

Title: Relationship between free asparagine concentration and dough quality in Canadian hard red spring wheat

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Acrylamide, a carcinogenic compound formed during thermal processing of starchy foods, e.g., bread, has been a major concern to international and European food authorities. Free asparagine in wheat, the main precursor to acrylamide formation, is affected by environment, genotype, as well as nitrogen and sulfur contents of soil. However, these factors can also affect wheat storage proteins, also known as gluten proteins, that are critical for the final product quality. Gluten provides wheat flour dough with a unique gas-holding capacity that allows bubble growth during dough fermentation, resulting in a desirable loaf volume. Thus, it is crucial to understand if reducing wheat free asparagine has any detrimental effect on dough properties and final product quality. To achieve this, eight Canadian wheat varieties, grown at four environments (location-years) under four fertilization treatments (sulfur and nitrogen combinations) were studied. Whole-wheat flours were utilized for free asparagine analysis and for bread specific loaf volume (SLV) measurement. Straight grade flours (white flours) were utilized for dough testing during mixing and under extension. Overall, wheat free asparagine concentration was negatively correlated with gluten strength and SLV. Therefore, reducing free asparagine concentration in wheat was not detrimental to dough and bread quality characteristics.