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Public Perception of Irradiated Food
CIRM 2011

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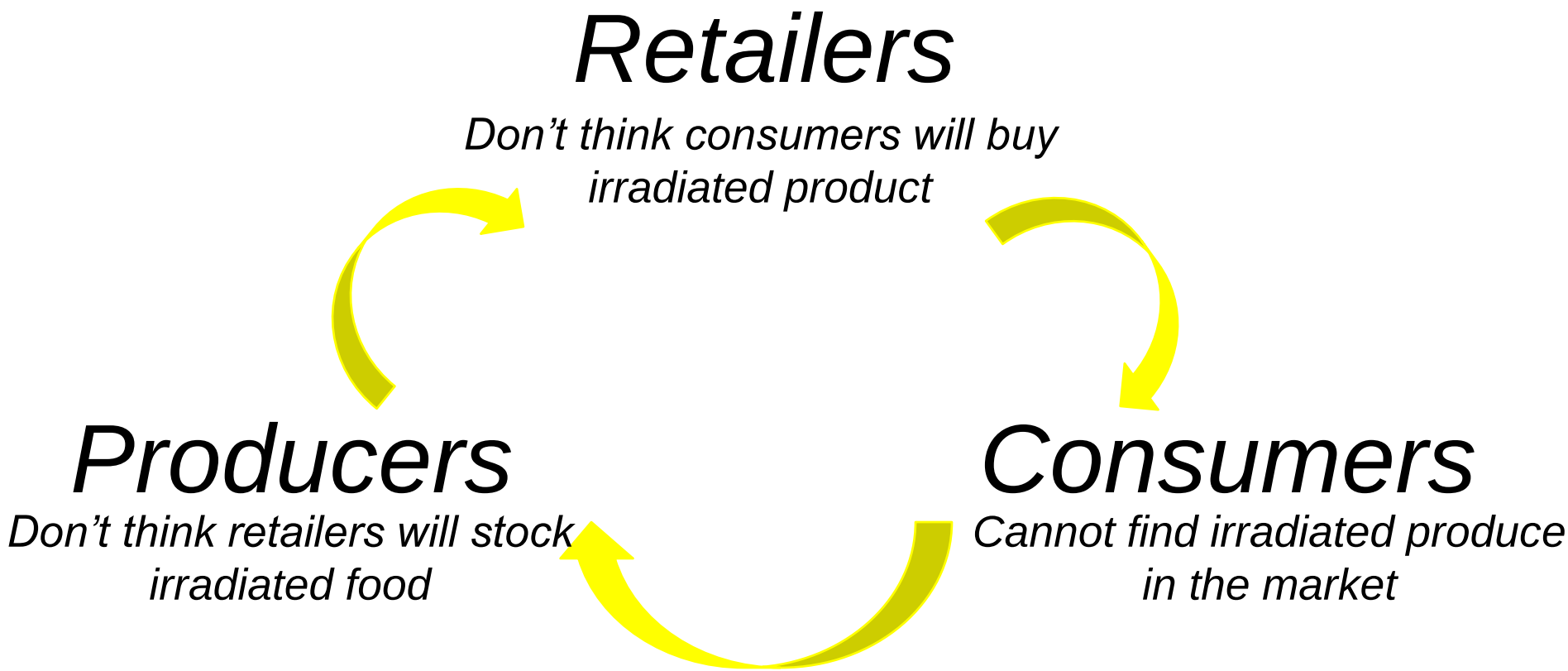
Food Science Program

Where’s the catch?



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Consumer acceptance

- Driven by risk perception
  - Whether risk is voluntary or involuntary
  - Perception that consequences of a hazard are relatively unknown to experts
  - Uncertainty is being “hidden” by regulators or industry
  - Perception that risk may affect health, the environment, or worker safety
  - Moral and ethical worries
  - Perceived benefits

Socio-demographic and economic factors

- Some college education
- Household income > $30,000
- Men
- Knowledge about irradiation
- Positive or neutral for most
- A minority are opposed
- Consumers more accepting in developing countries

Rollins et al., 2011 Trends in Food Sci & Tech. 22; Frenzen et al JFP 2001

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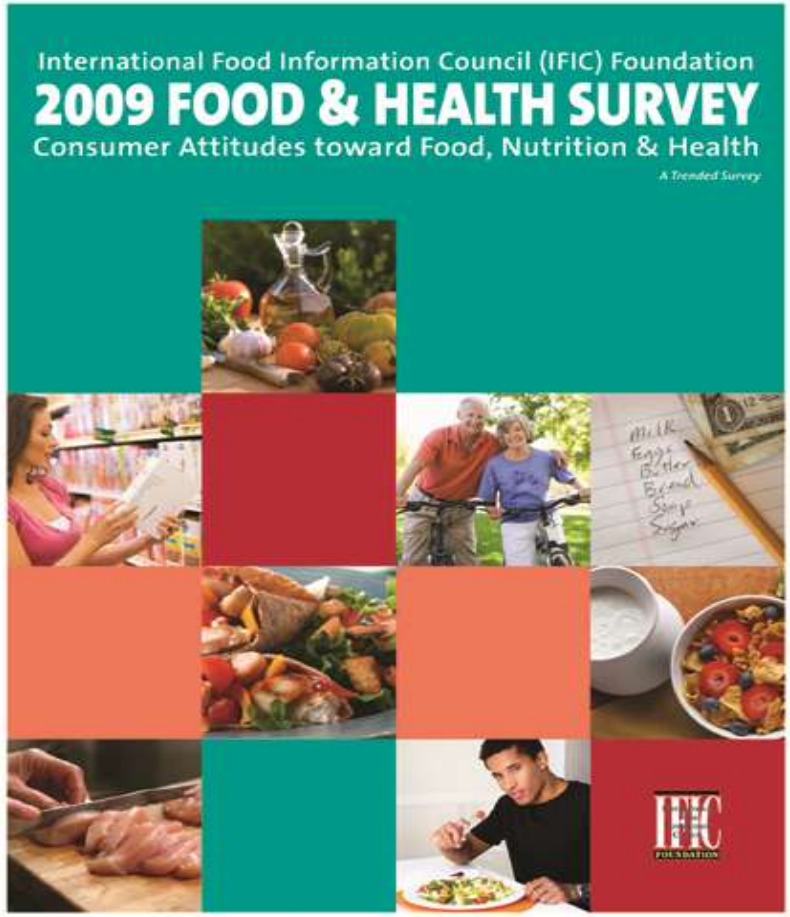
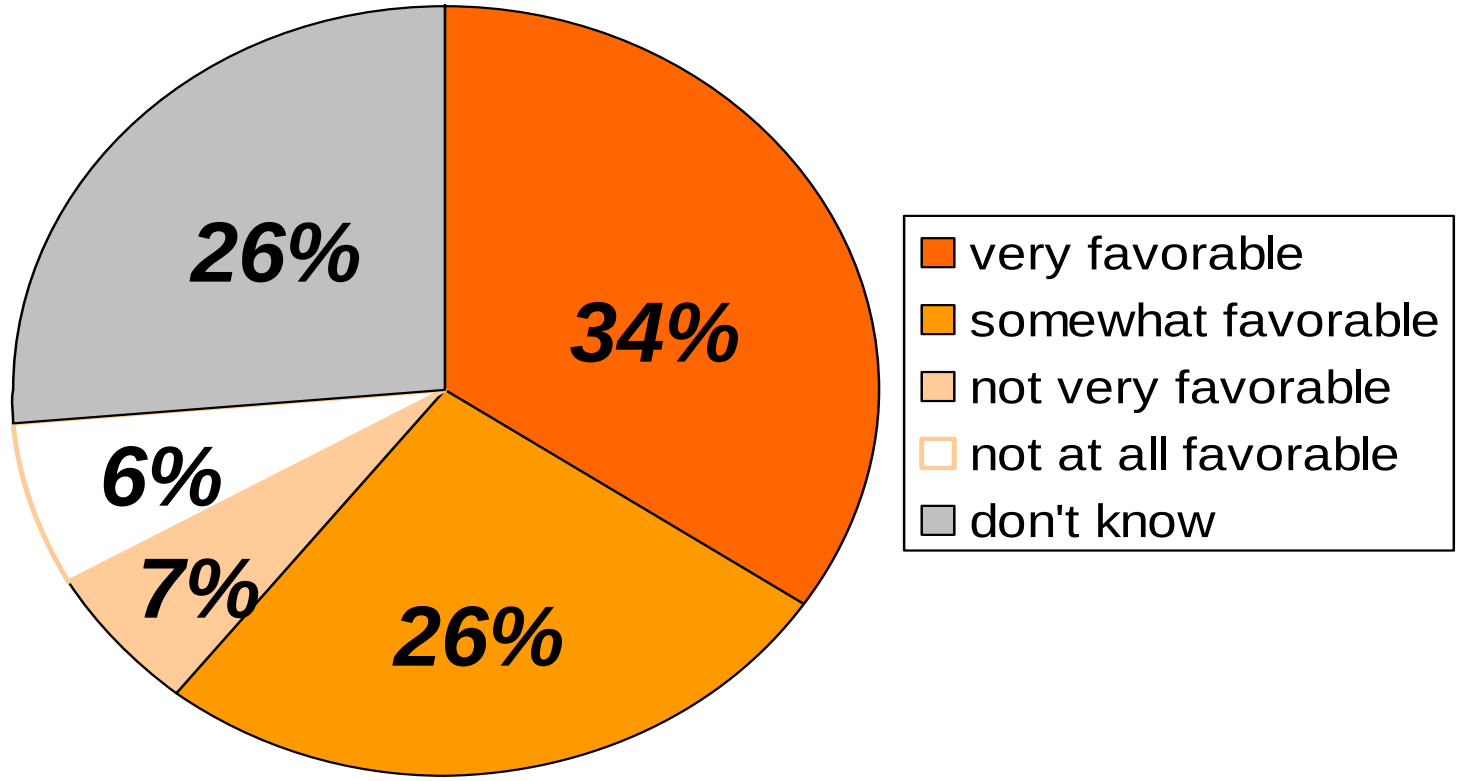
2009 Food & Health Survey



- Quantitative, n=1000
- Questions on irradiation posed for the first time

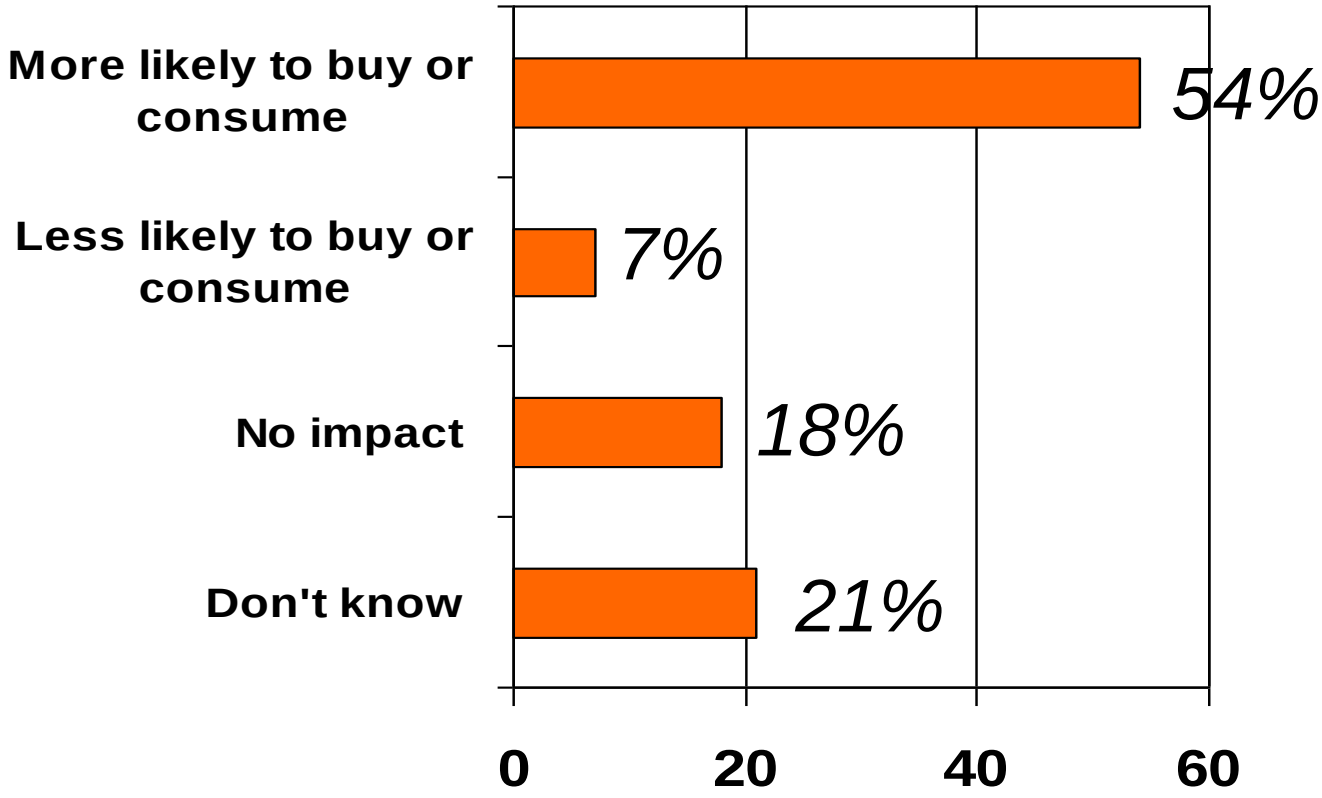
In general, how favorable are you toward the idea of food irradiation?

n=1064



2009 IFIC Foundation Food and Health Survey

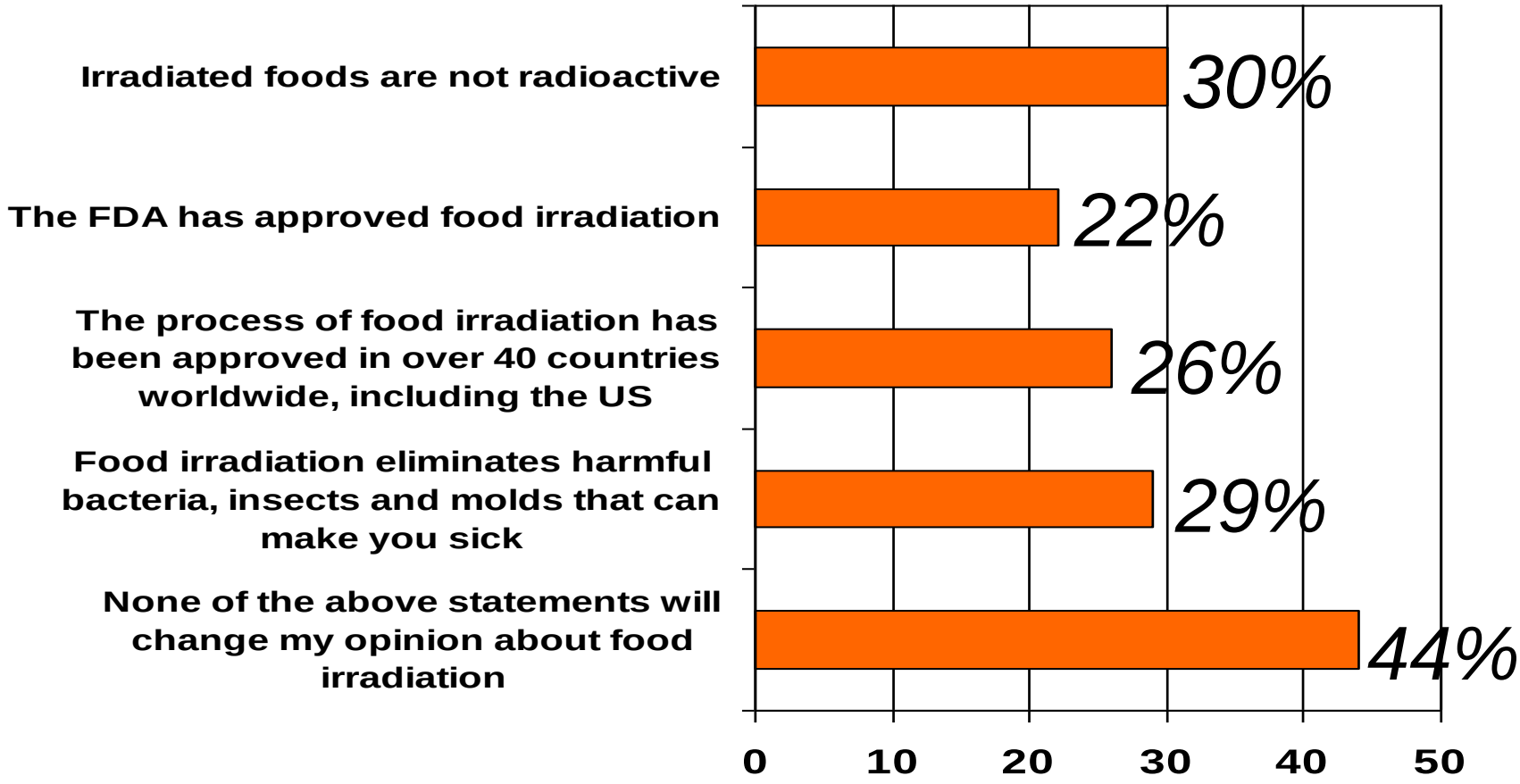
If you knew that irradiated food was safer to eat than non-irradiated food, what impact would that have on your decision to buy and consume the food? n= 1064



2009 IFIC Foundation Food and Health Survey

Which of the following statements, if any, would improve your opinion of food irradiation? Select all that apply.

n=143



2009 IFIC Foundation Food and Health Survey

Knowledge

- Information can have positive, negative, or no effect on consumer perception
- While knowledge does not guarantee positive attitudes, lack of knowledge can serve as a major barrier towards acceptance
- Media has a direct effect
- Trust in the source of information
- Labeling: ????
- Brazilian study: Radura symbol “transmits the sensation of confidence and safety”
- (*Junqueirra-Goncalves et al., 2011, Radiat Phy Chem*)

Perceived benefits

- Perceived risks outweigh perceived benefits
- Risk benefit ratio is different in different countries
- Advantages are seen to benefit industry
- Personal benefits are not obvious except during times of high profile outbreaks or for imported foods
- Availability
- Price
- Convenience
- Specialty and ethnic foods
- Sensory attributes

Irradiated papayas in Brazil

Deliza et al., 2010, J. Sensory Studies

- Retail environment
- Papayas were labeled
- Price was known
- Consumers were able to evaluate the appearance of the papayas
- Acceptance, willingness to purchase
- Appearance was the most important factor
- Irradiation was a negative factor but if appearance was good, irradiation did not matter as much.
- Education and information about irradiation improved consumer acceptance

People buy foods, not technologies

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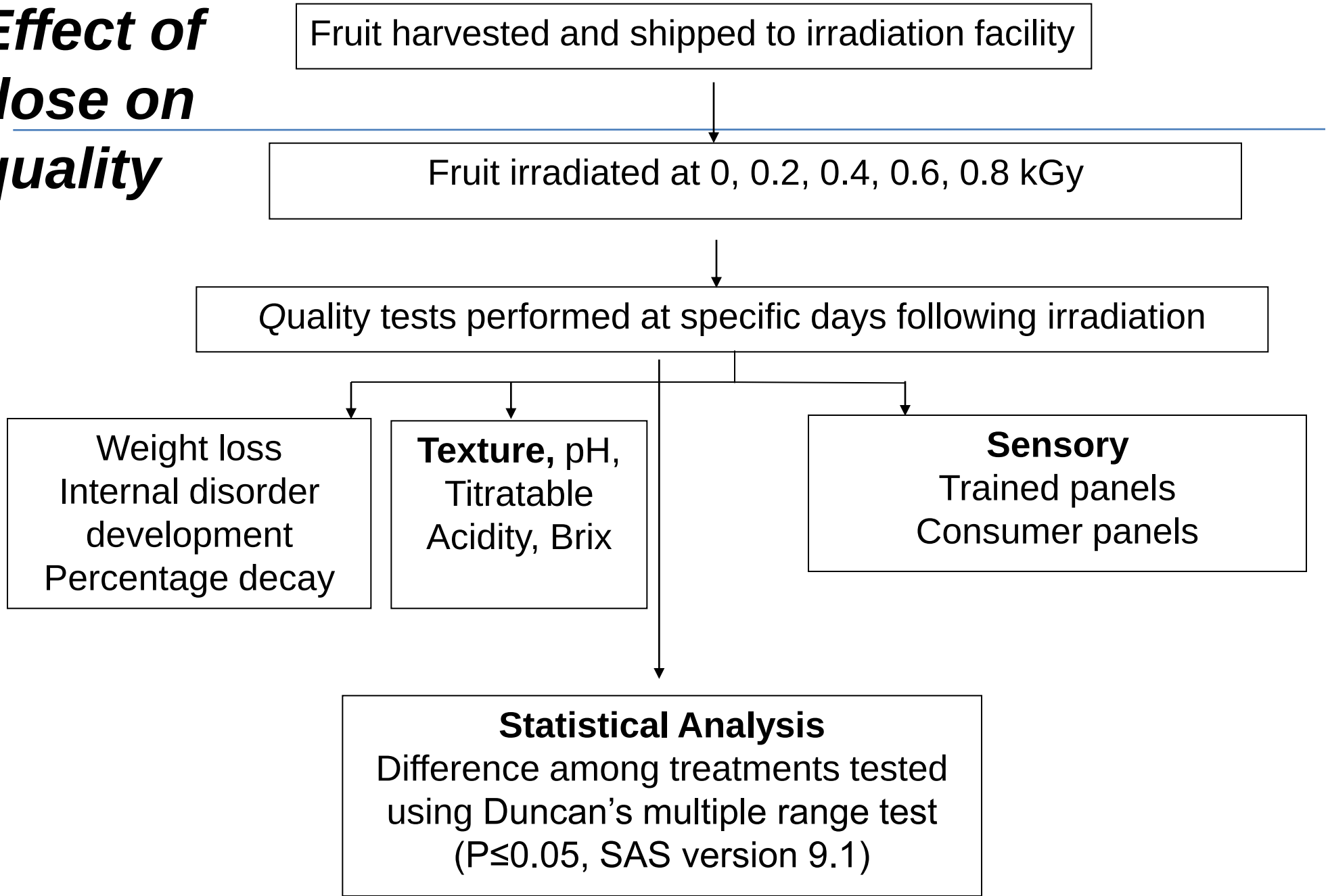
Sensory evaluation, consumer acceptance, and consumer perception

Sensory evaluation is used to evoke, measure, analyze, and interpret reactions to characteristics of foods and materials as they are perceived by the senses of sight, smell, taste, touch and hearing

- The sensory experience plays a key role in a consumer's food choice
- As we optimize the sensory attributes the value perceived by the consumer increases
  - trial purchase
  - experience
  - repeat purchase

Effect of dose on quality



Two types of sensory tests

- Analytical= Type and degree of difference
- Acceptability= Do you like it?

Trained Panels

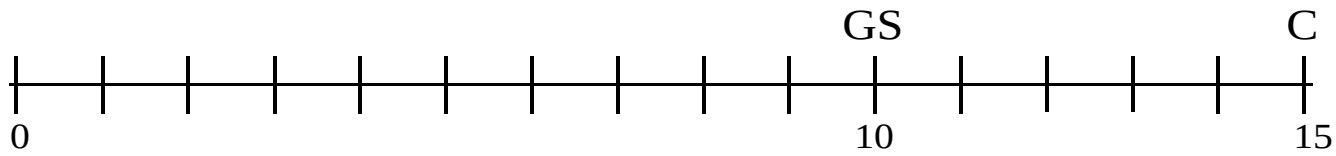
Questions of Interest	Type of Panelists
How do products differ in specific attributes?	Trained for ability to distinguish differences and determine intensity of product attributes
Magnitude of differences	5-20+ panelists needed

Trained Panel Peach attributes

Appearance	Aroma	Texture	Flavor
Smoothness	Overall Peach Aroma	Firmness Whole	Overall Peach Flavor
Bruising		Firmness Cut	Sweet
Flesh Color		Skin Firmness	Tart
		Mealiness	
		Ripeness	
		Juiciness	

Texture

Firmness to Touch – use fingertips to evaluate whole peach



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Consumer Panels

Question of Interest	Type of Panelists
How well are products liked or which products are preferred?	Screened for product use, untrained
	50-50,000 panelists needed

Consumer Test Methodology

75-100 consumers of fruit

Attributes: Overall Appearance, Overall Flavor, Overall Texture, Overall Liking, Preference

9 point hedonic scale

1. Considering ALL characteristics (Appearance, Flavor, and Texture) indicate your **OVERALL OPINION** by checking one box.

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

Dislike Extremely nl/nd Like Extremely

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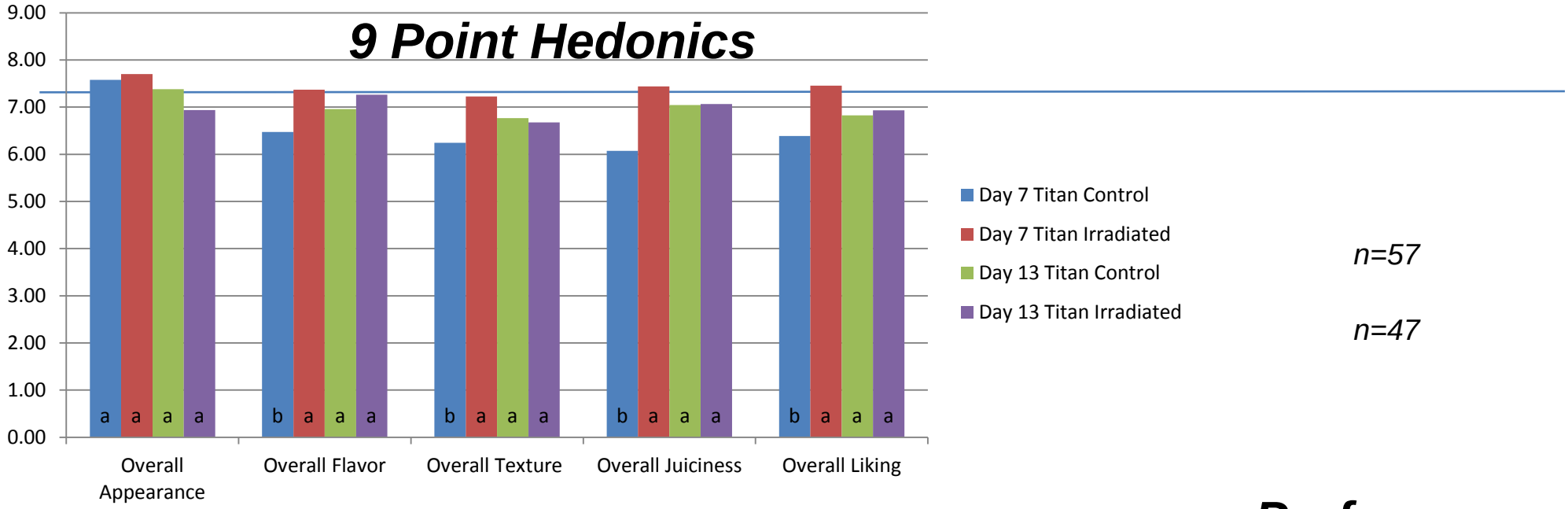
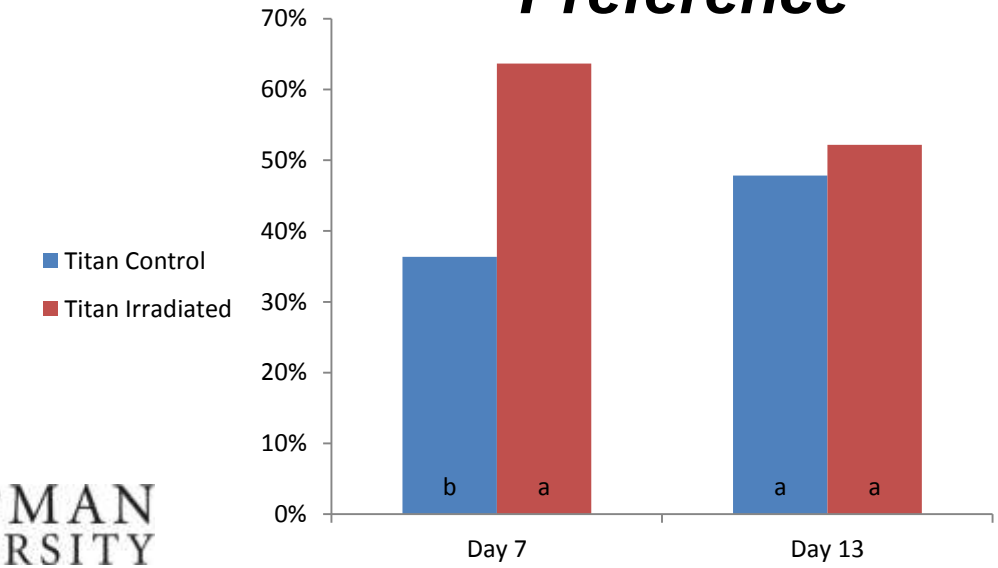
Consumers preferred Irradiated Peaches





Navel oranges after 28-day storage

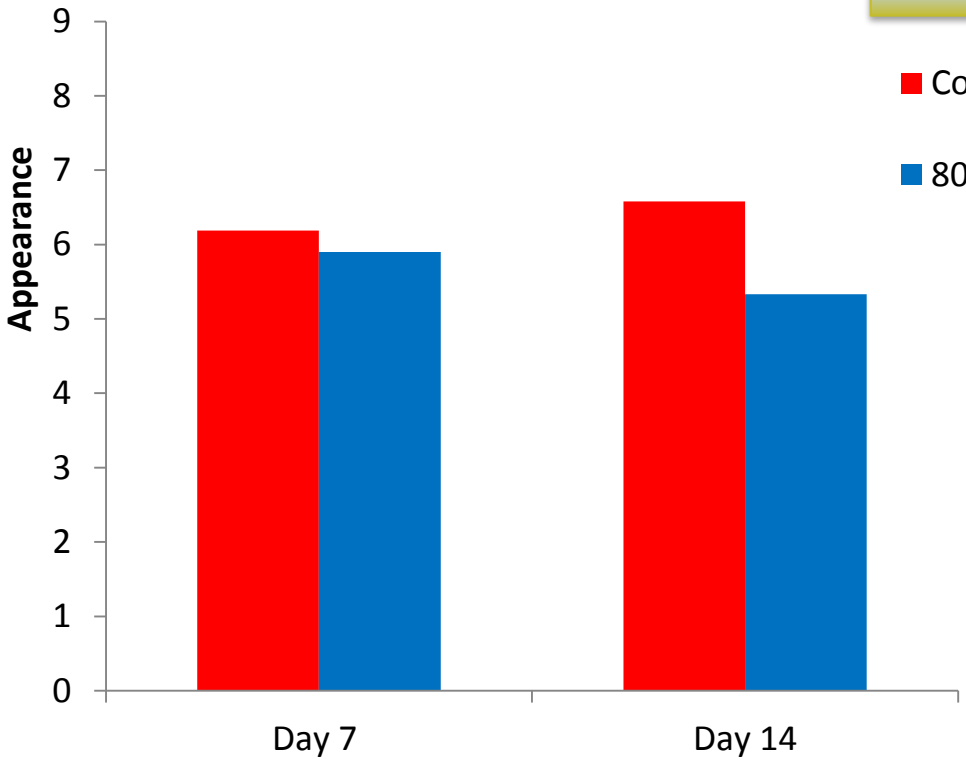
stored at 3 C

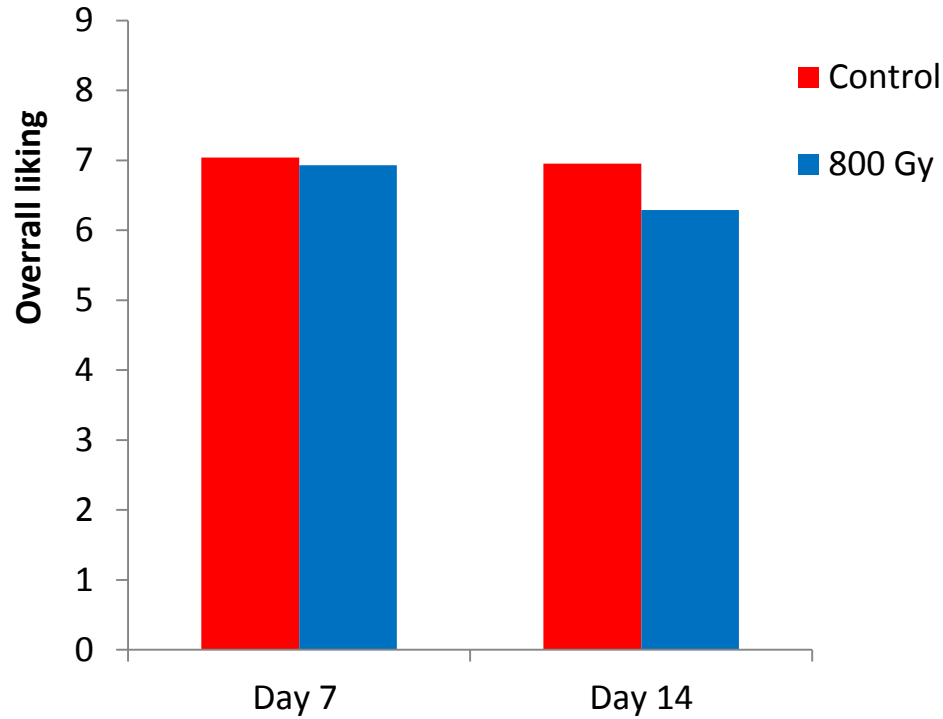
commercial storage

Control ***0.2KGy*** ***0.4KGy*** ***0.6KGy***

Bartlett Pears

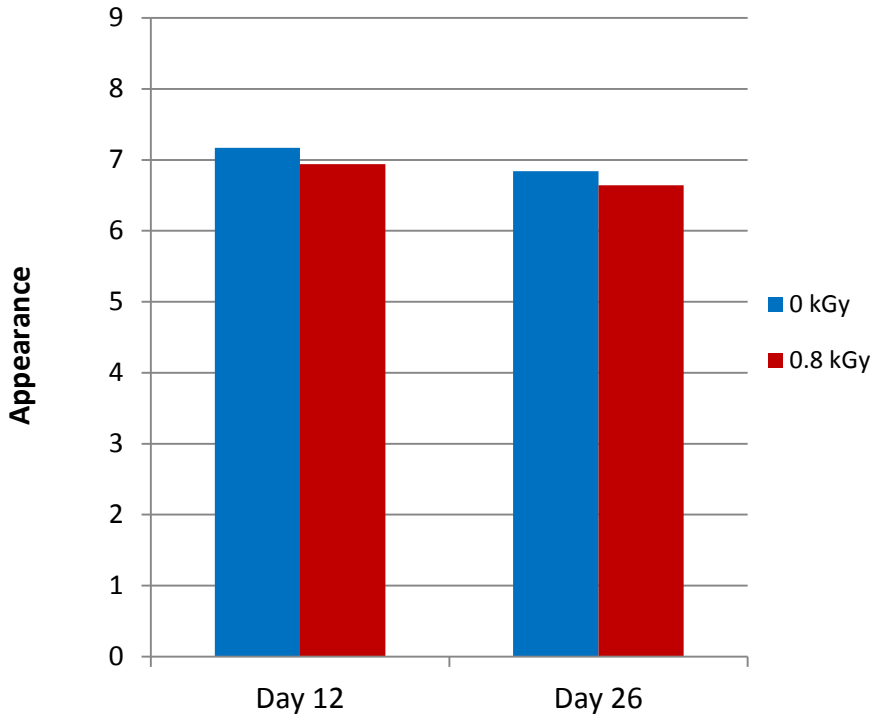
Control ***0.8 kGy***

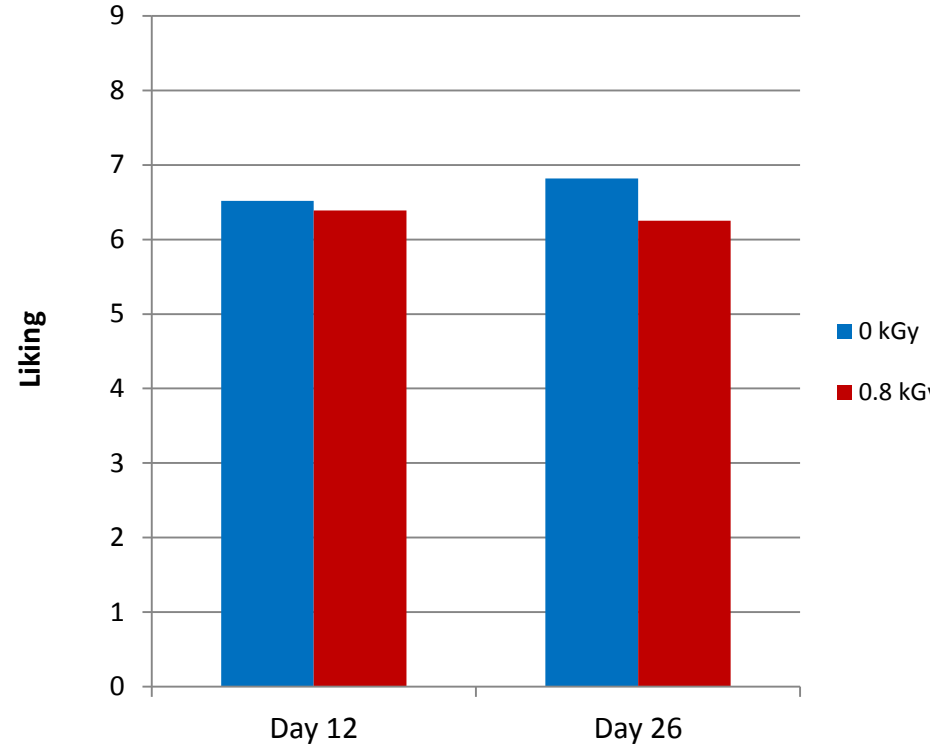




Blueberries stored at 3 C

Consumer evaluation of blueberries





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Beyond survey research

- Consumers need to see and taste irradiated product
- Market tests must be combined with sensory evaluation
- Be transparent-label the product
- Consumers respond positively when informed
- Focus on the product and its benefits, rather than the technology: increased safety, insect disinfestation
- Emphasize that it is used on top of other techniques as a necessary risk reduction strategy
- Use people/institutions that the public has trust in
- Educate supermarket CEOs, managers, and clerks
- Outreach to growers, producers, and distributors

Summary

- People purchase and eat irradiated food
- Most (but not all) will buy when given the opportunity

Perceived lack of consumer acceptance !

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