Quality of cornmeal stored long-term in a low oxygen atmosphere

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INTRODUCTION
The U.S. Department of Homeland Security encourages efforts to be prepared for natural disasters and other emergencies, including the storage of food (FEMA, 2006). The American Red Cross also recommends that food be stored for use during disasters (Arnold, 2005). Cornmeal can be stored in No. 10 cans with a low oxygen atmosphere that has been established as a safe shelf life for disasters, but the effect of long-term storage on quality is unknown. This study examines the effect of long-term storage up to 33 years at ambient temperatures in a low oxygen atmosphere.

METHODLOGY
Samples
Twelve samples of yellow, degermed cornmeal packaged in No. 10 cans ranging in age from <1 to 33 years were obtained from private donors. The cornmeal and products made from the cornmeal (combined and cornmeal hot cereal) were evaluated by a 50-member consumer panel using a 9-point hedonic scale for attributes including appearance, aroma, texture, flavor, and overall acceptability. Acceptability for everyday use and emergency situations was also determined. Additional measurements included can headspace oxygen, can sweetness, color, and water activity.

Sensory Evaluation
Taste profile tests were performed on two panels conducted on cornmeal, combined, and cornmeal hot cereal. Cornmeal was prepared for sensory evaluation. Cornmeal hot cereal was made using 10% (wt/vol) NaOH. Fifteen mL of isobutanol was used for headspace oxygen determinations. Headspace oxygen levels in cans of cornmeal were determined using a Sable Systems Instruments, Inc. (Orem, Utah) colorimeter.

Cornmeal thiamin values ranged from .38 to 1.2 g/g. Cornmeal stored up to 33 years.

Thiamin
Cornmeal thiamin values ranged from 38 to 12 mg/g except for Sample 28 which contained 4.3 mg/g (Fig. 5). Thiamin concentration significantly increased with increasing sample age. According to CFR P1 137.260, enriched cornmeal is required to have between 4.2 to 4.4 mg/g of thiamin per serving. These sample labels declared that the cornmeal was enriched and the thiamin content of 20 mg. Feeding trials indicated cornmeal ranges from 90 to 99 % headspace oxygen in cans of cornmeal hot cereal from 6.0 to 7.7 for overall acceptability.

CONCLUSIONS
There was a lack of corn meal stored in restaurant store. The cornmeal was considered acceptable for use in an emergency situation by at least 92% of the panelists for cornmeal, 94% of panelists for cornmeal hot cereal, and 96% of panelists for cornbread. Also, thiamin concentrations were found to be stable over time.

Cornmeal can be an important part of a long-term food storage plan because of its stability when properly packaged and stored.

REFERENCES