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Volume 91, Issue 2, March-April 2014, Pages 159-168

Globulin expression in grain of australian hard wheat cultivars is affected by growth environment (Article)

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Abstract

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Our aim was to study changes in wheat proteomes across different growth locations as the first step in linking protein composition with functional changes in grains produced with commercial production systems. Soluble and insoluble proteins were extracted sequentially from grain of three commercial wheat cultivars grown at four locations in New South Wales, Australia, during a single season. Bands were separated with SDS-PAGE and identified by peptide mass fingerprinting. Quantitative changes in the electrophoretic patterns were observed mainly in the insoluble polypeptides of molecular mass 40,000-70,000 for all three cultivars grown at two of the four locations. These proteins were identified as mainly globulin and serpin isoforms, as well as triticin. Other proteins with changed expression included disease-resistance proteins, class III peroxidase, starch branching enzyme I, β -amylase, and storage proteins. Two-dimensional electrophoretic analysis was performed on two of the same wheat cultivars grown at one of the locations during two consecutive seasons. Protein spots that varied between seasons consisted of globulin and serpin isoforms, triticin, HMW glutenin, γ -gliadin, starch branching enzyme IIb, and α -amylase. The implications of the upregulation of globulin and triticin on whole meal flour quality, through their participation in polymerization of the gluten network, are considered. © 2014 AACCI International, Inc.

ISSN: 00090352
CODEN: CECHA
Source Type: Journal
Original language: EnglishDOI: 10.1094/CCHEM-05-13-0108-R
Document Type: Article
Publisher: American Association of Cereal Chemists

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