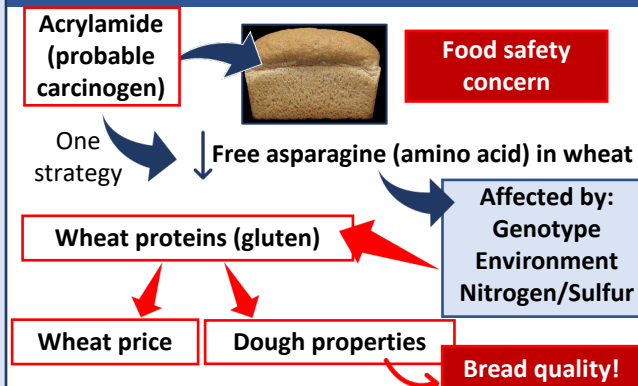


Relationship between free asparagine concentration and dough quality in Canadian hard red spring wheat

Susane Trevisan¹, Ali Salimi Khorshidi¹, Elaine Sopiwnyk², Yi Xie¹, Zhaoxian Zhou³, James D. House¹, Martin G. Scanlon¹

¹Department of Food and Human Nutritional Sciences, University of Manitoba, Winnipeg, Canada, ²Cereals Canada, Winnipeg, Canada, ³AoKun Food Ltd., GuangZhou, Guangdong, China

Introduction



Objective

To investigate if reducing free asparagine in wheat will have a negative impact on dough and bread qualities.

Materials and methods

8 wheat genotypes (G)

(AAC Brandon, AAC Cameron, AAC Elie, BW5011, CDC Plentiful, Glenn, Prosper, SY Rowyn)

4 environments (E)

(Carberry-2018, Lilyfield-2018, Grosse Isle-2019, Lilyfield-2019)

4 fertilization treatments (kg ha⁻¹) (F)

(100N+0S, 135N+0S, 100N+17S, 135N+17S)

Whole-wheat free asparagine quantification

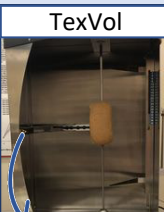
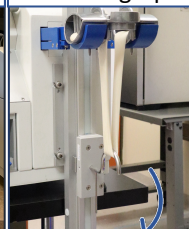
Performed by Xie et al. (2020)

Straight grade flour (white flour):

Whole-wheat bread:

Farinograph

Extensograph



Dough stability during mixing (DS, minutes)

Ratio of dough resistance to extensibility (R/E)

Specific loaf volume (SLV, cm³ g⁻¹)

Results and discussion

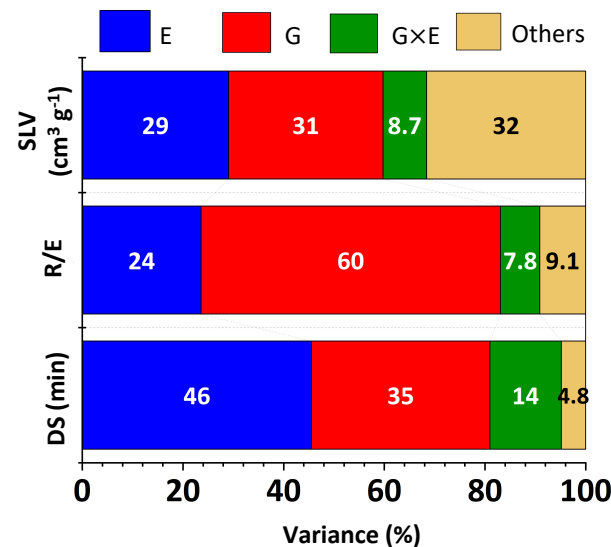


Fig. 1. Percentage of total variance for the significant ($p < 0.05$) factors. Fertilization treatments were not statistically significant at $p < 0.05$.

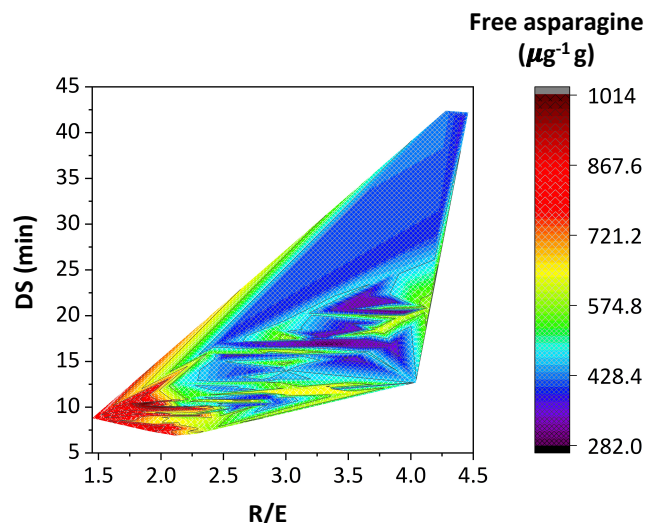
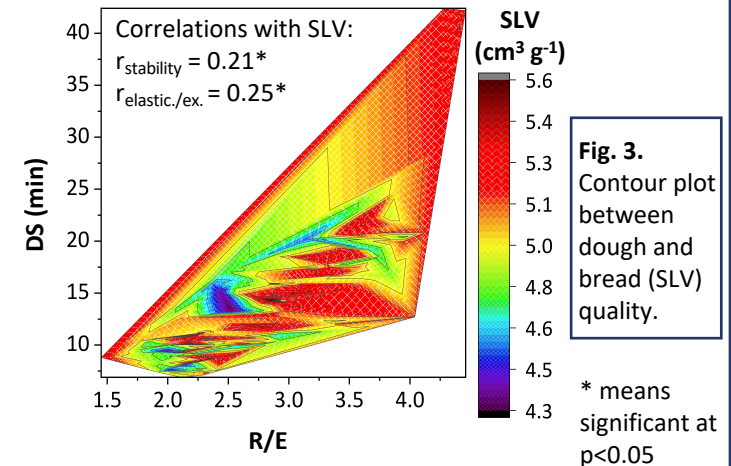


Fig. 2. Contour plot between dough quality (DS, R/E) and free asparagine concentration.



Highlights and conclusion

- E, G, and G×E → Main factors affecting DS, R/E, and SLV
- Fertilization → Non-significant effect on DS, R/E, and SLV
- Lower free asparagine → Higher DS, R/E, and SLV values

Farmers can grow low free asparagine wheat (G selection and commercial nitrogen levels (100 kg ha⁻¹))

No detrimental effects on dough and bread qualities.

Acknowledgements



References

Xie, Y., Malunga, N., Ames, N., Waterer, J., Khorshidi, A., Scanlon, M., 2020. Effects of growing environment, genotype, and commercial fertilization levels on free asparagine concentration in Western Canadian wheat. *Cereal Chem* cche.10364. <https://doi.org/10.1002/cche.10364>

Pictures: Bread and TexVol (Yi Xie) farinograph and extensograph (Susane Trevisan)