Studies provide insight into key oat chemical

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Studies conducted by Agricultural Research Service (ARS) scientists are helping to increase understanding about the environmental factors that regulate production of avenanthramides (Avns), metabolites with potent antioxidant properties, in oat grain.

Avns are one reason oats have been widely touted for their many health benefits. The specific purpose of Avns inside the oat plant is still largely unknown, but previous studies have found an increased production of Avns in oat leaves when the plant is attacked by a fungus. This finding leads researchers to believe that Avns help oat plants fight off these fungi.

Chemist Mitchell Wise with the ARS Cereal Crops Research Unit in Madison, Wis., teamed up with fellow chemist Doug Doehlert with the ARS Red River Valley Agricultural Research Center in Fargo, N.D., to examine the correlation between disease pressure and Avn concentration in the oat grain.

The scientists tested 16 oat cultivars and two breeding lines at three locations in North Dakota over a two-year period. They found that oat plants with the strongest crown rust resistance typically had the highest Avn concentrations in environments where crown rust occurred. They also found that Avn production is likely influenced by additional environmental factors, because not all cultivars with strong crown rust resistance produced high Avn concentrations. Details of this study can be found in the scientific journal *Cereal Chemistry*.

Still, according to Wise, the results suggest that oat breeders—taking into account crown rust pressure during growth—can select certain cultivars for enhanced production of Avns.

Wise is also further researching the biosynthesis of Avns in the laboratory. He developed a suspension culture system from oat shoot tissue in which Avns are produced in response to a chemical that mimics fungal infection. This useful tool can be used for more detailed investigation into how certain Avns are produced.

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