RHEOLOGICAL PROPERTIES OF ORANGE FLESHED SWEET POTATO, PUMPKIN AND WHEAT BLENDED FLOUR DOUGHS AND QUALITY CHARACTERISTICS OF BREADS

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INTRODUCTION

- Orange–fleshed sweet potato (OFSP) and pumpkin can improve the nutritional benefits and eating quality of wheat composite bread.
- However, incorporating these gluten-free flours can impact on the dough and bread quality properties.
- This study aimed to optimize wheat-OFSP-pumpkin dough and bread quality properties using a response surface methodology (RSM).

MATERIALS & METHODS

- I-optimal (combined) design of RSM of the Design-Expert software version 11 (Stat-Ease Inc., Minneapolis, United States) was used for the experimental design.
- A total of 27 experimental trials were created with 5 lack of fit, 5 replications and a repeated central point.
- Wheat flour (A) was replaced with OFSP (B) and pumpkin flour (C) in the limits of 10–50% and pumpkin 10–40% respectively.
- Baking temperature was 150–200 °C and baking time of 15–25 min.
- Bread preparations, dough and bread quality measurements were performed using International Association for Cereal Science and Technology standard methods.

RESULTS AND DISCUSSION

- OFSP and pumpkin flour significantly (p<0.001) decreased optimum water absorption (OWA) and degree of softening (DOS) but increased dough development time (DDT) and stability time (Fig. 1).
- Average OWA, DDT, stability and DOE ranged between 50.8–60.1%, 2.2–29.2 min, 6.0–50.0 min and 9.0–138.0 BU respectively.
- OFSP and pumpkin flour decreased loaf volume and specific volume but increased crumb hardness (Fig. 3).
- High baking temperatures (190–200 °C) hardened the crust of bread and minimized moisture loss and hence reduced crumb hardness.
- Crumb redness (a*) and yellowness (b*) increased while lightness (L*) decreased as OFSP and pumpkin flour increased.

CONCLUSION

- The optimum rates of OFSP and pumpkin flour in wheat flour for bread making were 33 % and 12% respectively and baking at 160–180 °C for 15-17 min produced bread with good qualities.

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