Effects of Long-term Storage on Quality of Wheat Packaged in No. 10 Cans

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ABSTRACT

Starch and related nutritional quality parameters of thirteen samples of hard red wheat (including 5 duplicates) were evaluated. Samples, which were obtained from donors, were packaged in hermetically sealed No. 10 cans in reduced oxygen atmospheres and stored at ambient temperatures. Can headspace oxygen was measured using a 1018 Series Hach Oxicorder Analyzer. Cans were stored in a humidity-controlled room with a relative humidity of 80% and sample age at 5, 8, 9, 10, 12, 13, 14, 17, 24, 27, 29, and 32 years.

Wheat was ground using a Quadramat Jr. laboratory mill, and aged in closed paper bags for two weeks. Bread was then made according to AACC Method 74-09 (AACC International 2000), except strain was decreased to 25% and trigger force increased to 10 g. Dough was mixed for 10 minutes on low speed with a dough hook, and then fermented at 30 ºC and 85% relative humidity with pinching down after 52, 77, and 90 min. Dough was shaped into loaves, and proofed for 33 minutes in a 10 × 20 cm loaf pan. Loaves were baked at 200ºC.

Overall Acceptability

Texture

Sensory analysis was performed using a 9-point scale. The acceptability of the bread was determined by a sensory panel consisting of 50 panelists. The sensory panel was conducted at the Brigham Young University. The bread was evaluated based on overall acceptability, texture, flavor, and aroma.

RESULTS AND DISCUSSION

Wheat Quality

Wheat moisture content was low enough in all samples to prevent mold growth (Table 1) (Wang and Flores 1999). CIE L* value, which can be used to determine the acceptability of wheat to consumers, was 7.0-7.5 for all samples. CIE L* value was not correlated with sample age. CIE L* value did not change significantly with age.

Baking Quality

Baking quality, as measured by loaf volume and firmness, ranged from 425 to 775 g (Figure 4), and also was not correlated with wheat age. These results may be due to the use of a new oven and different sources of flour, which may have affected the results.

CONCLUSIONS

In conclusion, the storage of wheat, some aspects of kernel (increases in free fatty acids and mold growth) and quality changes (e.g., flavor and overall acceptability) were determined. However, sensory results indicated that bread made from stored wheat maintained a high degree of acceptability for use in emergency and everyday situations. Baking quality, as measured by loaf volume and firmness, did not decrease with age, which is encouraging. These results show that while wheat stored under ideal conditions throughout the study remained highly acceptable to consumers, and is therefore useful to include in food storage regimens.

REFERENCES


