

Consumer Knowledge and Use of Dates on Product Packaging: Results of a Web-Based Survey

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 Presented at The 93rd Annual International
 Association for Food Protection Meeting,
 Calgary, Alberta, Aug. 13-16, 2006
 RTI International is a trade name of Research Triangle Institute.

1. Introduction

Consumers are increasingly relying on ready-to-eat (RTE) foods because they are convenient, quick, and easy (EPM, 2004). RTE foods have long, refrigerated shelf lives and are usually consumed without reheating. RTE foods often have open dates (i.e., calendar dates) to help consumers know by when to purchase or use RTE foods for best quality.

Currently, no federal regulations or guidelines govern how open dates are established or validated. Open dates are generally established by food manufacturers to indicate a product's shelf life and are not meant to indicate microbiological food safety. If an open date statement is used, the U.S. Department of Agriculture (USDA) requires food manufacturers to include both the month and day of the month (and the year for shelf-stable and frozen products). USDA also requires a phrase explaining the meaning of the date, such as "sell-by" or "use-by" (USDA, 2001).

To characterize consumer knowledge and use of open dates for specific refrigerated RTE foods (e.g., smoked seafood; cooked crustaceans; bagged salads; pre-washed, cut produce; soft cheeses; frankfurters; deli meats; fermented sausages; and deli salads), we conducted a nationally representative Web-enabled survey (n = 2,060).

USDA's Definitions of Open Date Statements

A **"Sell-By"** date tells the store how long to display the product for sale. Consumers should buy the product before the date expires.
 Source: USDA, 2001.

A **"Best-if-Used-By (or Before)"** date is recommended for best flavor or quality. It is not a purchase or safety date.

A **"Use-By"** date is the last date recommended for use of the product while at peak quality. The date has been determined by the product manufacturer.

2. Purpose

The purpose of our study was to collect information on a wide range of home storage and handling practices for specific refrigerated RTE foods. Storage and handling practices include consumers'

- knowledge of open dates,
- opinions on the most important factor in deciding whether to eat a refrigerated food product, and
- use of open dates before purchasing RTE foods,
- opinions on the most useful open date,
- use of open dates before preparing or serving RTE foods,

3. Study Design

We surveyed a nationally representative sample of the U.S. population aged 18 years and older using a Web survey approach. The sample was selected from a Web-enabled panel developed and maintained by Knowledge Networks (Menlo Park, CA). The Web-enabled panel was designed to be representative of the U.S. population (Couper, 2000) and was based on a list-assisted, random-digit-dial sample drawn from all 10-digit telephone numbers in the United States. Panel members were provided with free Internet hardware and free Internet access.

From the panel of 28,090 individuals, we used a stratified systematic sampling approach to select 2,428 individuals aged 18 years and older to receive the survey. The survey was sent via e-mail to selected individuals, and two e-mail reminders were sent to nonrespondents to encourage participation. To minimize respondent burden, we split the questionnaire into two versions; each respondent randomly received one of the two versions. We received a total of 2,058 completed surveys (i.e., 85% completion rate).

The survey data were weighted to reflect the selection probabilities of sampled units and to compensate for differential nonresponse and undercoverage. We calculated weighted frequencies for each survey question using the SAS version 8 software package (SAS Institute, Inc., 1999).

4. Results

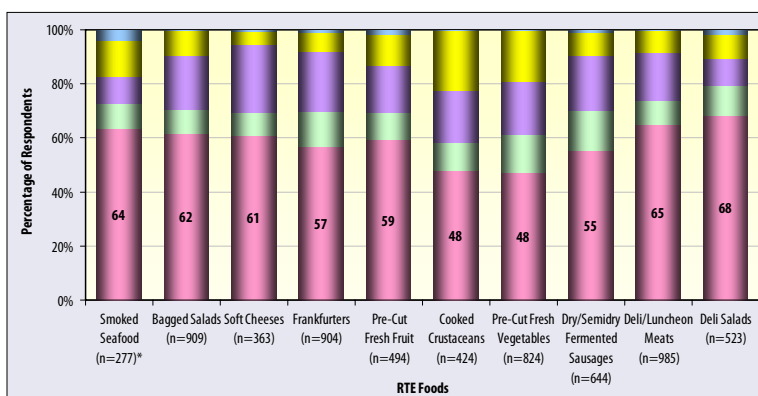
Use of Open Dates before Purchasing RTE Foods

USDA recommends that consumers look for open dates and purchase RTE foods before open dates expire (USDA, 2001). In our study, respondents' use of open dates before purchasing RTE foods varied by type of product.

- About 60% of respondents check open dates all or most of the time for smoked seafood, bagged salads, soft cheeses, frankfurters, pre-cut fresh fruit, fermented sausages, deli meats, and deli salads.
- Less than half of respondents check open dates all or most of the time for cooked crustaceans and pre-cut fresh vegetables.
- About 20% of respondents rarely or never check open dates on most RTE foods.
- About 10% of respondents have not seen open dates on most RTE foods. Respondents reported not seeing open dates most often on cooked crustaceans (22%) and pre-cut vegetables (18%).

Figure 1. Check Open Dates Before Purchasing RTE Foods

■ No Response
 ■ Have Not Seen Dates
 ■ Rarely or Never
 ■ Some of the Time
 ■ All or Most of the Time



*n = Number of respondents who purchased the RTE food.

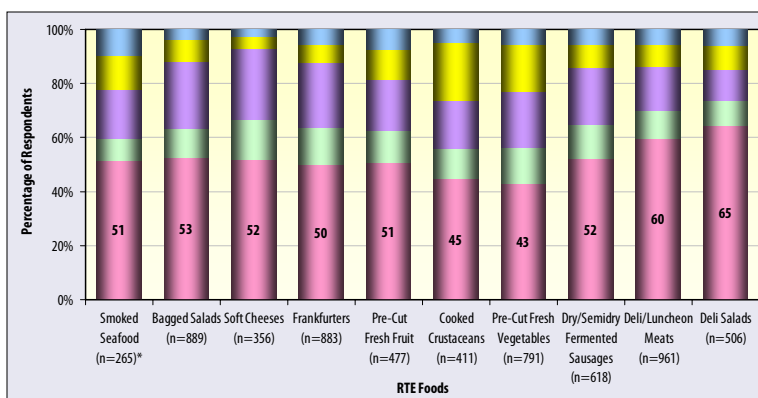
Use of Open Dates before Preparing or Serving RTE Foods

Our survey findings suggest fewer respondents check open dates before preparing or serving RTE foods.

- About 60% of respondents check open dates all or most of the time before preparing or serving deli meats and/or deli salads.
- About half of respondents check open dates all or most of the time for other RTE foods asked in the survey.
- About 20% of respondents rarely or never check open dates on most RTE foods.

Figure 2. Check Open Dates Before Preparing or Serving RTE Foods

■ No Response
 ■ Have Not Seen Dates
 ■ Rarely or Never
 ■ Some of the Time
 ■ All or Most of the Time



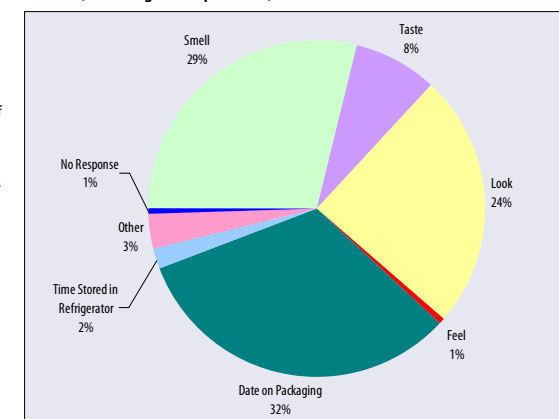
*n = Number of respondents who prepared the RTE food.

Most Important Factor when Deciding Whether to Eat a Refrigerated Food Product

Storing RTE foods at 40°F or below and consuming RTE food as soon as possible can reduce consumers' risks of illness from *Listeria monocytogenes* by more than 50% (U.S. Food and Drug Administration, USDA, Centers for Disease Control and Prevention, 2003). Because open dates are not meant to be indicators of microbiological food safety, and because consumers cannot rely on their senses to detect foodborne bacteria, consumers should follow recommended food storage times, such as those provided in USDA's Cold Storage Chart (USDA, 2006).

- Almost two-thirds of respondents reported their senses (taste, smell, sight, and touch) were the most important factors when deciding whether to eat a refrigerated food.
- About one-third of respondents reported that an open date is the most important factor when deciding whether to eat a refrigerated food.
- Less than 2% of respondents rely on the length of time the product has been stored in the refrigerator when deciding whether to eat a refrigerated food.

Figure 3. Most Important Factor When Deciding Whether to Eat a Refrigerated Food Product (Percentage of Respondents)

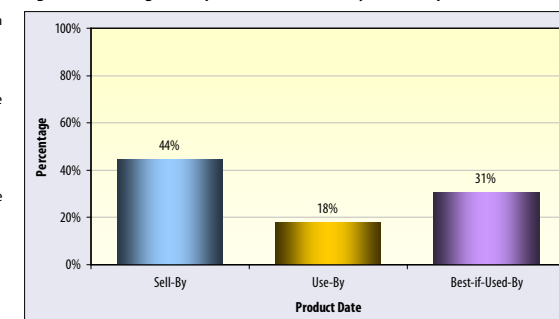


Knowledge of Open Dates

Consistent with previous consumer research on open dating (Cates et al., 2004; Labuza & Szybist, 1999), many respondents do not know the meanings of the different types of open dates.

- Less than half of respondents correctly defined the "sell-by" date, and fewer respondents correctly defined the "use-by" (18%) and "best-if-used-by" (31%) dates.
- More than half of respondents have the misconception that the "use-by" date indicates the last date recommended for safe consumption of a product. This misperception may lead to a false sense of security, particularly if products have suffered temperature abuse.

Figure 4. Percentage of Respondents Who Correctly Defined Open Dates



Most Useful Open Date

Open dates help consumers know by when to purchase or use RTE foods for best quality, not for microbiological food safety.

Our survey findings suggest that almost half of respondents think the most useful open date is one that provides information on the last date recommended for safe consumption of the product.

Few consumers think the sell-by and best-if-used-by dates are useful.

Table 1. Most Useful Open Date

| | Percentage of Respondents |
|---|---------------------------|
| Tells the consumer the last date recommended for safe consumption of the product | 49 |
| Tells the consumer the date by which to discard the product | 22 |
| Tells the consumer the last date recommended for use of the product while at peak quality | 11 |
| Tells the consumer the date recommended for best flavor or quality | 8 |
| Tells the store how long to display the product for sale | 4 |
| Tells the consumer the last date recommended to maintain the product's nutritional value | 4 |
| No response | <1 |
| Other | <1 |
| Total | 100 |

5. Discussion

Consistent with previous research on open dating (Cates et al., 2004; Labuza & Szybist, 1999), many survey respondents use open dates before purchasing RTE foods, but less than half of respondents understand the meanings of the different types of open dates. In particular, many respondents have the misperception that open dates are an indicator of microbiological food safety. Such misperceptions may lead to a false sense of security, especially if products have suffered temperature abuse. The survey findings, coupled with previous research, suggest that consumers could benefit from education regarding open dating. For open dating to be useful, consumers must understand the meaning of the different types of open dates (e.g., use-by vs. sell-by), what information can be gleaned from open dates, and how to use this information to inform product storage decisions.

Respondents mostly prefer an open date that provides information on the last date recommended for safe consumption of the product. This finding is consistent with previous focus group research, in which most participants wanted an open dating system adopted in which all products display the same date statement, preferably a use-by date (Cates et al., 2004). As a result of the *L. monocytogenes* risk assessment, the federal government is evaluating the usefulness of establishing safety-based use-by dates to reduce the risk of foodborne listeriosis. Application of safety-based use-by dates, however, has many practical limitations at the manufacturer level, such as the numerous RTE products in the marketplace, the lack of accurate information on initial levels and growth rates of *L. monocytogenes* for many products, and the lack of a food safety objective tied to a public health goal (National Advisory Committee on Microbiological Criteria for Foods, 2005).

We found that many respondents follow the unsafe practice of relying on their senses when deciding whether to eat a refrigerated food. Few respondents rely on the length of time the product has been stored in the refrigerator. These findings suggest that consumers may not be familiar with the recommended storage times for different RTE products. Thus, there is a need to educate consumers about recommended storage times for different refrigerated foods (USDA, 2006) and to use or discard foods before the recommended time. Because both storage time and temperature are important in controlling the growth of foodborne pathogens, such as *L. monocytogenes*, consumer education efforts on recommended storage times and open dating should be coupled with refrigerator temperature education efforts.

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This work was partially funded through a grant from the National Integrated Food Safety Initiative of the Cooperative State Research, Education, and Extension Service (CSREES), U.S. Department of Agriculture (Grant No. 2004-51110-02177). All views expressed here are those of the authors and not necessarily of CSREES, USDA.