

How agronomists can help to control free asparagine in Western Canadian wheat?

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Acrylamide, a “2A” carcinogen, forms during high temperature (>120 °C) processing of starchy foods through series of reactions involving the free amino acid “asparagine” and reducing sugars. In 2018, European Union established commission regulation regarding acrylamide levels in foods, with the allowable limit for bread acrylamide being 50 µg/kg. Since there is no record on acrylamide forming potential of Canadian wheat, such regulations might limit demands for Canadian wheat in the global market. Therefore, there is a dire need for Canadian wheat producers to take acrylamide mitigation strategies, such as reducing free asparagine (ASN) in wheat, to reassure customers of Canadian wheat regarding its low acrylamide forming potential. Free ASN is mainly influenced by growing environment (E), genotype (G), and agronomic practices, i.e., nitrogen and sulfur fertilization (F). Therefore, in this study, free ASN concentration was evaluated in eight commercial Canadian wheat cultivars grown at four site-years under four fertilization treatments (nitrogen and sulfur combinations). All three effects (E, G and F) and their interactions showed significant contributions to variations in wheat ASN concentration. In conclusion, agronomists can help to reduce free ASN in Canadian wheat through judicious selection of low ASN genotypes and levels of fertilizers to apply.