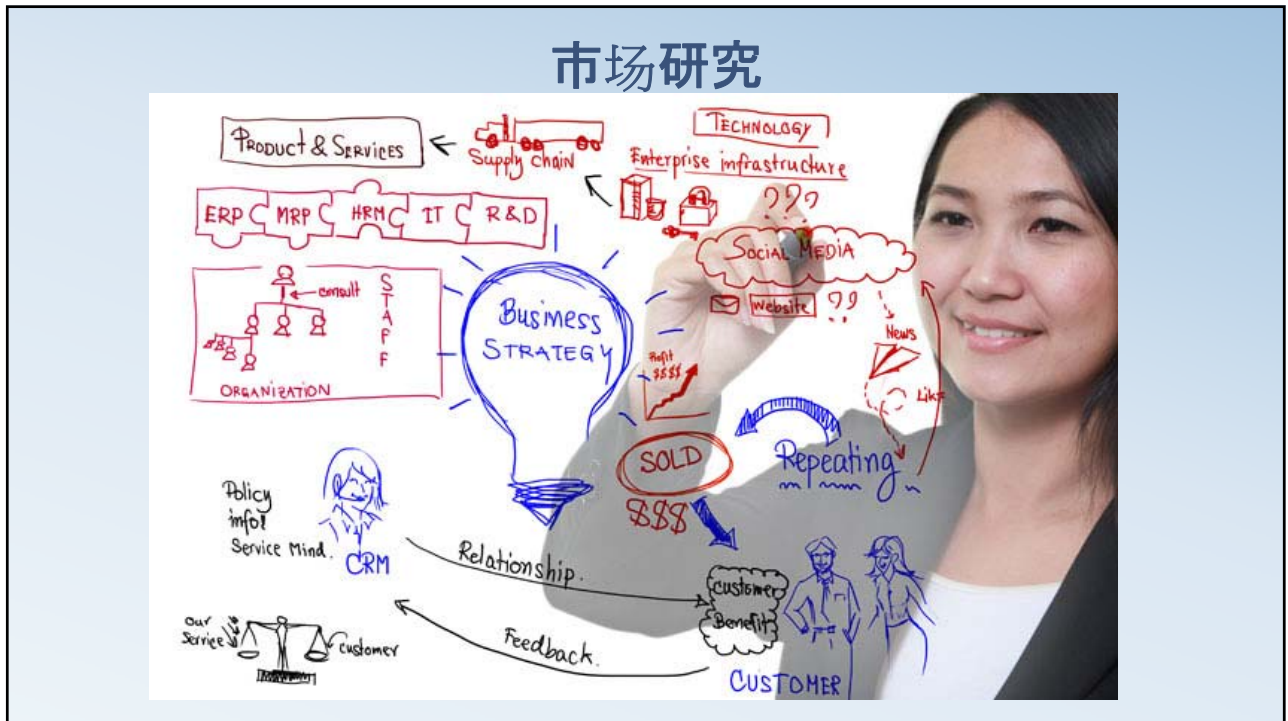
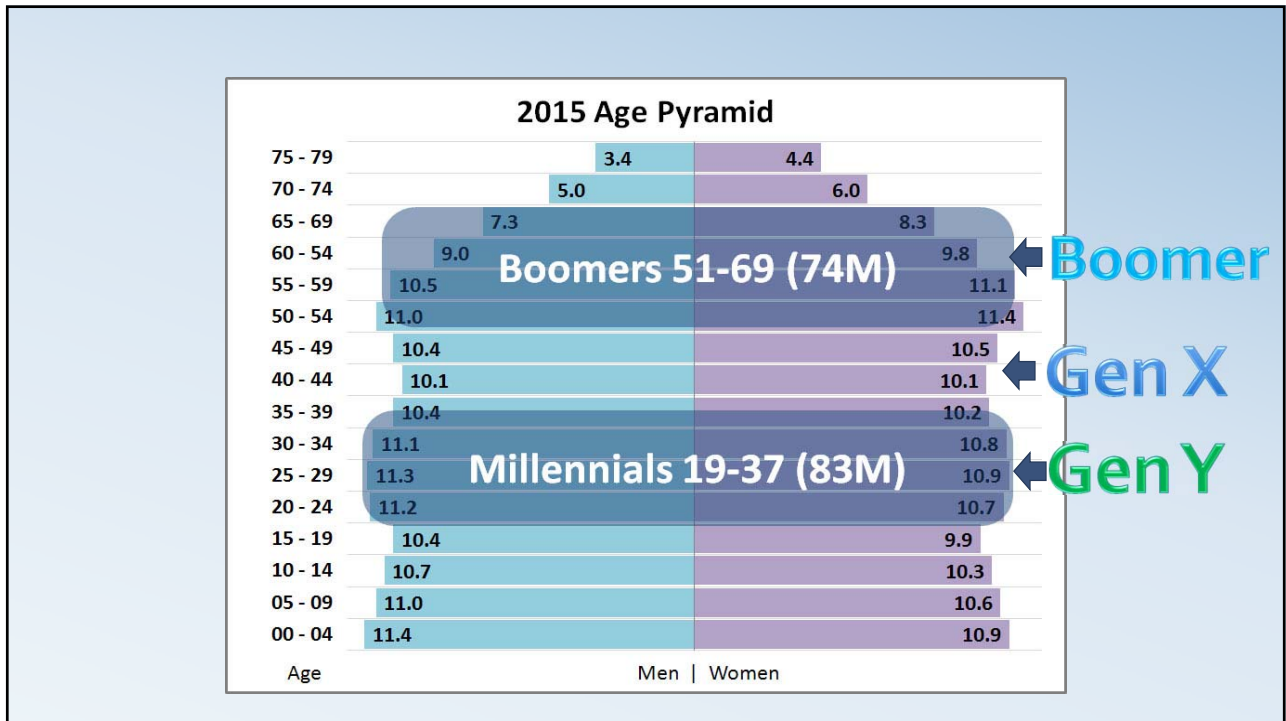
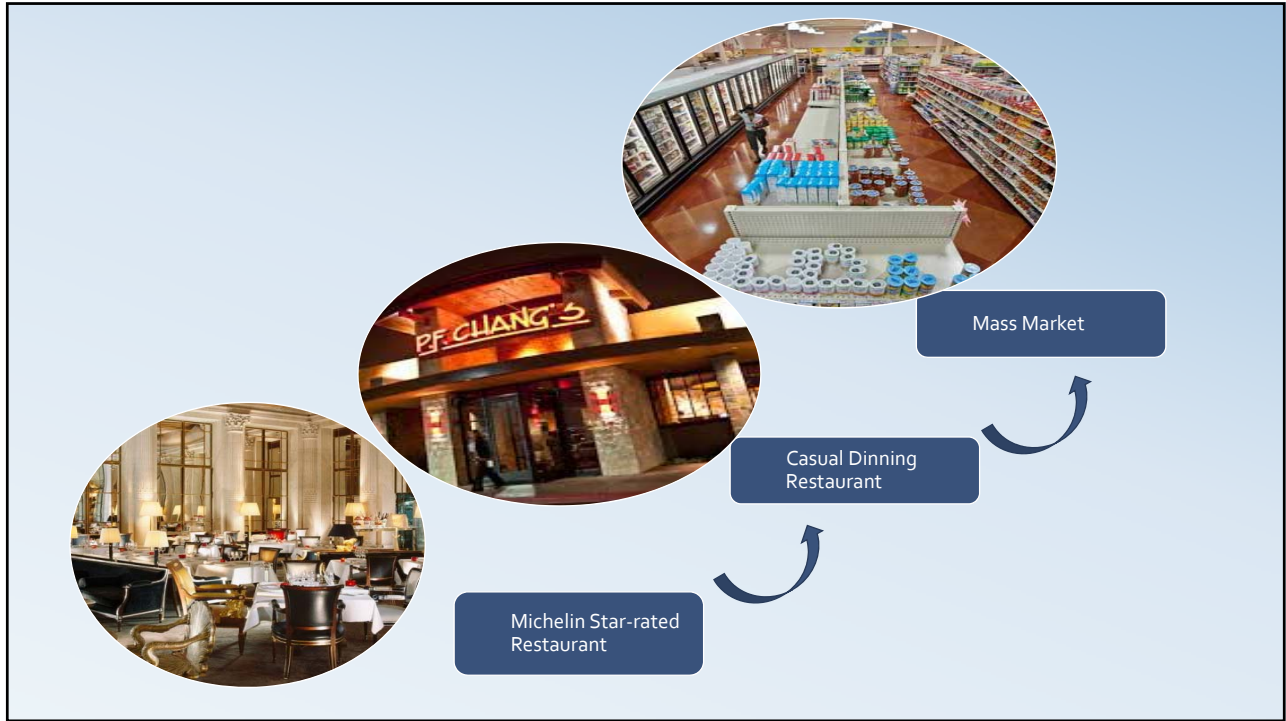
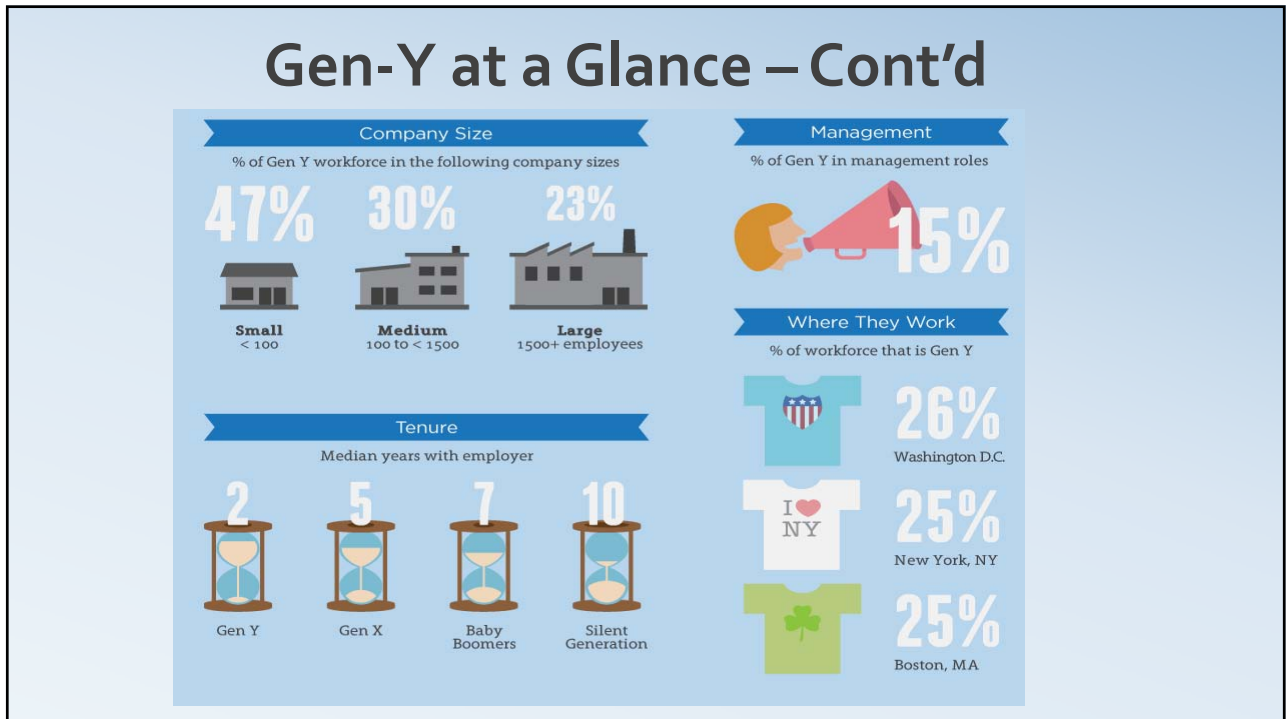
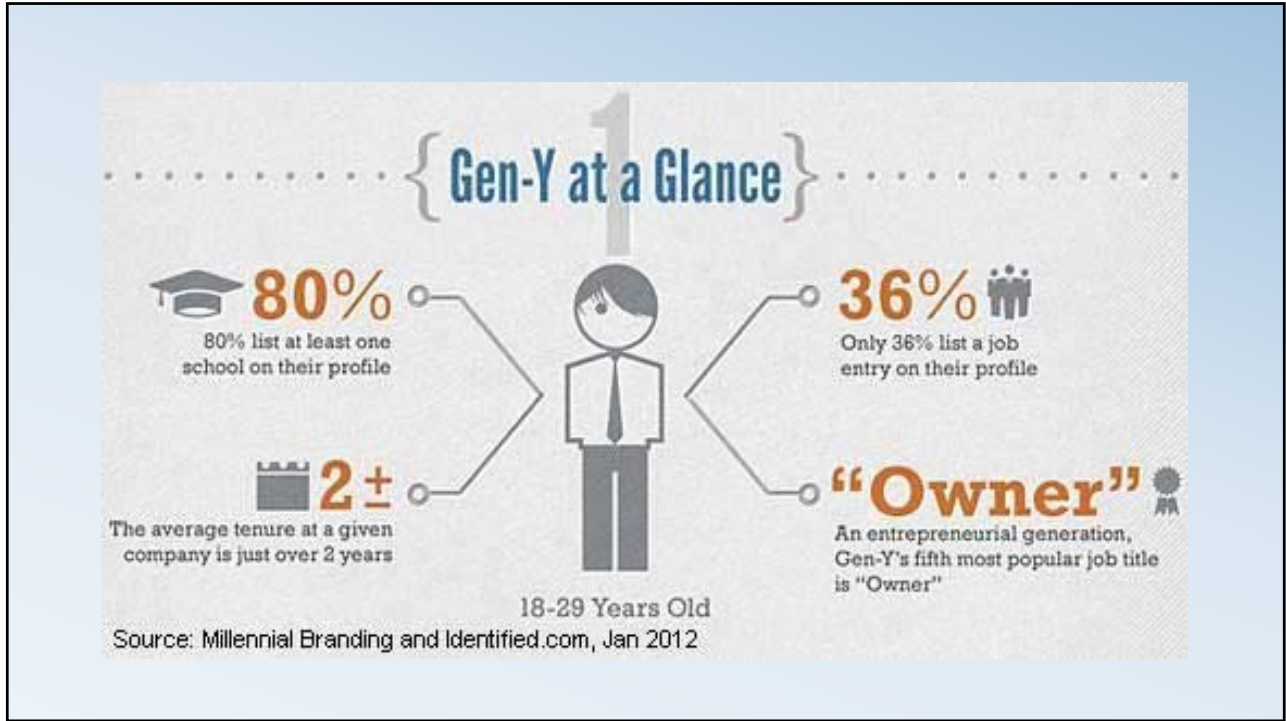


Content

- Marketing Research
- Food Product Development Process
- Food Ingredient and Food Additive
- Food Manufacturing process
- Food Safety
- GM vs. Organic Food product
- Trans Fat
- Gluten Free





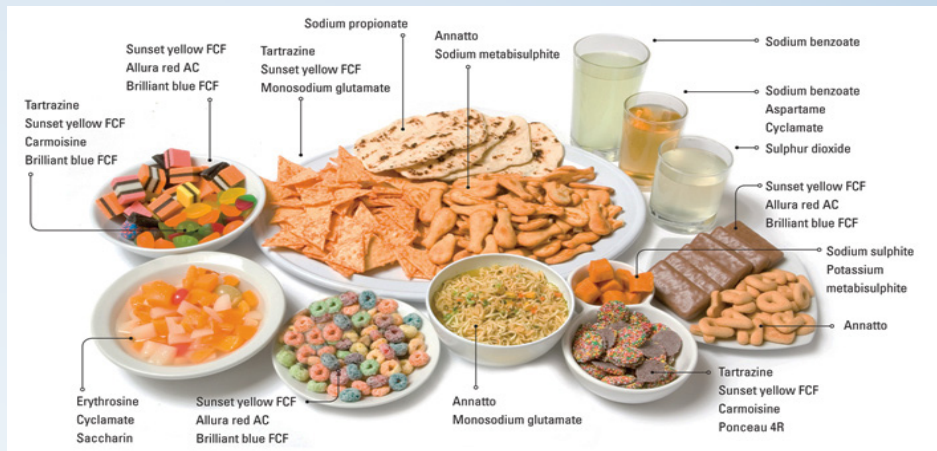














食品添加剂

- 定义：食品添加剂是有意识地一般以少量添加于食品，以改善食品的外观、风味和组织结构或贮存性质的非营养物质



Different types of food additives

Type of additive	First digit of the E number	Purpose	Example
<i>Colourings</i> 	1	to improve colour	tartrazine (E 102) , a synthetic yellow dye added to sweets, fizzy drinks and packet food
<i>Preservatives</i> 	2	to preserve food so that it goes bad less quickly	benzoic acid (E 210) added to beer, sauce and jam
<i>Flavourings</i> 	(not numbered)	to add or enhance flavour	ethyl ethanoate , a synthetic ester, added to give a pineapple flavour in drinks and sweets
<i>Anti-oxidants</i> 	3	to stop fats and oils getting oxidized, changing colours and tasting bad	BHA (E 320) added to biscuits, butter, margarine and oils
<i>Emulsifiers and stabilizers</i> 	3 or 4	to make oil and water mix, and alter the texture of food	lecithin (E 322) added to ice cream, salad dressings and margarine
<i>Acid and bases</i> 	5	to control pH	citric acid added to soft drinks; sodium hydrogencarbonate (E 500) added to canned custard etc.
<i>Sweeteners</i> 	4 or 6	to sweeten food without using sugar	sorbitol (E420) added to certain drinks and sweets (suitable for diabetics and those on diet)
<i>Nutrients</i> 	(not numbered)	to increase the nutritive value	vitamin C added to soft drinks; minerals added to milk powder

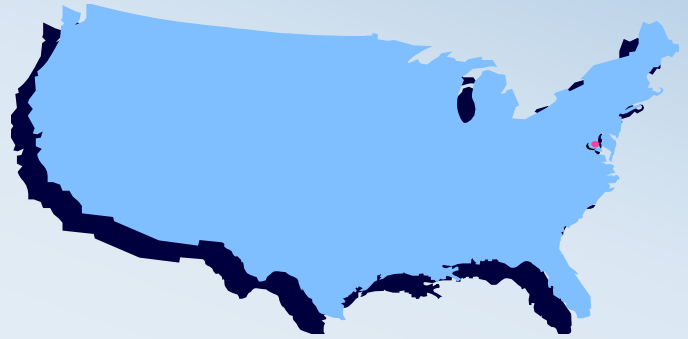
天然食品添加剂 vs. 合成食品添加剂



Food Safety

Estimates of foodborne illnesses in the U.S. each year:

- 76 million people become ill
- 5,000 people die

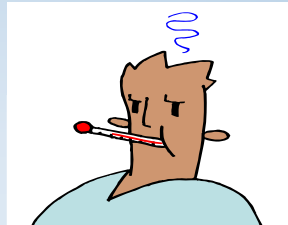


Source: <http://nutritionandaging.fiu.edu/>

Signs and symptoms



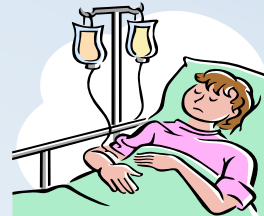
Upset stomach



Fever



Diarrhea



Dehydration

Source: <http://nutritionandaging.fiu.edu/>

“Key recommendations” for food safety

The 2005 USDA Dietary Guidelines give five
“Key Recommendations”
for food safety.



Source: <http://www.health.gov/dietaryguidelines/dga2005/recommendations.htm>



Recommendation 1: CLEAN



Clean hands,
food-contact surfaces, fruits
and vegetables.

Source: <http://nutritionandaging.fiu.edu/>



Recommendation 2: SEPARATE

Separate raw, cooked, and ready-to-eat foods while shopping, preparing or storing foods.

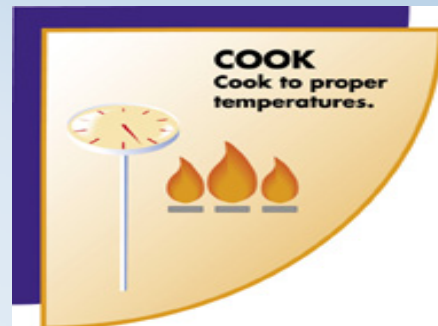


Source: <http://nutritionandaging.fiu.edu/>

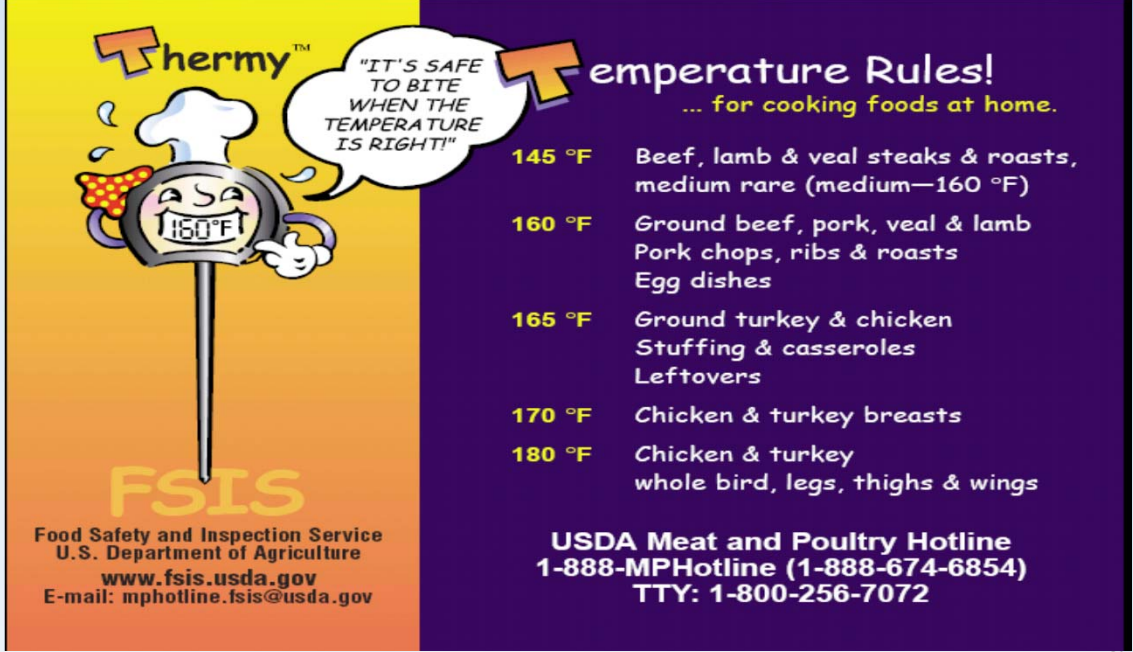


Recommendation 3: COOK

Cook foods to a safe temperature to kill microorganisms.



Source: <http://nutritionandaging.fiu.edu/>



Thermometer
"IT'S SAFE TO BITE WHEN THE TEMPERATURE IS RIGHT!"

Temperature Rules!
... for cooking foods at home.

- 145 °F** Beef, lamb & veal steaks & roasts, medium rare (medium—160 °F)
- 160 °F** Ground beef, pork, veal & lamb
Pork chops, ribs & roasts
Egg dishes
- 165 °F** Ground turkey & chicken
Stuffing & casseroles
Leftovers
- 170 °F** Chicken & turkey breasts
- 180 °F** Chicken & turkey
whole bird, legs, thighs & wings

FSIS
Food Safety and Inspection Service
U.S. Department of Agriculture
www.fsis.usda.gov
E-mail: mphotonline.fsis@usda.gov

USDA Meat and Poultry Hotline
1-888-MPHotline (1-888-674-6854)
TTY: 1-800-256-7072



Recommendation 4: CHILL

CHILL
Refrigerate promptly.

Chill (refrigerate) perishable foods promptly and defrost foods properly.

Source: <http://nutritionandaging.fiu.edu/>

The TWO-hour rule

Refrigerate perishable foods so **TOTAL time at room temperature is less than TWO hours** or only ONE hour when temperature is above 90 degrees F.

Perishable foods include:

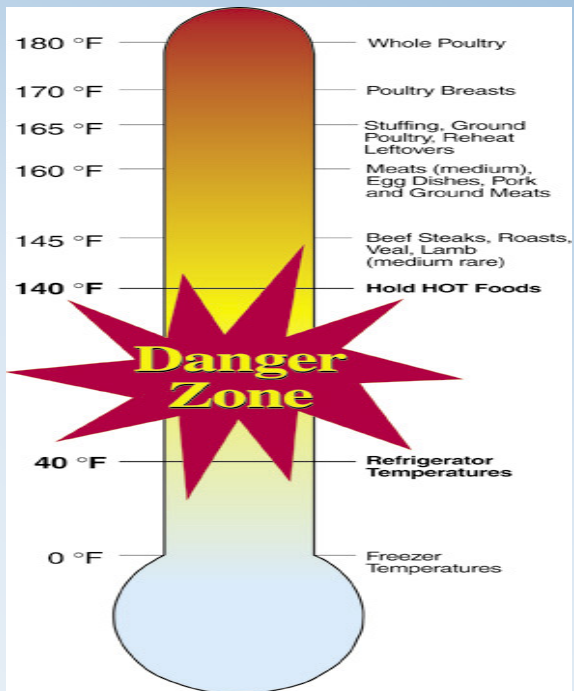
- Meat, poultry, fish, eggs, tofu
- Dairy products
- Pasta, rice, cooked vegetables
- Fresh, peeled/cut fruits and vegetables



Source: <http://nutritionandaging.fiu.edu/>

DANGER ZONE

Bacteria multiply *rapidly* between **40 and 140 degrees F.**



Source: <http://nutritionandaging.fiu.edu/>



Recommendation 5: AVOID...

- Raw (unpasteurized) milk or milk products
- Raw or partially cooked eggs and foods containing raw eggs
- Raw and undercooked meat and poultry
- Unpasteurized juices
- Raw sprouts



Most at risk are infants, young children, pregnant women, older adults and the immunocompromised.

Source: <http://nutritionandaging.fiu.edu/>

Genetic Modified Food



What is a Genetically Modified Organism?

- It involves the insertion of DNA from one organism into another OR modification of an organism's DNA in order to achieve a desired trait.



Suntory "blue" rose

Example of Genetic Modified Food ^[1]

- The first GM whole food, FLAVR SAVR™ tomato, was marketed in the United States in 1994.
 - Slower ripen rate
 - Ripen longer on vine
 - Fully developed flavors



Flavr Savr Tomato developed by Calgene

(Sources: <http://www.ca.uky.edu/agripedia/glossary/flavr.htm>)

Other examples of GM Food

- Soy bean
- Corn
- Canola
- Sugar Beet



Stockphoto

2014 BIOTECH CROP REPORT

Highlights of global biotech crop adoption by The International Service for the Acquisition of Agri-biotech Applications (ISAAA). For more information, visit ISAAA.org.

18 MILLION FARMERS in **28 countries** plant biotech crops

19 years of consecutive growth (1996-2014)

FASTEST ADOPTED CROP TECHNOLOGY IN RECENT TIMES

CONTINUED HECTARE GROWTH

Biotech crop plantings continue to show year-over-year growth. Global plantings increased +400 fold over the past 19 years.

MORE DEVELOPING COUNTRIES ADOPTING BIOTECH CROPS

Biotech crops are helping more countries and people who need it most.

- 29 additional countries
- Bangladesh planted biotech crops for the first time in 2014
- Indonesia & Vietnam approved biotech crops for 2014 plantings
- 80% small and resource-poor farmers

BIOTECH BENEFITS

- Improve Food Security:** Help alleviate poverty for more than 16.5M small farmers and their families.
- Realize Economic Gain:** Increased crop production valued at \$US 13.3B from 1996-2013.
- Mitigate Climate Change:** Lowered CO₂ emissions in 2013 alone equal to removing 12.4M cars from the road.
- Reduce Environmental Impact:** Reduced pesticide use, saving 500M kg of active ingredient from 1996 to 2012.
- Meet Farmers' Need:** Drought-tolerant traits progress with 5.5 fold gain of DT maize plantings in the U.S. from 2010 (150,000 hectares) to 2014 (275,000 hectares).

MORE STAPLE FOOD CROPS WITH DIRECT CONSUMER BENEFITS

- UNITED STATES:**
 - Improved soybean protein
 - Potato's 4th most important global food crop
 - Reduces crop loss and food waste from bruising
 - When cooked at high temps, produces less acrylamide (potential carcinogen)
- BANGLADESH:**
 - Consume cooked Bt brinjal (eggplant) in record volume
 - Brinjal is nutritious vegetable
 - Yield increase by 20%
 - Reduces farmer exposure to insecticides by 70-80%
- INDONESIA:**
 - Approved drought-tolerant sugar cane for food
 - Increases availability of valuable food source
 - Decreases dependency on imported sugar
- BRAZIL:**
 - Approved virus-resistant bean for 2010 plantings
 - Provides essential food crop for Brazilians as rice & beans are key part of diets
 - Emphasizes efficacy of a science-based approval system

PUBLIC-PRIVATE PARTNERSHIPS

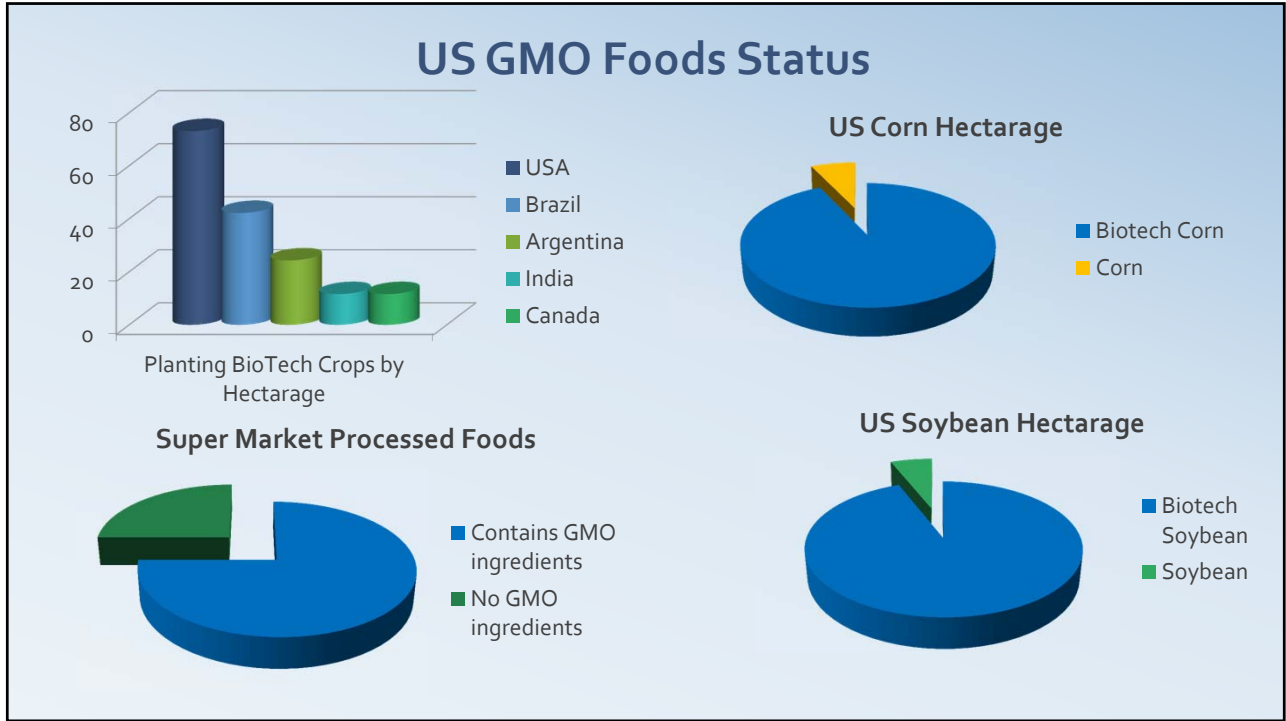
Public-private partnerships show promise of delivering approved biotech crops to farmers. These include:

- Bt and BASF-herbicide-tolerant soybean
- Bangladesh seed company Mahyco-Bt brinjal (eggplant)
- Sub-Saharan Africa and Monpart/drought-tolerant (DT) maize through the Water Efficient Maize for Africa (WEMA) project
- The WEMA project aims to deliver the first biotech DT maize to select African countries in 2017, where the food staple is depended on by 300M+ poverty-stricken Africans. Projections show DT DT maize hybrids yielding up to 20 to 25% more than current hybrids, resulting in 216.5 more million metric tons of maize to feed 14 to 21 million people.

TOP 5 COUNTRIES PLANTING BIOTECH CROPS BY HECTARAGE

Country	Plantings (Million Hectares)
USA	73.1M
Brazil	42.2M
Argentina	24.3M
India	11.6M
Canada	11.6M

About ISAAA and Clive James, Author of the Report: The International Service for the Acquisition of Agri-biotech Applications (ISAAA) is a not-for-profit organization with an international network of centers designed to contribute to the alleviation of hunger and poverty by sharing knowledge and cost-effective technology applications. Clive James, Executive Chairman and Founder of ISAAA, has been and will be asked for the past 20 years in the

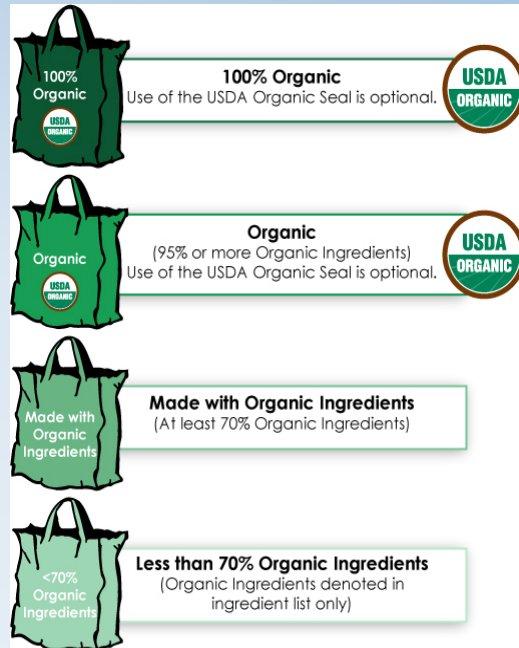


USDA Organic Standards

- No antibiotics
- No growth hormones
- Animals raised on organic feed
- Farmed without pesticides or herbicides
- Farmed without synthetic fertilizers



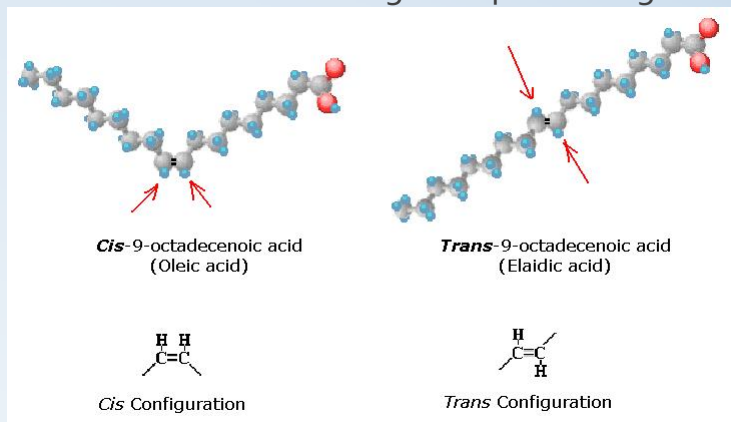
Organic Labeling





What is Trans Fat?

- Trans fat formed naturally
- Trans fat formed during food processing

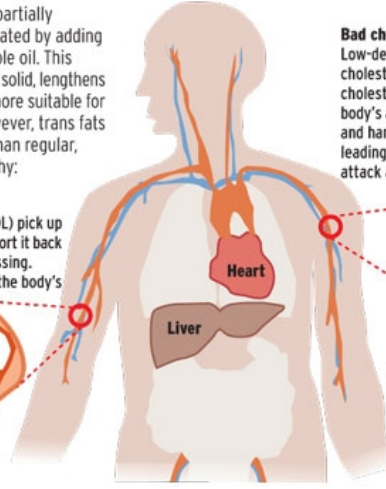
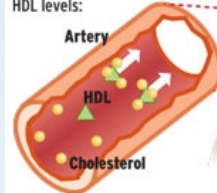


Why Trans Fat is Bad

Trans fats and the body

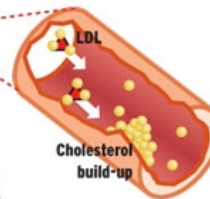
Trans fats (also known as partially hydrogenated oils) are created by adding hydrogen to liquid vegetable oil. This process makes the fat more solid, lengthens its shelf life and makes it more suitable for frying and other uses. However, trans fats are also more unhealthy than regular, unsaturated fats. Here's why:

Good cholesterol
High-density lipoproteins (HDL) pick up excess cholesterol and transport it back to the body's liver for processing. Consuming trans fats lowers the body's HDL levels:



Bad cholesterol

Low-density lipoproteins (LDL) transport cholesterol throughout the body. As cholesterol builds up in the walls of the body's arteries, the arteries become narrow and hardened, reducing blood flow and leading to an increased chance of heart attack and stroke:



Sources: The Mayo Clinic;
American Heart Association
Brian Moore / The Register

What Food Contains Trans Fat?

- Coffee creamer
- Crackers, cookies, cakes, frozen pies, and other baked goods
- Fast food
- Frozen pizza
- Ready-to-use frostings
- Refrigerated dough products (such as biscuits and cinnamon rolls)
- Snack foods (such as microwave popcorn)
- Vegetable shortenings and stick margarines



How to identify Trans Fat?

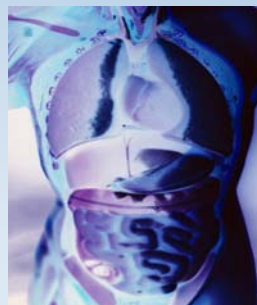
Nutrition Facts	Amount/Serving	%DV*	Amount/Serving	%DV*
	Total Fat	7g	11%	Total Carb.
Serv. Size 4 cookies (32g) Servings 9	Sat. Fat	4.5g 23%	Dietary Fiber	1g 4%
Calories 150 Calories from fat 60	Trans Fat	0g	Sugars	10g
	Cholest.	0mg 0%	Protein	2g
	Sodium	115mg 5%		
	Vitamin A 0% • Vitamin C 0% • Calcium 0% • Iron 4%			

INGREDIENTS: Enriched flour, riboflavin, sugar, partially hydrogenated vegetable oil, cocoa, cornstarch, hydrogenated oils, soy lecithin, salt, caramel color, artificial flavors.



Celiac Disease

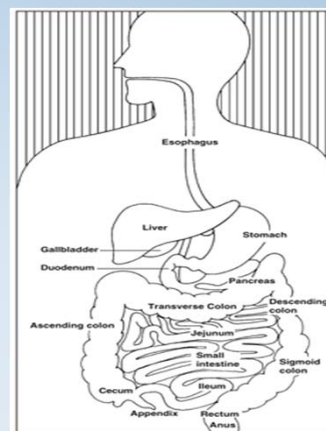
- Digestive disorder
- Small intestine could be damaged
- Abdominal pain
- Nutrient loss



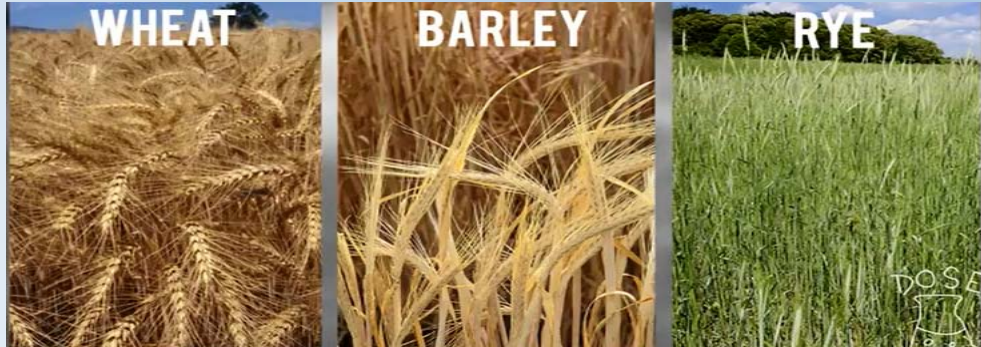
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Gluten Intolerance

- Also called Gluten Sensitivity
- Experience same symptoms
- Test negative for Celiac disease
- Avoid food with gluten to ease symptoms



National Institute of Diabetes and Digestive and Kidney Diseases, National Institutes of Health



Gluten

What is Gluten? : A protein found in wheat, barley and rye and all foods made with these grains

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Common Foods with Gluten

- Beer
- Bread
- Cakes
- Cereals
- Cookies
- Couscous
- Crackers
- Dressings
- Flour Tortillas
- Gravy
- Muffins
- Oats
- Pasta
- Pastries
- Sauces



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Gluten-Free Foods

- Beans
- Dairy
- Fruits
- Nuts
- Vegetables
- Quinoa
- Rice
- Gluten-free versions of foods



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Top Reasons Cited for Seeking Gluten-Free Products

1. **Digestive Health (39%)**
2. Nutritional Value (33%)
3. **Help Lose Weight (25%)**
4. Other (21%)*
5. Healthier Skin (20%)
6. Joint Pain (18%)
7. Improve Concentration (13%)
8. Alleviate Stress (12%)
9. Cleansing Regimen (10%)
10. Alleviate Depression (9%)
11. Alleviate Asthma (6%)
12. **Treat Celiac Disease (5%)**

Source: Hartman Group Survey, 1700 US Adults, July 2009

Nutritional Impact of Going Gluten Free

- ❖ Diet can be high in fat, calories
- ❖ Alternative grain foods (Rice cereal, rice-tapioca bread etc.) higher in sugar and fat
- ❖ High glycemic index (GI) and low in fiber
- ❖ Not enriched or fortified, may lack certain nutrients that are found in fortified wheat products, including vitamin B₁, B₂, B₃, and (Iron) Fe.

Jenkins et al 1987 AJCN 45: 946-951; Berti 2004 EJM 43: 198-204

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Q&A



