:“Basic” 功能许可证
- 终点和等当点滴定(单一/动态):“Advanced” 功能许可证
- 终点和等当点滴定(单一/动态),包括平行滴定:“Professional” 功能许可证



带两块铂板 (0.15 x 8 x 8 mm) 的玻璃鞘电极,两块铂板经极化,用于氧化还原滴定(双伏安滴定法)。该电极特别适用于

- 维生素 C 测定
- 电量的氮测定
- 溴指数
- 葡萄酒中的亚硫酸 (SO_2)
- 按照温克勒法的氧含量