Water in Antibiotics

Karl Fischer application

Product group

Pharmaceuticals

General Information concerning the product group

Pharmaceuticals

Pharmaceutical products are often characterized by complex formulations. Difficulties observed during Karl Fischer determination are often caused by the limited solubility. In some cases side reactions have to be considered. In dependance of composition and properties of the formulations, various measures are necessary for an undisturbed Karl Fischer determination.
In pharmaceutical guidelines (USP, Ph Eur, DAB) the Karl Fischer titration is described as common method for water determination. For some substances special procedures can be found. The determination of mass loss as method for water determination is not recommended.

Special Information concerning the sample and the methods

Most types of antibiotics are easily soluble in alcoholic media. Side reactions with the KF reagent only occur in rare cases.Water determination can be carried out according to volumetric standard methods of the one or two component titration. In the case of solubility problems the presence of formamide and / or titration under warm conditions (50 °C) accelerates the release of water.

Titration one component system

Reagents

Titrant:	Aquastar - CombiTitrant 5 One component reagent for volumetric Karl Fischer titration, 1 mL = approx. 5 mg water	188005	
or	Aquastar - CombiTitrant 2 One component reagent for volumetric Karl Fischer titration, 1 mL = approx. 2 mg water	188002	
Solvent:	Aquastar - CombiMethanol Solvent for volumetric Karl Fischer titration with one component reagents, max. 0.01 % water	188009	50 mL
or	Aquastar - CombiMethanol / Formamide solvent mixture for one component titration	188009 / 109684	30 mL / 20 mL

Titration parameters
Extraction time: 120 sec.
Default titration settings, e.g.:
I(pol) = 20 - 50 µA, U(EP) = 100 - 250 mV
Stop criterion: drift < 20 µL/min

Sample size
0.2 - 2 g (depending on the water content)

Procedure
The titration medium is first placed into the cell and titrated dry by means of the titrant. Then the powdered sample is added from a weighing boat (exact sample weight determination by weighing of weighing boat before and after addition) and the titration is started. For complete dissolution of the sample or rather full extraction of the water a

stirring time of 120 seconds is recommended. In the case of hardly soluble samples the titration cell is heated to 50 °C.

Titration two component system

Reagents

Titrant:	Aquastar - Titrant 5 Titrant for volumetric titration with two component reagents, 1 mL = approx. 5 mg water	188010	
or	Aquastar - Titrant 2 Titrant for volumetric titration with two component reagents, 1 mL = approx. 2 mg water	188011	
Solvent:	Aquastar - Solvent Solvent for volumetric titration with two component reagents	188015	50 mL
or	Aquastar - Solvent / Formamide solvent mixture for two component titration	188015 / 109684	30 mL / 20 mL

Titration parameters
Extraction time: 120 sec.
Default titration settings, e.g.:
I(pol) = 20 - 50 µA, U(EP) = 100 - 250 mV
Stop criterion: drift < 20 µL/min

Sample size
0.2 - 2 g (depending on the water content)

Procedure
The titration medium is first placed into the cell and titrated dry by means of the titrant. Then the powdered sample is added from a weighing boat (exact sample weight determination by weighing of weighing boat before and after addition) and the titration is started. For complete dissolution of the sample or rather full extraction of the water a stirring time of 120 seconds is recommended. In the case of hardly soluble samples the titration cell is heated to 50 °C.

Ordering Information

Product	Catalog No.
Formamide for analysis EMSURE®	109684
CombiTtitrant 2 one component reagent for volumetric Karl Fischer titration 1 ml ca. 2 mg H2O Aquastar®	188002
CombiTitrant 5 one-component reagent for volumetric Karl Fischer titration 1 ml □ ca. 5 mg H2O Aquastar®	188005
CombiMethanol Solvent for volumetric Karl Fischer titration with one component reagents max. 0.01% H2O Aquastar®	188009
Titrant 5 titrant for volumetric Karl Fischer titration with two component reagents 1 ml □ ca. 5 mg H2O Aquastar®	188010
Titrant 2 titrant for volumetric Karl Fischer titration with two component reagents 1 ml □ ca. 2 mg H2O Aquastar®	188011
Solvent solvent for volumetric Karl Fischer titration with two component reagents Aquastar®	188015