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Quality of dehydrated whole egg packaged in No. 10 cans
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ABSTRACT
Dehydration reduces egg mass and in-home shelf life without significantly altering most functional properties. This has created a demand for dehydrated whole egg in military rations, emergency food, personal storage, personal emergency kits, and travel kitchens. A review of research sources indicates that dehydrated egg products are not standardized and compared by sensory or functional properties. The objective of this study was to investigate the quality of selected brands of dehydrated whole egg commercially packaged in No. 10 cans.

Eight brands of dehydrated whole egg were obtained from food retailers. All but one brand were labeled using a low oxygen environment. A 58-member consumer panel evaluated appearance, aroma, flavor, texture, and overall acceptability using a 9-point hedonic scale. Other observations included color of egg solids, can headspace oxygen, can seam quality and water activity.

Headspace oxygen ranged from 0.28 to 18.8% with a significant difference found from 3.5 to 6.4. During package evaluation between brands, flavor and color were most important attributes. Headspace oxygen was inversely related to overall acceptability scores. A significant difference in flavor values was observed with less than half the brands having >2% oxygen. Water activity ranged from 0.16 to 0.42. The brand which scored highest in overall acceptability had the lowest headspece oxygen suggesting a detrimental effect on shelf life. Although all samples were purchased immediately before the study, the can coded indicated a 2-year age difference between brands. This was reflected in panel results. The quality of dehydrated whole egg available for retail sale was wide, as diverse quality of packaging. Manufacturers need to adhere to good manufacturing practices and buyers should be aware of product variability between brands.

RESULTS AND DISCUSSION
Headspace oxygen, can seam, and water activity
Headspace oxygen ranged from 0.2 to 18.8%, with 5 of 8 brands having >2% oxygen (Fig. 1). Headspace oxygen did not correlate with can seam quality, oxygen induced color, powder color or headspace aroma. All cans were acceptable (data not shown). The majority of cans were scored 'good.' Water activity ranged from 0.16 to 0.42 (Fig. 2). The maximum recommended water activity of unpreserved dried egg is 0.10 (Labuza and Rahman 1999), but 5 of 8 brands had a mean water activity above this critical level for egg stability.

Sensory analysis and color
Moderate scores for overall acceptability ranged from 3.5 to 6.3 with significant differences between brands (Fig. 3). A significant difference in overall acceptability was observed between brands (Fig. 3). The overall acceptability of one brand was scored by Brand 8, which had visual gelling in the dry solid state and after reconstitution and cooking. Headspace oxygen ranged from 0.28 to 18.8%. Although all samples were purchased immediately before the study, the can coded indicated a 2-year age difference between brands. This was reflected in panel results. The quality of dehydrated whole egg available for retail sale was wide, as diverse quality of packaging. Manufacturers need to adhere to good manufacturing practices and buyers should be aware of product variability between brands.

CONCLUSIONS
The sensory quality of dehydrated whole egg available for retail sale in No. 10 cans varies widely. Buyers should be aware of product variability between brands of dehydrated whole egg and should be selective when purchasing dehydrated whole egg.

REFERENCES

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INTRODUCTION
During the development of a sensory analysis procedure, many studies focused on product quality and storage life of dried eggs (Lightbody and Fevold 1948). Since that time there have been major advances in the production and packaging of dehydrated egg products (Gnadt and Ogden, 1993). However, there is a lack of research in the field of dehydrated egg product quality, in spite of the current use of whole dehydrated egg in military rations, emergency relief programs and personal storage. Because the product shelf life is not immediately apparent, the buyer may be unaware of product quality until long after purchase. The objective of this study was to evaluate the appearance, aroma, flavor, texture, and overall acceptability using a 9-point hedonic scale. Sensory evaluation and color

METHODOLOGY
Samples
Eight brands of dehydrated whole egg were obtained from food retailers representing manufacturers in 8 states. All but one brand was labeled using a low oxygen environment. Can seams differed in flange size but were similar in year and month. The can code indicated a 2-year age difference between brands. This was reflected in sensory panel results. The quality of dehydrated whole egg available for retail sale was wide, as diverse quality of packaging. Manufacturers need to adhere to good manufacturing practices and buyers should be aware of product variability between brands.

Headspace oxygen, can seam and water activity
Headspace oxygen was inversely related to overall acceptability scores. A significant difference in flavor values was observed with less than half the brands having >2% oxygen. Water activity ranged from 0.16 to 0.42. The brand which scored highest in overall acceptability had the lowest headspece oxygen suggesting a detrimental effect on shelf life. Although all samples were purchased immediately before the study, the can coded indicated a 2-year age difference between brands. This was reflected in panel results. The quality of dehydrated whole egg available for retail sale was wide, as diverse quality of packaging. Manufacturers need to adhere to good manufacturing practices and buyers should be aware of product variability between brands.