

Acrylamide-forming capacity of different flours in heated glucose/flour systems

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INTRODUCTION & AIM

Wheat flour is the primary ingredient in the recipes of traditional cereal-based foods. However, new products using other flours to enhance food properties are being explored by food companies. Innovative formulations can modify or improve the nutritional and sensory parameters of bakery products but can also affect the formation of potentially harmful compounds such as acrylamide¹⁻³. This study aimed to assess the acrylamide forming capacity during the baking process of different flours, considering both the type of flour and the addition of glucose to a dough model system.

METHOD

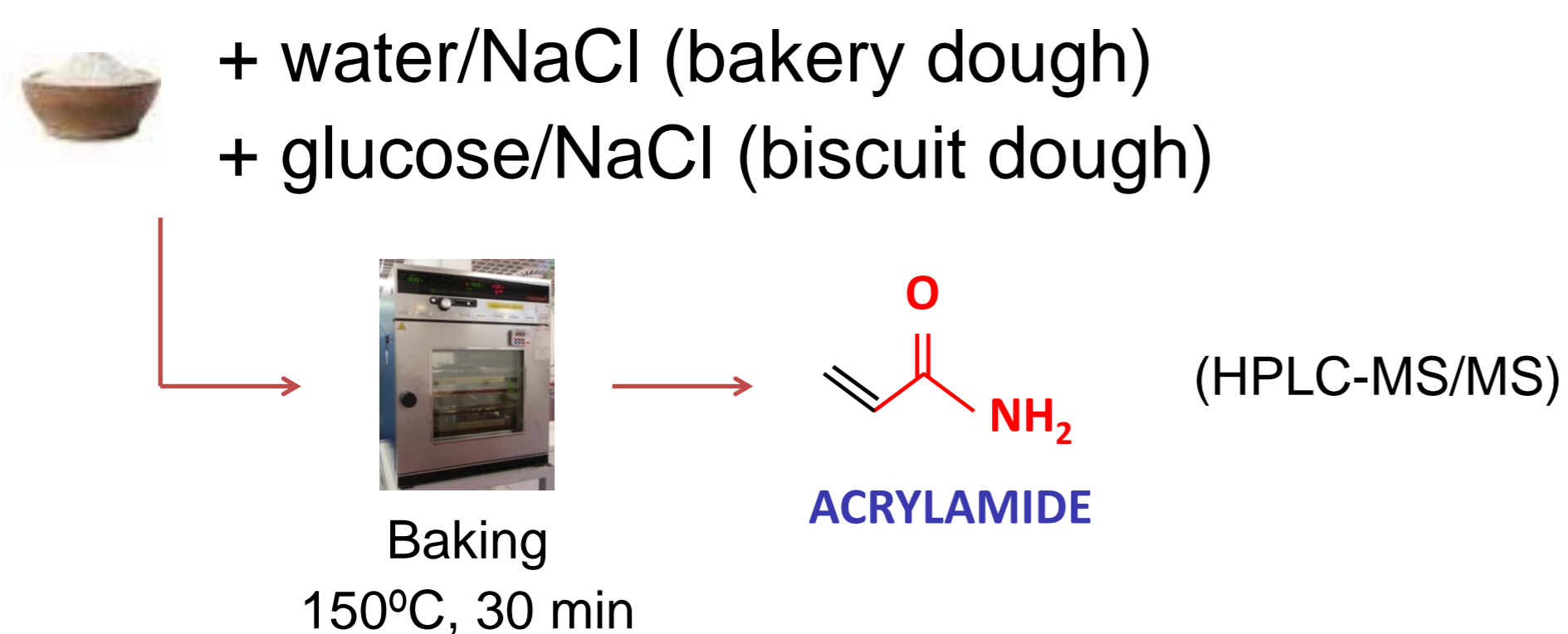
16 flour samples 

- Cereals: wheat, durum wheat, rice, corn, teff, rye, oat, spelt
- Pseudocereals: buckwheat, quinoa
- Legumes: soybean, lentil, chickpea
- Fruits: coconut, chestnut
- Roots: cassava

Acrylamide precursors:

- reducing sugars (DNS)
- free asparagine (HPLC)

Acrylamide-forming capacity:

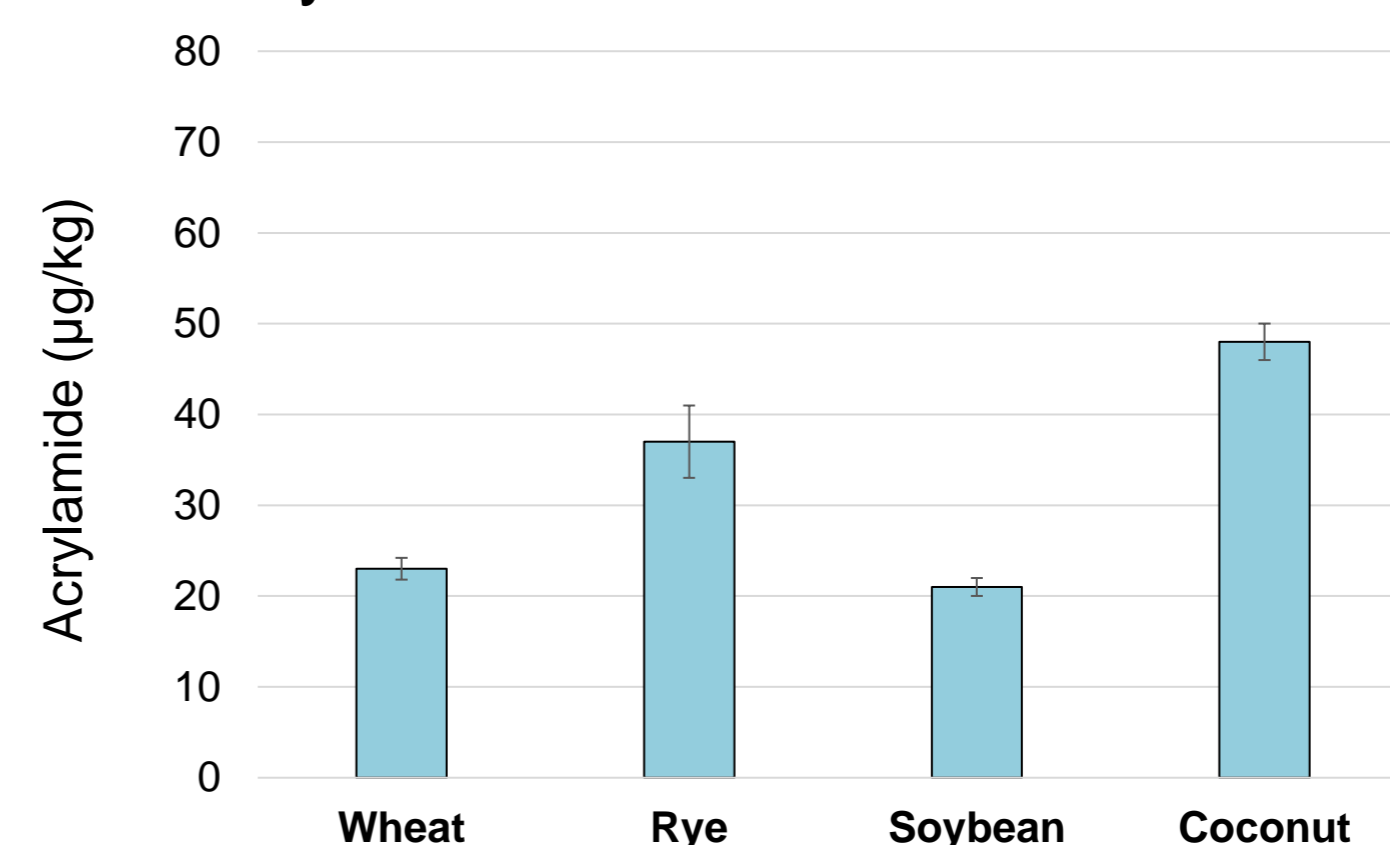


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RESULTS & DISCUSSION

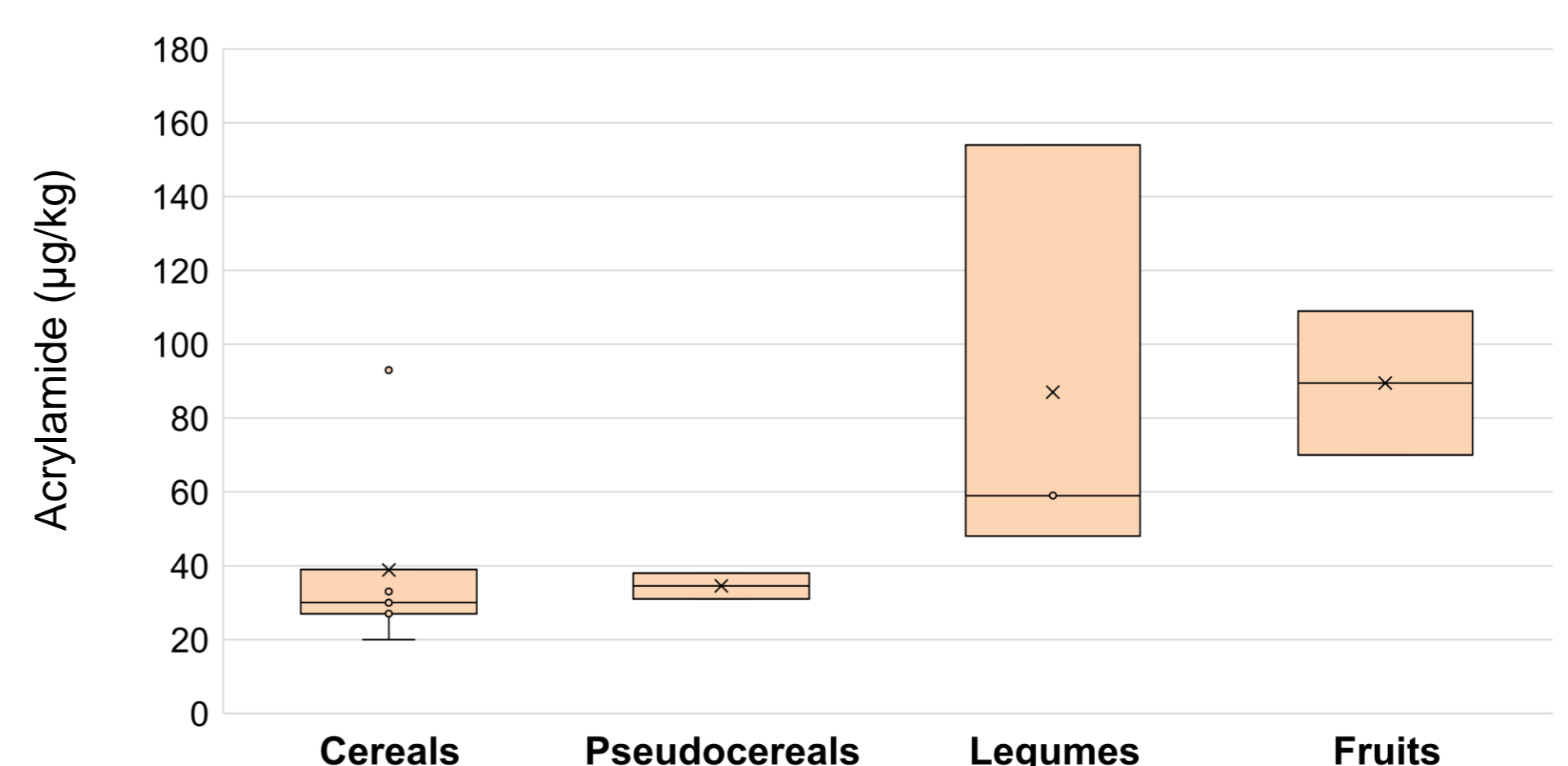
Only the water systems formulated with wheat, rye, soybean and coconut flours exhibited detectable acrylamide levels, ranging from 21 to 48 µg/kg.

Figure 1. Acrylamide levels in flour-water-NaCl system



The addition of glucose increased acrylamide formation in all the systems except in cassava formulations, where it was not detected. The highest levels were found in lentils flour (154 µg/kg) and the lowest concentrations in corn flour (20 µg/kg).

Figure 2. Acrylamide levels in flour-glucose-NaCl system



CONCLUSION

Careful consideration should be given to the potential formation of acrylamide in new food products made with alternative flours rather than traditional wheat flour, particularly concerning food safety aspects.

FUTURE WORK / REFERENCES

- ¹ Musa et al. (2024). LWT, 203, 116365.
- ² Przygodzka et al. (2015). J Cereal Sci 65, 96-102.
- ³ Portman et al. (2021). Legume Sci 3, e78.