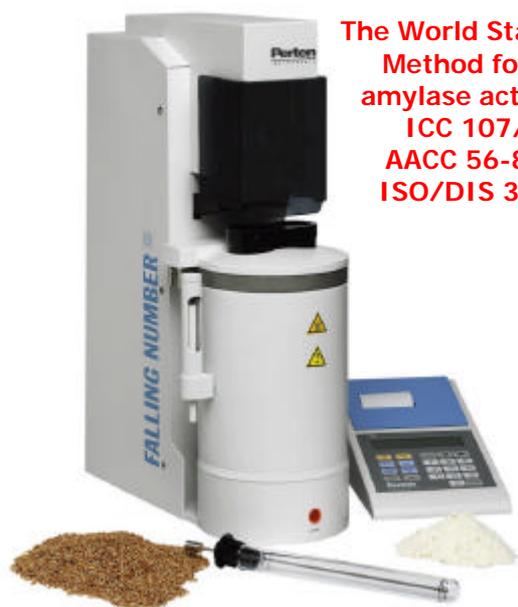




The Falling Number Method for Detection of Sprout Damage in Barley



The World Standard Method for α -amylase activity:
ICC 107/1
AACC 56-81B
ISO/DIS 3093

Falling Number 1900

Field Sprouting of Barley

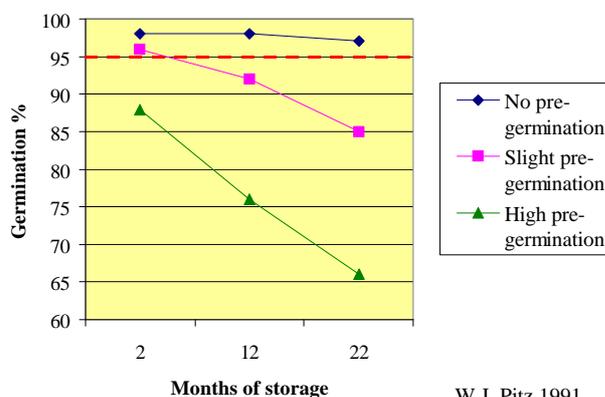
Sound, viable grains are required for a high germination in malting barley. Several studies have shown that barley that has pre-germinated in the field has a decreased ability to germinate during the malting process, leading to high levels of beta-glucan in the wort. Even barley with a low degree of pre-germination will be affected. The ability to germinate further decreases during storage, and barley with acceptable germination at harvest could only months later exhibit germinations significantly lower than the generally requested 95%. The slight pre-germination is not possible to detect through visual inspection, but through measurement of α -amylase activity.

The Falling Number Method

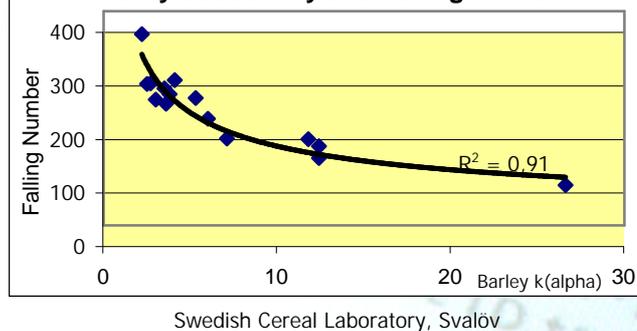
The Falling Number method is widely used in the grain and milling industries for rapid sprout damage detection in grain. The method is standardized and officially approved by important organizations such as AACC, ICC and ISO.

The principle of the method is to heat a mixture of water and ground grain, thus gelatinizing the starch. The starch will then be hydrolyzed if α -amylase is present. The higher the α -amylase activity the more starch will be hydrolyzed, thus lowering the viscosity of the mixture. The viscosity is measured by letting a rod fall through the mixture, measuring the time it takes for it to fall a specified distance. That time correlates to the α -amylase activity and is the Falling Number (FN) of the sample.

Malting barley germination stability



Relationship between barley alpha-amylase activity and Falling Number



Industrial Use – Barley Intake

To avoid purchase of pre-germinated barley the Falling Number analysis can be used for acceptance testing at the barley intake. The method is rapid and determines if the barley is pre-germinated within 5 minutes. Carlsberg Sweden in Stockholm uses Falling Number 220 as a limit when purchasing malting barley.

FN > 220 Sound barley, batch OK for intake
 FN < 220 Pre-germinated. Risk for poor germination, further tests needed.

Literature

- W. J. Pitz. *Rapid and Objective Methods for the Estimation of Pre-germination and Viability in Barley*. ASBC Journal Vol. 49, No. 3 1991.
- P. A. Brookes. *The Significance of Pre-harvest Sprouting of Barley in Malting and Brewing*. Cereal Research Communications, Vol. 8, No. 1, 1980.