

Alcohol determination in ethanol/water mixtures

Distillation unit EasyDist:

Steam distillation in comparison with EEC 2870/2000, EEC 2676/1990 and OIV-MA-AS312-01A

1. Introduction

In most jurisdictions around the world there is a legal requirement to accurately determine the alcohol content of alcoholic beverages and medicines for labelling and for taxation purposes. An accurate and reliable method for the determination of the alcohol content in mixtures of four different ethanol/water concentrations, two of them in comparison to EEC 2870/2000 (spirits), EEC 2676/1990 (wine) and OIV-MA-AS312-01A (wine) is hereby introduced.

2. Experiment

Equipment:

EasyDist with glass splash protector (11K36512040), Density meter (DMA 5000, Anton Paar), Recirculating Chiller F-314, Various volumetric flasks with stopper, Thermostated water bath (capable of maintaining 20 ± 0.1 °C)

Procedure:

The ethanol/ water mixtures are distilled using the distillation unit EasyDist with a glass splash protector. A digital density meter is used to determine the alcohol content after the distillation and for the reference measurement by direct injections. (For more detailed Information, data and methods used please download AN756_2021.)

Table 1. Distillation parameters on EasyDist

Parameter	Parameters on EasyDist
Steam Steps	No
Steam Power	100%
Distillation Time	600 s
Level Detection	No
MaxAccuracy Mode	On
Chiller/Tap Water	Chiller F-314
Set Temperature	10°C



3. Results

Table 2: Determined EtOH contents (rsd in brackets, n(10% and 50%)=10, n(0.25% and 1.00%)=5).

Product	Average Content measured after Dist. (RSD)	Delta to before distillation
10% v/v ethanol/water	9.998% v/v (RSD=0.010%)	0.009% v/v
50% v/v ethanol/water	50.003% v/v (RSD=0.106%)	-0.038% v/v
0.25% v/v ethanol/water	0.269% v/v (RSD=2.662%)	-0.009% v/v
1.00% v/v ethanol/water	1.026% v/v (RSD=0.349%)	-0.018% v/v

4. Conclusion

The determination of ethanol content in ethanol/water mixtures in four concentrations with the EasyDist unit provides reliable and reproducible results. The presented results are in a close agreement with the following regulations: EEC 2870/2000 (spirits), EEC 2676/1990 (wine) and OIV-MA-AS312-01A (wine) if a 1:8 distillation protocol is used.

5. References

AN756/2021
 Operation Manual Dist Line
 EEC 2870/2000 (spirits)
 EEC 2676/1990 (wine)
 OIV-MA-AS312-01A (wine)