2003-07-01

Quality of dehydrated whole egg packaged in No. 10 cans

T.A. Gnadt

Lynn V. Ogden

See next page for additional authors

Follow this and additional works at: https://scholarsarchive.byu.edu/facpub

Part of the Food Science Commons, and the Nutrition Commons

Original Publication Citation
Gnadt, TA Ogden, LV Pike, OA. Quality of dehydrated whole egg packaged in No. 1 cans. Poster presentation. Annual Meeting of the Institute of Food Technologists in Chicago.

BYU ScholarsArchive Citation
Gnadt, T.A.; Ogden, Lynn V.; and Pike, Oscar A., "Quality of dehydrated whole egg packaged in No. 10 cans" (2003). All Faculty Publications. 68.
https://scholarsarchive.byu.edu/facpub/68

This Poster is brought to you for free and open access by BYU ScholarsArchive. It has been accepted for inclusion in All Faculty Publications by an authorized administrator of BYU ScholarsArchive. For more information, please contact scholarsarchive@byu.edu, ellen_amatangelo@byu.edu.
Authors
T.A. Gnadt, Lynn V. Ogden, and Oscar A. Pike

This poster is available at BYU ScholarsArchive: https://scholarsarchive.byu.edu/facpub/68
Quality of dehydrated whole egg packaged in No. 10 cans

T. A. Gnadt, L. V. Ogden and O. A. Pike

Department of Nutrition, Dietetics and Food Science, Brigham Young University, Provo, UT 84602

ABSTRACT

Dehydration reduces egg mass and in order to store life without significantly affecting most functional properties. This has created demand for dehydrated whole egg as an ingredient, for use in areas where refrigeration is unavailable or impractical. To investigate this new demand, 8 different brands of dehydrated whole egg were purchased from a variety of suppliers. The objective of this study was to investigate the quality of several brands of dehydrated whole egg commercially packaged in No. 10 cans.

Eight brands of dehydrated whole egg were obtained from food outlets. All but 1 brand were labeled as having a low oxygen environment. A 9 member consumer panel evaluated appearance, aroma, flavor, texture, and overall acceptability using a 9-point hedonic scale. Other attributes were scored using a 5-point sensory panel.

Headspace oxygen ranged from 0.28 to 18.8% with 5 of 8 brands having > 2% oxygen. Headspace oxygen did not correlate with can quality, sensory evaluation, method, powder color or hedonic scores. All cans scored acceptable (data not shown). The majority of cans were rated ‘good.’ Water activity ranged from 0.16 to 0.42. The maximum recommended water activity of unpreserved dried egg is 0.16 to 0.30 (Eliahu and Rahnemo 1999), but 5 of 8 brands had a mean water activity above this level excluding one brand.

RESULTS AND DISCUSSION

Headspace oxygen, can seam, and water activity

Headspace oxygen ranged from 0.28 to 18.8%, with 5 of 8 brands having > 2% oxygen. Headspace oxygen did not correlate with can quality, sensory evaluation, method, powder color or hedonic scores. All cans scored acceptable (data not shown). The majority of cans were rated ‘good.’ Water activity ranged from 0.16 to 0.42. The maximum recommended water activity of unpreserved dried egg is 0.16 to 0.30 (Eliahu and Rahnemo 1999), but 5 of 8 brands had a mean water activity above this level excluding one brand.

Sensory analysis and color

Sensory scores for overall acceptability ranged from 5.7 to 8.2 with significant differences between brands (Fig. 3). Appearance, flavor, and texture scores were similar to overall acceptability scores. The lowest score for all parameters tested was received by Brand D, which was 3 years old as indicated by the can code. Brand E scored highest in overall acceptability followed by Brand C. The negative correlation between water activity and overall acceptability score (Fig. 5) suggests the importance of controlling water activity during production of dehydrated egg. Likewise, the negative correlation between water activity and Hunter L* color (data not graphed in Fig. 7) indicates the critical nature of water activity in preventing browning in dehydrated egg. Finally, the positive correlation between Hunter L* values and overall acceptability shown in Fig. 6, an example of reputed quality, best product was scored highest by consumer panelists.

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. Manufacturers need to adhere to good manufacturing practices and buyers should be aware of product variability between brands.

INTRODUCTION

During the development of whole egg dehydration procedures, 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 whole egg (Gonzalez and Colthart 1995). However, there is a lack of recent research on dehydrated whole egg quality. In style of the common use of whole dehydrated egg in military rations, emergency relief efforts and personal food 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 quality of various brands of dehydrated whole egg commercially packaged for retail sale in No. 10 cans.

METHODOLOGY

Samples

Eight brands of dehydrated whole egg were obtained from food stores representing manufacturers in 8 states. All but 1 brand were labeled as having a low oxygen environment. Can seams indicated 2 years life from the can year. Three brands did not have a manufacturing analysis report. The can year on one indicator indicated the can was 1 year old. Duplicate samples (2 cans) were analyzed for each brand.

Headspace oxygen, can seam and water activity

Headspace oxygen was measured using a simplified version of the method described by Vickers et al. (1976). Headspace oxygen was measured using each can by cutting a 1/2 inch by 1 inch slot in a can seam and a 1/4 inch by 1 inch slot in the center of the can. A 6 inch length of polyethylene tubing was inserted through the slot in the can seam to aspirate the air from the headspace, and a 6 inch length of polyethylene tubing was inserted through the slot in the can center to aspirate the air from the center. Both lines were aspirated into a gasometer which was used to convert the volume of air aspirated into percent oxygen. Headspace oxygen was measured for all samples.

Water activity was measured using a Series Headscope SA 30, manufactured by Tristar Instruments, Inc. (Bloomington, IL). Water activity was measured using a 15-millimeter diameter metal ring to obtain an averaged reading of the can.

Sensory evaluation and color

Sensory analysis was conducted at the BYU Sensory Laboratory using standard procedures. Panelists were recruited from university employees and members of the local community. Each panelist scored eight brands of dehydrated whole egg. Both panelists were approximately 20 year old males and were approximately equal representation of age groups from 20 to 60 years. Samples were scored in double-blind and scored on a 9-point hedonic scale. The maximum recommended water activity of unpreserved dried egg is 0.16 to 0.30 (Eliahu and Rahnemo 1999), but 5 of 8 brands had a mean water activity above this level excluding one brand.

Data analysis

Data were analyzed for significance using ANOVA. Analysis of variance (F-test) was used to determine if differences in sensory data were statistically significant (Snedecor and Cochran 1956). Both analyses and Duncan’s Multiple Range Test were used to determine if differences were statistically significant. Differences were defined as 0.05.