



# Testing Urea Fertilizer Quality

## What is Urea fertilizer?

Urea fertilizer is the most widely used nitrogen fertilizer in the world. It comes in a white, granular or pellet form and contains 46% nitrogen, if the quality is good. This means that 46% of the fertilizer is nitrogen by weight. For example, a 50 kg bag of urea fertilizer would have 23 kg of nitrogen in the bag.

## Urea fertilizer quality.

In many parts of the world, urea fertilizer is not tested for quality. Many farmers buy urea fertilizer that has less than 46% nitrogen by weight and end up wasting money and applying less nitrogen than what is needed by the crop. Farmers depend on suppliers to sell them good urea fertilizer since farmers, generally, cannot afford to test the urea themselves.



**Figure 1.** Urea fertilizer in some water. The reaction between water and urea will cool the palm. (Source: UC Davis)

## Simple ways to test urea fertilizer quality.

When urea dissolves in water, the water gets colder. This reaction can be used to assess urea fertilizer quality either by feel, or more accurately, with a thermometer. The reaction is so dependent on the amount of urea in the fertilizer that the temperature drop can be predicted for a known mixture of water and urea. For example, a 4-to-1 mixture of water to urea pellets should decrease the water temperature by about 8 °C.

### Feel test:

Put some urea fertilizer pellets in the palm of your hand (Figure.1). Add a little water to the palm. If the palm begins to feel cool, then the urea fertilizer quality is probably good.

### Thermometer test:

1. Get a small glass and add a known volume of water (i.e., 100 ml).
2. Measure the temperature of the water with a thermometer and record.
3. Add one-fourth the amount of water as urea fertilizer pellets (i.e., if 100 ml of water was added to the glass, then add 25 ml of urea fertilizer pellets).
4. Stir the mixture until all the urea has dissolved and record the water temperature again.

Calculate the difference in temperatures. If the temperature difference is about 8 °C, then the urea fertilizer quality is probably good.

**Note:** These tests are not a substitute for more accurate analytical tests.

For more information visit: <http://ip.ucdavis.edu>

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Reference: Kirk-Othmer Encyclopedia of Chemical Technology, 2004

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