Mapping Consumer Trends in Food and Agriculture Technologies

William K. Hallman, PhD
Chair/Professor
Department of Human Ecology
Rutgers University

JIFSAN – April 23, 2014
Genetic Engineering

• Agricultural products can be improved in a faster, more accurate way.

• GE allows scientists to select specific genetic traits from one plant or animal and insert them into the genetic code of another plant or animal.

• The process permits the transfer of genetic material between species that is not possible using conventional methods.
What to Call this Process?

• Genetic Engineering?
• Genetic Modification?
• Biotechnology?

• What you call it matters.
• Much of the world calls it GM, and its products GMOs
Rapid Adoption Worldwide

- GM crops have been adopted faster than any other crop technology in the history of modern agriculture.
Rapid Adoption in the US

- The United States remains the largest producer of GM agricultural products
  - More than 170 million acres planted in GM crop varieties
  - US harvests about 43% of the world's GM crops.
Adoption of genetically engineered crops in the U.S.

Percent of planted acres

Data for each crop category include varieties with both HT and Bt (stacked) traits.
Genetically engineered varieties of corn, upland cotton, and soybeans, by State and for the United States, 2000-12

US Crop Estimates - 2012

Genetically engineered varieties of corn, upland cotton, and soybeans, by State and for the United States, 2000-12
Other GM Crops in the US

- Herbicide Resistant Alfalfa
- Virus Resistant Squash and Papaya
Prevalence of GM Ingredients

• The U.S. government does not track nor trace GM ingredients.
• GM varieties are mixed with the non-GM varieties when stored.
• Corn, soy, sugar, and canola are three of the most common ingredients in processed foods.
• The majority of soy, corn, canola, and sugar beet used in processed foods is genetically modified.
• It is likely that most of the processed foods you eat contain GM ingredients.
Products that Might Contain GM Ingredients

- Soda, juice, candy, cookies, sweet snacks or any other product that contains corn components or corn syrup.
- Products containing sugar from sugar beets
  - 54% of the sugar sold in the US is from sugar beets.
- Food with soy-based flavorings, vegetable broth, hydrolyzed vegetable proteins, foods that contain gums or starches.
- Canola oil or products that contain canola ingredients.
- Products containing cotton seed oil
GM Ingredients

- Estimates are that 70-75% of processed foods on US shelves contain “GM ingredients”
- The refining of most oils, corn syrup, and sugar removes any DNA
What do People Know?

2013 Rutgers Survey
Survey Particulars

- Conducted using the GfK online survey panel
- 1148 respondents
- October 23-27, 2013
- Margin of error +/- 3.1%
- Data weighted to project to the US population
What Do People Think They Know?

- How would you rate your own basic understanding of how food is grown and produced?

Fair/Poor – 22%
Preamble

• Survey began with questions about reading food labels and what other information people thought should be on food labels

• Introduction to GM:

  “The remainder of this survey will focus on genetically modified foods. Genetic modification involves methods that make it possible for scientists to create new plants and animals by taking parts of the genes of one plant or animal and inserting them into the cells of another plant or animal.

This process is sometimes called genetic engineering or biotechnology, and the plants and animals that result are sometimes called GMOs, or genetically modified organisms. Foods using ingredients made from these are often referred to as genetically modified foods or GM foods.”
Awareness of the Existence of GM Foods

- Before this survey, were you aware that genetically modified foods existed?
  - 25% say no
Length of Awareness

• When did you first hear about GM foods?*

*Those Aware of GM Foods Before the Survey (N=842)
Heard or Read?

• How much have you heard or read about genetically modified foods?
  • A great deal 4%
  • A fair amount 13%
  • Some 33%
  • Very little 29%
  • Nothing at all 19%
  • Refused 2%

Rutgers 2013 Survey
How Much Do You Know?

- How much do you know about genetically modified foods?
  - A great deal 2%
  - A fair amount 11%
  - Some 32%
  - Very little 32%
  - Nothing at all 21%
  - Refused 2%

Rutgers 2013 Survey
Ever Talked about GM Foods?

- Have you ever discussed GM foods with anyone?
  - 2/3 say no

[Pie chart showing the distribution of responses with 66% saying yes, 32% refusing to answer, and 2% saying no.]

Rutgers 2013 Survey
Frequency of Discussion of GM Foods?

- How often have you discussed GM foods?
  - 3% Frequently
  - 18% Occasionally
  - 11% Very Rarely
  - 66% Never

Rutgers 2013 Survey
GM Foods in Stores Now?

- As far as you know, are there any foods containing genetically modified ingredients in supermarkets right now?
  - Yes 43%
  - No 4%
  - Don’t know 51%
  - Refused 2%

Rutgers 2013 Survey
Perceived Availability of GM Foods

Percent of 491 Consumers who said GM foods are available in U.S. Supermarkets

Rutgers 2013 Survey
Ever Eaten GM Foods?

- As far as you know, have you ever eaten any food containing genetically modified ingredients?
  - Only 26% say yes

Rutgers 2013 Survey
Opinions About Biotechnology

- Being uninformed doesn’t stand in the way of having an opinion
  - The number of respondents who report approving or disapproving of biotechnology typically exceeds the number who report knowing much about it
Opinions About Biotechnology

• Relatively uninformed opinions are “uncrystallized”
• These opinions are:
  • Not well thought through
  • Not strongly held
  • Subject to change
  • Influenced by the wording of questions
• They are still important
Context for Opinion Formation

• Biotechnology is:
  • An abstract concept for many
  • Not high on the issue agenda for most people
  • Not something about which people have been forced to make personal decisions
Deciding About Biotechnology

- Once people make a decision their opinions become more crystallized
  - They adjust their attitudes and opinions to support their decisions
  - They pay attention to confirming information
  - They discount inconsistent information
  - They reinterpret disconfirming information to support their decision
Approval of GM - Plants

Do you Approve or Disapprove?

- 17% Approve
  - 5% Strongly Approve
  - 12% Somewhat Approve
- 50% Neutral
- 30% Disapprove
  - 14% Strongly Disapprove
  - 16% Somewhat Disapprove
- 25% Unsure
Approval of GM - Animals

Do you Approve or Disapprove?

- 10% Approve
  - 3% Strongly Approve
  - 7% Somewhat Approve
- 42% Neutral
  - 19% Neither Approve nor Disapprove
  - 23% Unsure
- 46% Disapprove
  - 24% Strongly Disapprove
  - 22% Somewhat Disapprove
Lean to Approval of GM - Plants

Do you Approve or Disapprove?

- **Approve** (35%)
  - Strongly Approve (5%)
  - Somewhat Approve (12%)
  - Lean Toward Approve (18%)
- **Neutral** (18%)
- **Disapprove** (45%)
  - Strongly Disapprove (14%)
  - Somewhat Disapprove (15%)
  - Lean Toward Disapprove (16%)
Lean to Approval of GM - Animals

Do you Approve or Disapprove?

- 19% Approve
  - 3% Strongly Approve
  - 7% Somewhat Approve
  - 9% Lean Toward Approve
- 18% Neutral
- 61% Disapprove
  - 24% Strongly Disapprove
  - 22% Somewhat Disapprove
  - 15% Lean Toward Disapprove
- 18% Unsure

Lean Toward Approve

Neutral

Disapprove
Approval of the Use of GM to Create:

- **Plant Based Food Products**
- **Animal Based Food Products**

Legend:
- **Strongly Approve**
- **Strongly Disapprove**
- **Somewhat Approve**
- **Neither Approve nor Disapprove**
- **Somewhat Disapprove**
- **Refused**
- **Neither Approve nor Disapprove**
- **Somewhat Disapprove**
- **Refused**
Approval of the Use of GM to Create:

- Trees that can Help Clean Chemically Contaminated Water
- More Nutritious Grain to Feed People in Poor Countries
- Sweet Corn that Reduces the Need to Spray Pesticides
- Rice with Enhanced Vitamin A to Prevent Blindness
- Corn that is Drought Resistant
- Sheep - Milk Can be used to Produce Medicines / Vaccines
- Fruits and Vegetables that are Less Expensive
- Better Tasting Fruits and Vegetables
- Grasses that Don't Need to be Mown as Often
- Cattle that Produce Beef with Less Cholesterol
- Fruits and Vegetables that Last Longer on a Shelf
- Soybean Plants that are Herbicide Resistant
- Hormones that Enable Cows to Produce More Milk
- Plant Based Food Products
- Animal Based Food Products

(Bar chart showing percentage approval levels for each category)

Legend:
- Strongly Approve
- Somewhat Approve
- Neither Approve nor Disapprove
- Somewhat Disapprove
- Refused
- Unsure
Basis for Opinions

- Would you say your opinion of genetically modified foods is based on a general feeling or specific issues?
  - General feeling – 50%
  - Both – 34%
  - Specific issues – 15%
Issues of Concern

“Please put a check next to all the issues that are related to your opinion of GM foods.”
Approval of GM Plants by Basis of Opinion

- General Feeling
- Specific Issues
- Both

- Strongly Approve
- Somewhat Approve
- Somewhat Disapprove
- Strongly Disapprove
- Neither Approve nor Disapprove
- Unsure
- Refused
All genetically modified crops are controlled by Monsanto.

There are no consumer benefits to genetically modified foods.

There are no environmental benefits to genetically modified crops.

Most farmers would prefer to farm organically.

Genetically modified foods are part of corporate efforts to take over the food supply.

Sugar made from genetically modified sugar beets is different from sugar made from regular sugar beets.

Before they can be sold, the government must test genetically modified foods to make sure they are safe for humans to eat.

Most of the soybeans grown in the US are a genetically modified variety.

Genetically modified salmon grow faster than regular salmon.

Foods containing genetically modified ingredients are required to be labeled as such in Europe.
Tomatoes genetically modified with genes from catfish would probably taste fishy.

By eating a genetically modified fruit, a person's genes could also become modified.

Eating genetically modified foods is more likely to cause obesity than eating non-genetically modified foods.

Pollen from genetically modified corn was shown to kill butterfly larva in a laboratory.

Eating genetically modified foods has caused an increase in cancer.

A large fast-food company used chickens so altered by genetic modification that they can't be called chicken anymore.

Eating genetically modified foods is more likely to cause obesity than eating non-genetically modified foods.

By eating a genetically modified fruit, a person's genes could also become modified.

Tomatoes genetically modified with genes from catfish would probably taste fishy.
Should GM Foods be Labeled?
The US Food and Drug administration does require special labeling of a GM food to alert consumers when the characteristics of a familiar food product have been substantially altered;

- for example, if an allergen is introduced, or its nutritional qualities have been altered.

However, the labels do not need to indicate that the change was produced through the process of genetic modification.

As such, there are no current regulations mandating that GM foods be identified as such.
FDA

• Based on the scientific evidence, the FDA has concluded that current GM crops are not substantially different from their conventionally bred counterparts.

• Therefore, no special labels are required.
USDA Organic Standard

- Products meeting the USDA organic standard are not permitted to contain GM ingredients.
Exceptions

• The organic standard does not apply to animals.
Are GM Foods Required to be Labeled?

- Are foods that contain genetically modified ingredients required by law to be labeled as such in the US?

  - Only 26% say no
Should GM Foods Required to be Labeled?

- Current regulations do not require genetically modified foods to be labeled in the US. Do you think that genetically modified foods should be required to be labeled?
  - Only 8% say no
  - 17% are unsure

Rutgers 2013 Survey
Labeling

• National polls indicate that when asked “should GM foods be required to have special labels” more than 9 in 10 Americans say “yes”.
Label Reading

• Beyond just looking at the brand name, how often do you read food labels?
  • Always – 10%
  • Frequently – 36%
  • Sometimes – 36%
  • Rarely – 14%
  • Never – 4%
  • Refused – 1%

19%
Other Label Information

- What information (if any) would you like to see on food labels that is not already on there?
  - Presence of GM ingredients – 7%
  - Country/Place of origin – 6%
  - Clearer information about ingredients – 4%
  - More information about nutrition – 4%
  - Others (each less than 2%)
    - Allergens, Gluten Free, Preservatives, Pesticides, Chemicals, Irradiation, Organic, Natural, Artificial Colors, Flavors, or Additives
Importance of Additional Labeling Information

- **How important is it to you that the following information be on a food label?** (very or extremely important)
  - Grown using hormones (63%),
  - Grown using pesticides (62%),
  - Raised using antibiotics (61%),
  - Whether it was grown or raised in the United States (60%),
  - Whether the product contains allergens (59%)
  - *Whether the product contains GM ingredients (59%)*
Labeling is Politically Popular

• It’s tough for many politicians to argue against food labeling
  • When asked, most consumers say they are in favor of GM labels on food.
  • Many express a “right to know” as essential to make informed choices
    • particularly if they believe that the long-term health impacts of such products are unclear
  • Some charge that government and industry are conspiring to deny consumers the right to know what they are feeding their families.
Labeling is Politically Popular

- Proponents argue that labeling of GM food products would offer increased choices to consumers
  - giving them the freedom to exercise their religious, philosophical, or dietary preferences,
  - and the ability to use market forces to express their political views in support or opposition to the use of GM technology.
Labeling is Politically Popular

- About two dozen countries plus the EU have either adopted or announced plans to introduce labels for genetically modified foods
  - These are a mixture of voluntary, mandatory, and “threshold mandatory” rules
  - There is little international consensus concerning labeling criteria
- Where threshold mandatory rules exist, few GM food products exist
GM Food Labeling Has its Critics

- Many in government & industry argue:
  - Providing this information is costly
    - Mandatory labeling is an economic strategy designed to block the commercialization of GM products.
  - Maintaining ‘identity preservation’ is logistically difficult
    - This may be especially true of processed foods with many ingredients – like vegetable soup
  - It is unclear that consumers would use the labels
GM Food Labeling Has its Critics

- Many in government and industry argue:
  - Labels would imply that GM food products or ingredients are harmful or of less quality than those produced through conventional means.
    - GM ingredients generally accepted as safe
    - GM products more extensively tested than conventionally-bred products
  - In sum, labels would be interpreted as **Warnings**
Labeling in the News

- California proposition 37 was the most high-profile labeling effort
  - Opponents were able to raise more than $45 million to defeat it
  - Were backed by powerful agribusiness companies including Monsanto, Dow, DuPont, and Syngenta as well as by large food manufacturers such as Kraft, The Hershey Co., Nestlé USA, Mars Inc., and PepsiCo, California
- Voters only rejected the proposed regulation by six percentage points.
  - Though outspent five-to-one, proponents of mandatory labeling were able to attract more than 4.2 million “yes” votes.
Labeling in the News

- Washington State (Initiative 522)
- Opponents were able to raise more than $22 million to defeat it
- Proponents raised about $8 million
- Voters rejected the proposed regulation by 10 percentage points. 55% no; 45% yes
Labeling in the News

• Labeling initiatives or legislative efforts were introduced in at least 20 states last year.

• More are expected this year.
  • The Vermont House voted 114-30 to adopt a state Senate labeling bill. Gov. Peter Shumlin has said he plans to sign the bill, whose requirements would take effect in July 2016.

• Manufacturers and retailers are discussing potential uniform labeling standards
Labeling in the News

• The AquaBounty Salmon is expected to receive final FDA approval
  • This will likely re-ignite legislative and media attention on GM labeling
  • More attention on GM crops in general
• Labeling initiatives force consumers to make a decision about GM foods
For More Information:

William K. Hallman, PhD
Department of Human Ecology
Rutgers University
New Brunswick, NJ 08901-8520
(848) 932-9227
hallman@aesop.rutgers.edu