



Assessment of consumer perceptions, preferences, and behaviors with fluid milk from different packaging



Paterson, M¹., S. Clark¹, M. Bozic³, K. Prusa¹, C. Strobehn²

¹Food Science and Human Nutrition Department, and ²Apparel Events and Hospitality Management Department, Iowa State University, Ames, IA 50011, ³Department of Applied Economics, University of Minnesota, St. Paul, MN 55108

Abstract

- The study compared consumers' purchasing habits, preferences and acceptance of skim and 2% milk samples from translucent plastic and paperboard packaging.
- Eleven consumer panels (n=100) were conducted. Consumers participated in a survey and sensory evaluation of skim and 2% milk samples from translucent plastic and paperboard packaging, all exposed to light.
- A trained panel (n=9) evaluated 6 attributes of all milk samples using a 15 cm line scale.
- The results from the trained panel and consumer panel acceptability scores were analyzed using one-way ANOVA. Significant differences were found in the trained panel evaluation (p<0.05), but no significant differences were found in consumer preference tests or acceptability tests (p>0.05).

Introduction

- When milk sits in the lighted refrigerated dairy case, the light can initiate a chemical reaction that can cause a flavor defect¹ and decrease of vitamin A and riboflavin in milk packaged in translucent plastic packaging².
- With other packaging options available (paperboard and lightblock plastic), manufacturers want to know if consumers notice the difference and if changing to a different packaging type would accommodate consumers' preferences better.
- Consumer perceptions of packaging and oxidized milk, based on purchasing behavior, sensory evaluation and education, will help the dairy industry to determine if trying new packaging is necessary.

Materials & Methods

Trained Panel

- Panelists were recruited from the Food Science Department or Dairy Products evaluation team and were ultimately chosen based on ability and availability.
- Nine panelists were trained using modified Quantitative Descriptive Analysis of six attributes (cooked, feed, flat, foreign, lacks freshness and oxidized). Ten one-hour training sessions were conducted with two mock evaluations
- Panelists evaluated samples simultaneously with consumer panels.

Milk Sample Preparation

- Milk samples were received from Schroeder (directly from warehouse; samples stored in dark), two days after production, and held at 4° C in a commercial refrigerator until use.

- On the day of the panels, all milk (in original containers) were exposed to fluorescent light at 1300 lux for 1 h prior to serving¹.

Consumer Panels

- Consumers were recruited through online postings, emails, flyers and word of mouth. The criteria were to be 18 years or older and consume/purchase milk weekly.
- Consumers (n=100) first signed consent forms and then filled out a survey with questions about purchasing and consumption behavior as well as demographics.
- Consumers were then served 4 milk samples in two sets (skim plastic, skim paper, 2% plastic, 2% paper) and indicated preference in each pair and acceptability on a 7-point hedonic scale.
- Consumers also tasted 2 "certified fresh taste" samples (2% and skim in lightblock) and were able to make comments about their liking for each.

Results & Discussion

- Trained panelists recognized the oxidized attribute at higher levels in skim and 2% plastic (Tables 1 & 2) than skim and 2% lightblock packaging (p<0.05). Oxidized scores for milk in paper and lightblock packaging were not significantly different (p>0.05).

Table 1. Trained panel oxidized scores for skim milk.

Treatment	Oxidized Score [†]
Skim Plastic	5.8 ^a
Skim Paper	3.0 ^{ab}
Skim Lightblock	2.4 ^b

Table 2. Trained panel oxidized scores for 2% milk.

Treatment	Oxidized Score [†]
2% Plastic	5.1 ^a
2% Paper	0.3 ^b
2% Lightblock	2.1 ^b

^{a,b} within a column, significant differences exist when scores do not share the same letter (p<0.05)
[†] Scored on a 15cm line scale

- Consumers did not prefer milk from translucent plastic over milk from paperboard (p>0.05; data not shown).
- There were no differences in consumers' acceptability scores (p>0.05) (Table 3).
- Additionally, when consumers tasted "certified fresh" samples, >50% indicated positive comments.

Table 3. Consumers' acceptability scores for milk samples

Treatment	Acceptability score [†]
Skim Paper	4.7 ^a
Skim Plastic	4.8 ^{ab}
2% Plastic	4.9 ^{ab}
2% Paper	5.2 ^b

^{a,b} within a column, significant differences exist when scores do not share the same letter (p<0.05)
[†] Scored on a 7-point hedonic scale; 1=dislike very much, 7=like very much

- 46% of consumers surveyed purchase skim milk, but sensory scores indicated that only about half of consumers gave skim milk higher acceptability scores (Figure A).
- 83% of consumers surveyed buy plastic packaging, but only about half of those consumers gave plastic a higher acceptability score (Figure B).
- Of consumers who purchase skim milk, 23% indicated purchasing it for nutritional aspects (Figure C).
- Of consumers who purchase skim milk, 13% indicated purchasing it for flavor (Figure D).

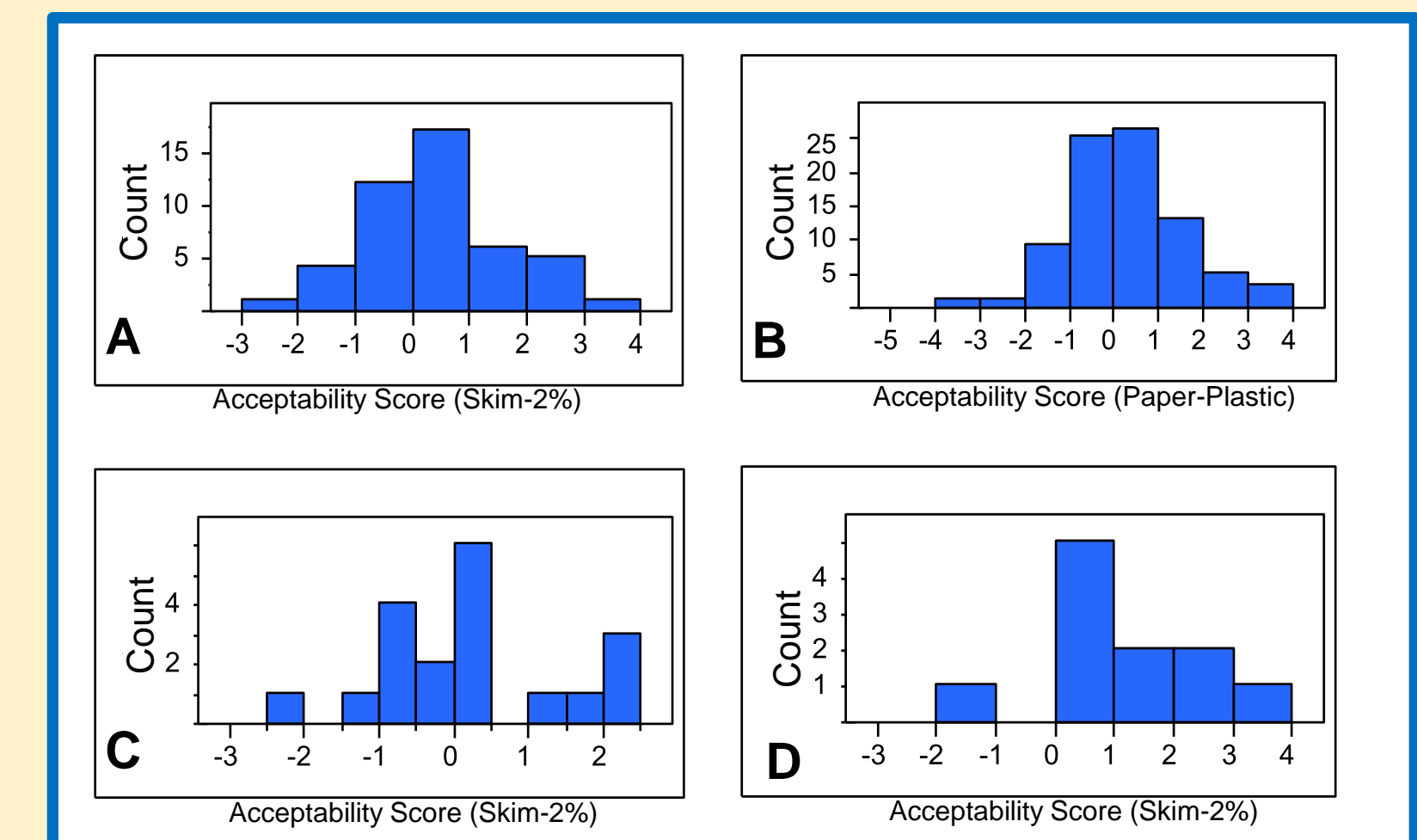


Figure 1. Distribution of consumer average acceptability scores A) Skim milk purchasers B) Plastic packaging purchasers C) Purchase skim milk for nutrition D) Purchase skim milk for flavor

Conclusion

- Trained panelists were able to detect the oxidized attribute in milk from translucent plastic that had been exposed to light at 1300 lux for 1 h (p<0.05).
- Consumers did not prefer milk from one type packaging over another, which was supported by non-significant differences in acceptability scores (p>0.05).
- Consumers' purchasing behaviors and perceptions of fluid milk do not always align with their sensory preference and acceptance of milk samples when samples are served to them unidentified.

References

- Chapman, K. W., L. J. Whited and K. J. Boor. 2002. Sensory threshold of light-oxidized flavor defects in milk. J. Food Sci. 67:2770-2773.
- Fox, P.F., P.L.H. McSweeney. 1998. Dairy chemistry and biochemistry. Pages: 269, 277-279.