Relationship between free asparagine concentration and dough quality in Canadian hard red spring wheat Susane Trevisan<sup>1</sup>, Ali Salimi Khorshidi<sup>1</sup>, Elaine Sopiwnyk<sup>2</sup>, Yi Xie<sup>1</sup>, Zhaoxian Zhou<sup>3</sup>, James D. House<sup>1</sup>, Martin G. Scanlon<sup>1</sup> <sup>1</sup>Department of Food and Human Nutritional Sciences, University of Manitoba, Winnipeg, Canada, <sup>2</sup>Cereals Canada, Winnipeg, Canada, <sup>3</sup>AoKun Food Ltd., GuangZhou, Guangdong, China Introduction **Results and discussion** Acrylamide SLV Correlations with SLV: Others 40 -G F G×E Food safety (probable (cm<sup>3</sup> g<sup>-1</sup>) r<sub>stabilitv</sub> = 0.21\* concern carcinogen) 35 5.6  $r_{elastic./ex.} = 0.25*$ (cm<sup>3</sup> g<sup>-1</sup>) SLV 29 32 5.4 31 One 30 Free asparagine (amino acid) in wheat Fig. 3. 5.3 strategy DS (min) Contour plot 25 Affected by: 5.1 between Genotype Wheat proteins (gluten) 20 dough and R/E 5.0 Environment 24 60 7.8 9.1 bread (SLV) Nitrogen/Sulfur 4.8 15 quality. 4.6 Wheat price **Dough properties** 10 DS (min) **Bread quality!** 4.5 \* means 46 35 14 2.5 1.5 2.0 3.0 3.5 4.0 Objective 4.3 significant at R/E p<0.05 To investigate if reducing free asparagine in wheat will have a negative impact on dough and bread qualities. 60 80 0 20 40 100 **Highlights and conclusion** Materials and methods Variance (%) Main factors affecting DS, R/E, and E, G, and G×E 8 wheat genotypes (G) SLV Fig. 1. Percentage of total variance for the significant (AAC Brandon, AAC Cameron, AAC Elie, BW5011, Non-significant effect on DS, R/E, (p<0.05) factors. Fertilization treatments were not Fertilization CDC Plentiful, Glenn, Prosper, SY Rowyn) and SLV statistically significant at p<0.05. Lower 4 environments (E) Higher DS, R/E, and SLV values free asparagine (Carberry-2018, Lilyfield-2018, Free asparagine Grosse Isle-2019, Lilyfield-2019)  $(\mu g^{-1}g)$ Farmers can grow low free asparagine wheat (G selection 4 fertilization treatments (kg ha<sup>-1</sup>) (F) 45 and commercial nitrogen levels (100 kg ha<sup>-1</sup>)) 1014 (100N+0S, 135N+0S, 100N+17S, 135N+17S) 40 No detrimental effects on dough and bread qualities. Whole-wheat free asparagine quantification 867.6 35 Performed by Xie et al. (2020) **Acknowledgements** 30 DS (min) 721.2 Straight grade flour (white flour): Whole-wheat 25 CEREALS Warburtons CANADA bread: Farinograph Extensograph 574.8 20 TexVol Alberta Wheat CANADIAN Sask Wheat AGRICULTURAL Universit 15 PARTNERSHIP 428.4 MANITOBA CROP 10 culture and Food Canada **FPGenetics** ALLIANCE 282.0 5

1.5

Specific loaf

(SLV, cm<sup>3</sup>g<sup>-1</sup>)

volume

Dough stability

during mixing

(DS, minutes)

Ratio of dough

extensibility (R/E)

resistance to

2.0

free asparagine concentration.

2.5

3.0

R/E

3.5

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

4.0

4.5

## 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)