Application Note AN-T-196

Assay of Vitamin C

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 bivoltametric 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 tiamo. 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(rel) = 0.23%) is obtained, which is within the given USP criteria of 90–150%. An example titration curve is displayed in **Figure 2**.

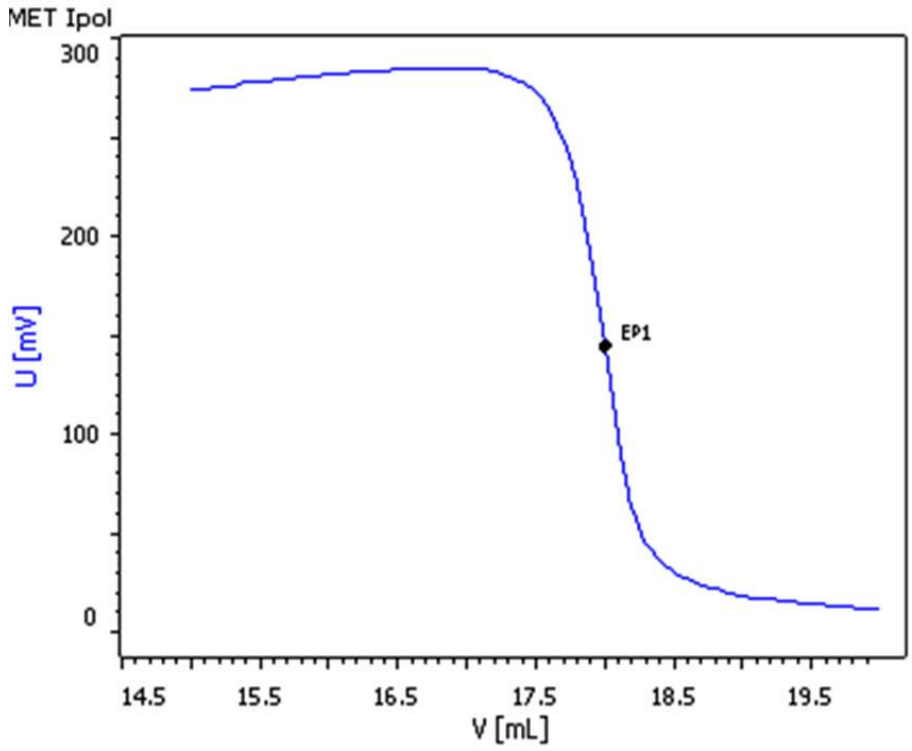

Figure 2. Example titration curve for vitamin C determination.

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

CONTACT

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CONFIGURATION

OMNIS Advanced

スタントアローン稼働またはOMNIS滴定システムのメインハートとしての、革新的なモシュール式の終点滴定および当量点滴定（等量/変動）のためのOMNIS電位差滴定装置てす。3Sリキットアタフタテクノロシーにより、化学物質の取り扱いに関してはこれまてにないほとの安全性を誇ります。滴定装置は測定モシュールおよひシリンターユニットによって自由にコンフィクレーションすることかてき、必要に応してフロヘラスターラて拡張することも可能てす。必要に応してOMNIS Advanced滴定装置を、対応するソフトウェア機能ライセンスによって並行滴定用に装備することかてきます。

- ハソコンまたはローカルネットワークを介した制御
- 他のアフリケーションまたは補助溶液のための他の滴定モシュールもしくはトーシンクモシュールか4つまて接続可
- フロヘラスターラの接続可
- 様々なシリンターサイスに対応: 5、10、20、50 mL
- 3Sテクノロシーによるリキットアタフター: 化学物質の安全な取り扱い、メーカーのオリシナル試薬テータの自動伝送

測定モートおよひソフトウェアオフション:

- 終点滴定: 機能ライセンス「Basic (ヘーシック)」
- 終点滴定および当量点滴定 (等量/変動): 機能ライセンス「Advanced (アトハンスト)」
- 並行滴定を伴う終点滴定および当量点滴定 (等量/変動): 機能ライセンス「Professional (フロフェッショナル)」

Pt

酸化還元滴定のために分極化されるフラチナシート(0.15 x 8 x 8 mm)を2つ伴うカラスシャフト電極(ハイホルタンメトリー滴定)。この電極は以下の用途に非常に良く適しています:

- ヒタミンCの測定
- 窒素の電量測定
- 臭素指数
- ワインに含まれる亜硫酸 (SO_2)
- Winkler(ウィンクラー)法による酸素含有量