

## Determination of vicinal diketones (VDK) in beer

*Distillation unit EasyDist:*

*Steam distillation and spectrophotometric analysis in comparison with gas chromatography*

### 1. Introduction

The control of VDK levels during fermentation is an important aspect of quality control in a brewery. An accurate and reliable method for the determination of VDK in beer is here by introduced in co-operation with Versuchs-und Lehranstalt für Brauerei Berlin (VLB) e.V. VDK standards and the beer samples are distilled using the distillation unit EasyDist with a glass splash protector. A UV-Vis spectrophotometer is used to determine the VDK content (resp. the complex with o-phenylenediamine is analyzed) after the distillation.

### 2. Experiment

**Sample:**

Aqueous solution of VDK, Beer

**Equipment:**

EasyDist with glass splash protector(11K36512040), Spectrophotometer (Shimadzu UV-1800 UV-VIS-Spectrophotometer), Gaschromatograph (HP 6890) equipped with an electron capture detector (ECD)

**Procedure:**

The decarbonated beer is distilled. Afterwards the sample is prepared, and the prepared sample is measured with Spectrophotometer.



Table 1. Distillation parameters EasyDist.

Parameters	Settings
Steam Power	100 / 50 / 10
Chiller	Chiller F-314
Set Temperature	10 °C

### 3. Results

The results of nitrogen determination and recovery for the distillations are presented in Table 2.

Table 2. VDK analysis using the EasyDist at different steam powers in an aqueous solution of VDK.

Steam Power [%]	Ø VDK [mg/L]	Recovery [%]
10	0.201	100.3
50	0.198	99.1
100	0.198	99.1

### 4. Conclusion

In comparison to the usage of classical Parnas or Markham stills (according to EBC method), the distillation with EasyDist can be executed more rapidly and safely. The determination of VDK in beer with the EasyDist provides reliable and reproducible results. In addition, it is easy to handle, and a fast method. Therefore, it is ideal for quality control of beer and in the brewing process. For further information please download the full application note from the website.

### 5. References

Application Note No. 781/2021: Determination of vicinal diketones (VDK) in beer, Operation Manual for the EasyDist,  
 Krogerus, K., & Gibson, B. R. (2013). 125th anniversary review: diacetyl and its control during brewery fermentation. Journal of the Institute of Brewing, 119(3), 86-97,  
 EBC Analytica 9.24.2-Vicinal Diketones in Beer: Gas Chromatographic Method, 1999,  
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 Methodensammlung der Mitteleuropäischen Brautechnischen Analysenkommission (MEBAK), Band II, 4 Auflage 2002.