# Secrets to superb malting barleys explored

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Many favorite breakfast cereals, candies, beers, and other foods and beverages owe much of their smooth, delicious flavor to malt. Malting barleys--the source of that malt--are the focus of studies at the Agricultural Research Service's (ARS) malting barley laboratory in Madison, Wis., part of the Cereal Crops Research Unit.

There, chemist Mark Schmitt and plant physiologist Allen Budde are discovering more about what goes on inside barley grains as they germinate, or sprout, in the malt house. Sprouting is one of many steps that go into making malt.

Findings from the scientists' basic and applied research help plant breeders develop even better malting barleys for tomorrow. Of particular interest to Schmitt are the specialized enzymes that the grain creates while it is sprouting. These enzymes, for example, convert the grain's stored proteins into their component amino acids, and convert the stored carbohydrates into what are known as "simple sugars."

Schmitt is also interested in the balance of this breaking down of proteins and carbs. That balance can affect the malt's flavor and other qualities.

Some of the team's current research into barley enzymes follows up on studies they reported several years ago. In one investigation, Schmitt found that enzymes called serine-class proteases, which break down proteins in the sprouting grain, can also break down beta-amylase, an important enzyme for converting carbs to simple sugars.

The study, a scientific first, was reported in a 2008 issue of the *Journal of Cereal Science*. The finding might help explain one of the patterns found in an earlier study, published in a 2007 issue of the journal *Cereal Chemistry*. In that analysis of more than 2,000 North American malting barleys, Schmitt and Budde found that high levels of a desirable, beta-amylase-associated attribute in the barleys correlated to low levels of the serine-class proteases.

**More information:** Read more about the research in the February 2010 issue of Agricultural Research magazine, available online at: www.ars.usda.gov/is/AR/archive/feb10/malt0210.htm .

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