



Application Note AN-K-071

Water content in flour, dough, and bread

Reliable and reproducible water content determination by volumetric Karl Fischer titration

Water content determination by volumetric Karl Fischer titration is one of the most important analyses worldwide, particularly when it comes to food quality. The water content has a major influence on the growth of microorganisms, and thus indirectly affects the storability of the products. It is therefore of significant interest for manufacturers to know this parameter.

To ensure that bakeries can guarantee quality goods for customers, it is imperative to quantify the exact water content in the raw materials and in the final products. Therefore, consistent quality is only possible with precise measurements during the process. This measurement is performed with the Metrohm Eco KF Titrator for flour, dough, and baked goods.

SAMPLE AND SAMPLE PREPARATION

This application is demonstrated on white flour, bread dough made from white flour, and whole wheat bread.

An appropriate amount of sample is weighed into a

flask and water-free methanol is added. Then the flask is closed and the solution is extracted for 24 hours. The blank measurement is made in the same way without sample.

EXPERIMENTAL

The determinations are carried out on an Eco KF Titrator equipped with a Polytron, a Solvent Pump, and a double Pt-wire electrode for volumetry.

An appropriate volume of sample is injected into the sample beaker and the sample size is weighed back. Alternatively, the sample can also be weighed in directly. However, the solution is homogenized with the Polytron and titrated with standardized Karl Fischer titrant to the endpoint.



Figure 1. Eco KF Titrator equipped with a Polytron, a Solvent Pump, and a double Pt-wire electrode for volumetric Karl-Fischer titration.

RESULTS

For the tested samples, well-defined water content and titration curves are obtained.

The results are summarized in **Table 1**. An example titration curve is displayed in **Figure 2**.

Table 1. Results for the water content by Karl Fischer titration with an Eco KF Titrator equipped with a double Pt-wire electrode for volumetry.

Sample (n = 6)	Mean H ₂ O content in %	SD(rel) in %
White flour	12.4	0.8
Bread dough	34.7	0.8
Whole wheat bread	44.4	0.4



Figure 2. Titration curve of the determination of water content of bread dough on an Eco KF Titrator.

CONCLUSION

Karl Fischer titration is a precise and reliable method to determine the water content in flour, dough, and bread products.

Using the Eco KF Titrator equipped with a Polytron, a Solvent Pump, and a double Pt-wire electrode for volumetry allows a fast and reproducible

determination with or without sample preparation.

The system offers both a low-price and user-friendly handling. Pre-installed methods on the Eco Titrator makes it easier for customers without laboratory experience to get started with precise and fast titrations, perfect for bakeries.

Internal reference: AW TI CH1-1315-012021

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