

Evaluation of Determination of Free Urea in Water-Soluble Liquid Fertilizers containing Urea & Ureaforms by Urease Method & by HPLC Method

**Michael M. Hojjatie, R&D Department,
Tessenderlo Kerley, Inc., 2248 West
Lower Buckeye, Phoenix, AZ 85009**

Summary

Currently there are three AOAC Official Methods for the determination of urea in fertilizers.

AOAC Official Method 959.03, Urea in Fertilizers, Urease Method, First Action 1959, Final Action 1960. This method is based on the use of fresh commercial 1% urease solution, or preparation of such solution from urease powder in water, or from jack bean meal in water.

AOAC official Method 983.01, Urea and Methyleneureas (Water-Soluble) in Fertilizers, First Action 1983, Final Action 1984, is based on liquid chromatography with refractive index detector using water as mobile phase and an ODS column.

AOAC Official Method 2003-14, Determination of Urea in Water-Soluble Urea-Formaldehyde Fertilizer Products and in Aqueous Urea Solutions, First Action 2003, Final Action 2008, is also base on liquid chromatography with UV detector using 85%:15% Acetonitrile: Water as mobile phase and a propylamine column.

The Urea Method, AOAC Official 959.03 is very much dependent to the nature of the urease enzyme. The analyses of free urea in water soluble urea-formaldehyde condensate products by urease method is frequently erroneous and inconsistent.

The AOAC Official Method 983.01 is not always reliable due to the interference of some of the components of these fertilizers, and due to the fact that the use of water as mobile phase does not always separate the free urea from other components.

The AOAC Official Method 2003-14 was subjected to Ring Test Studies and showed it could be used for the determination of “free urea” in these classes of fertilizers with quite accurate results and consistency.

Comparisons of the analytical methods for the determination of FREE urea in the water soluble urea-condensate fertilizers by these three methods are described.

Method to be published in JAOAC

Questions?