

Understanding the Falling Number Wheat Quality Test

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Introduction

Protein and moisture are key quality tests for both grade and marketing price of wheat. Farmers are most familiar with these tests since almost all SRW wheat is purchased on milling quality.

When it rains just before harvest, grain may start to germinate (or sprout) in the head. The germination causes an increase in alpha amylase, an enzyme that breaks down starch. There are also increases in enzymes that break down proteins. Of these, the starch degrading enzyme has a greater effect on reducing the quality of flour, and of products made from the flour. The longer the grain sprouts, the greater the amount of the alpha amylase formed. If badly sprouted grain is milled, the flour can cause product problems.²

Falling Number is a test more recently introduced into country elevators and mills. It gives an indication of the amount of sprout damage that has occurred within a wheat sample. Generally, a falling number value of 350 seconds or longer indicates a low enzyme activity and very sound wheat quality. As the amount of enzyme activity increases, the falling number decreases. Values below 200 seconds indicate high levels of enzyme activity.

Why is this important? Sprouting can affect food made from wheat in many ways. It can reduce mixing strength, cause sticky dough, and affect loaf volume and shelf life. In pasta, sprouting can reduce shelf life, increase cooking loss, and produce softer cooked pasta.

The falling number test is presently causing frustration and confusion on the Eastern Shore. That is because the level of impact of sprout damage is not fully realized until wheat is processed into bread or pasta. The falling number test does not directly measure amylase enzyme activity, but measures changes in the physical properties of the starch portion of the wheat kernel caused by these enzymes during the test.

Falling number tests can be run in remote locations like elevators or testing facilities and replicated anywhere in the world. Many buyers from export markets are said to have written minimum tolerances of 300 to 350 seconds into their purchase contracts. In the past several years, grain buyers have discounted wheat for falling number values below 300 seconds.³

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² <http://www.northern-crops.com/technical/fallingnumber.htm>

³ <http://www.wheat-research.com.au>

How the Test is Performed

The **Falling number** is used to measure the effect of the enzymes on wheat quality. In the falling number method, an instrument, which measures the time taken for a plunger to fall to the bottom of a precision bore glass tube filled with a heated paste of wheat meal and water is used. The time taken (in seconds) for the plunger to fall is known as the falling number, and is 62 seconds for badly sprouted wheat.

High quality wheat makes a thicker paste, and the test then takes between 300 to 600 seconds. The greater the sprout damage, the less viscous (or sticky) the starch paste, and so the lower the falling number. Wheat with a falling number greater than 300 is quite suitable for bread making. For other milling grades, falling numbers greater than 250 are acceptable.

What Happens When Wheat Fails the Falling Number Test?

On the Eastern Shore wheat for milling that falls below 275 seconds will be rejected. Sometimes good quality wheat can be blended to bring the falling number up to the required level. At other times, wheat quality can not be improved by blending. Wheat that does not meet the falling number requirement for milling must be sold for other uses.

Testing for Falling Numbers?

Currently, a simple test kit is not readily available. Further information regarding the falling number test can be obtained at the following web site: www.ciilab.com . A Test Request Form can be obtained at this site. The test requires about ½ pound of wheat sample, therefore, the sample size that is mailed should be about 1 pound. It is important to note that care needs to be taken in mailing a sample. The sample should be placed and sealed in a plastic bag and then placed in an appropriate mailer (box or reinforced envelope).

The Delaware Department of Agriculture is currently investigating the availability of a simple test kit. In the event that a simple test kit for falling numbers is located, that information will be then be made available. Questions regarding the falling number test can be directed to the DDA, Plant Sciences Section.

