



Application Note AN-T-154

Determination of alpha acids in hops according to EBC 7.4

Conductometric titration to test hops for alpha acid content

Hops are a key ingredient in beer production, contributing not only bitterness but also to its aroma and flavor. The alpha acid level (AA%) in hops plays a major role in the bitterness they can impart. During boiling in the brewing process, alpha acids transform into iso-alpha acids which make the beer bitter. For this reason, it is important for brewers to know the exact AA value of the hops they use.

Different hop varieties contain varying amounts of alpha acids—even the same hop variety may exhibit different levels. This also depends on

factors such as growing conditions and harvesting time. The AA% can vary between 1% up to 20% in hops. Therefore, brewers maintain the consistency of their beer's flavor profile by accurately measuring and controlling the AA content.

This Application Note describes the determination of AA% in hops according to the EBC method 7.4. The hops are first extracted with toluene, then the alpha acid content in the extract is determined through a precipitation titration using conductometric methods.

SAMPLES

Dried hop pellets, Solero variety (16% AA)

EXPERIMENTAL

The hop pellets are first extracted with toluene. For the analysis, an aliquot of the prepared sample is pipetted into the sample beaker and then methanol is added. The solution is then

titrated with standardized lead acetate in methanol/glacial acetic acid until after the equivalence point (Figure 1).

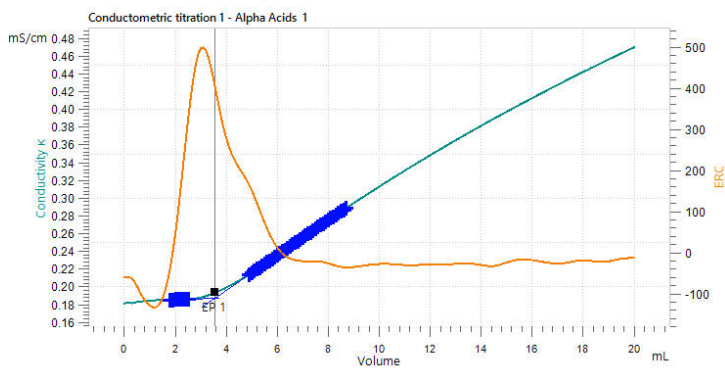


Figure 1. Example titration curve to determine alpha acid content in hop pellets.

RESULTS

The AA% could be reliably determined in hops with conductometric titration (Table 1).

Table 1. Results of the sample determination of alpha acid content in Solero hop pellets.

Sample	Result wt%	RSD in %
Solero	4.5	2.7

CONCLUSION

Alpha acid content in hop pellets can be easily determined by using conductivity titration according to EBC method 7.4. A significant advantage over other methods is the robust sensor used for the analysis. It is not influenced by external disturbances and is easy to clean.

This quality also simplifies implementing automation of the system.

The pellets' alpha acid content decreases over time. Therefore, this parameter should be measured again shortly before their use for the best results.

Internal reference: AW CH1-1116-122011

CONTACT

瑞士万通中国
北京市海淀区上地东路1号
院1号楼7层702
100085 北京

marketing@metrohm.com.cn

CONFIGURATION



OMNIS 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。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搅拌器。由于采用不同的软件功能许可证,因此可以有不同的测量模式和功能。

- 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

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OMNIS Titrator 或滴定模块的测量通道,用于连接电导电极。



5 $c = 0.7 \text{ cm}^{-1}$ Pt1000.65 m

带池常数的 5 环电导电极 $c = 0.7 \text{ cm}^{-1}$ (指导数值),集成有温度探针 Pt1000 和固定电缆 (0.65 m),用于连接到 OMNIS 电导率测量模块上。

该传感器适用于测量中等的电导率($5 \mu\text{S}/\text{cm}$ 至 $20 \text{ mS}/\text{cm}$),例如:

- 饮用水
- 地表水
- 废水