The Changing Label of Processed Meats: Consumers, Science and Implications

Rodrigo Tarté, Ph.D., Iowa State University
The Changing Label of Processed Meats
Consumers, Science and Implications

Rodrigo Tarté, Ph.D.
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Fresh vs. Processed Pork Consumption
Percent In-Home Pork Eatings

The majority of pork eatings involve processed pork, with fresh pork accounting for 21.5 percent of eatings.

- Processed 78.6%
  (ham, bacon, sausage, etc.)
- Fresh 21.5%
  (chops, ribs, roasts, etc.)

Ham Makes Up Over a Third of Processed Pork Eatings

- Bacon, Pork/All Other: 23%
- Sausage: 25%
- Pork Lunchmeat*: 13%
- Ham (including lunchmeat): 39%


*Pork lunchmeat = bologna, salami, luncheon loaf, etc.; excludes ham
Source: The NPD Group/National Eating Trends – Year ending November 2009
Agenda

• Meat product labeling basics
• What about the consumer?
• “Clean Label”
• Implications
• Appendix: Natural/“Clean Label” labeling requirements
What is a Food Product Label?

• Information about a product typically printed on the product’s container or a material affixed to the container
What are the Purposes of Food Labels?

• Inform consumers about products and their features
• Help consumers make value decisions when comparing products
• Prevent consumer deception
• Ensure equitable competition
• Prevent injury to consumers from sale of misbranded products
Mandatory Features of a Retail Meat & Poultry Product Label

1. **Product name** – what is it?
2. **Ingredients statement** – what’s in it?
3. **Address line** – who made it?
4. **Inspection legend and establishment number** – was it inspected? where was it made?
5. **Net weight statement** – how much is there?
6. **Handling statement** – how should it be handled/stored?
   • required for chilled products only
7. **Nutrition facts** – what’s its nutritional content?
What about *Voluntary* Features?

- Communicate products benefits (claims)
- Warn of product’s potential risks, if any
- Describe how product should be used/consumed
- Advertising, recipes, coupons, etc.
- Persuade the consumer of the product’s superiority
- Advertise other products
Special Statements or Claims
(USDA-FSIS, 2015)\(^1\)

- 3rd party raising claims or programs (e.g., Global Animal Partnership, AMS Process verified or certified programs, American Heart Association (AHA) claims)
- Claims regarding meat and poultry production practices (i.e., claims regarding the raising of animals such as “no antibiotics administered” or “vegetarian fed”)
- Breed claims (Berkshire, Angus, Hereford, etc.)
- Certified claims, Certified Halal
- Gluten free: both certified and non certified
- Health claims defined in 21 CFR Subpart E, e.g., dietary saturated fat and cholesterol and risk of coronary heart disease (21 CFR 101.75)

\(^1\) FSIS Compliance Guidance for Label Approval, Nov. 2015.
Special Statements or Claims (cont.)

(USDA-FSIS, 2015)¹

• Implied Nutrition Claims, e.g., Heart Smart, Baked Not Fried, Made without Butter
• Instructional or disclaimer statements concerning pathogens, such as “for cooking only”; “not tested for E. coli O157:H7”; or “For high pressure pasteurization at establishment ABC”
• Natural claims, e.g., “All Natural”, “100% Natural”
• Negative claims or “free” claims (no MSG, no MSG added, no preservatives)
• Statements that identify a product as “organic” or containing organic ingredients
• Omega 3 factual statements

¹FSIS Compliance Guidance for Label Approval, Nov. 2015.
Special Statements or Claims (cont.)
(USDA-FSIS, 2015)\(^1\)

- “Whole Grain”, “Made with Whole Grains”, “Made with whole wheat” claims
- Nutritional Front of Pack statements, e.g., “0 grams trans fat per serving”, Nutrition facts Up Front
- Claims of the use of non-genetically engineered ingredients
- Claims that are undefined in FSIS regulations or the Food Standards and Labeling Policy Book

Many of these claims are regulated by the Federal Trade Commission (FTC).

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\(^1\) FSIS Compliance Guidance for Label Approval, Nov. 2015.
Process Labeling of Food: Consumer Behavior, the Agricultural Sector, and Policy Recommendations

Abstract

The simple phrase "You are what you eat" is commonly taught to children and then repeated throughout one's life. This phrase speaks to the intimate connection between individuals' food choices and their health—and even their personal identity. Yet most modern consumers rarely grow their own food, which means that what people "are" is a bit out of their control. Given today's predominantly global food supply chain, consumers have little ability to observe directly the production process that created the food they eat.

Consumers are frequently exposed to labels communicating specific processing aspects of food production, such as Certified Organic, Rainforest Alliance Certified, rbST-free, Fair Trade, and Free of Genetically Modified Organisms. At the root of this phenomenon are the desires for individual control and a diffuse distrust in the safety and health of the food produced by modern agriculture. These desires are paired with concerns about the ethical, social, and environmental consequences of food production. Under appropriate third-party or governmental oversight, these "process labels" can effectively bridge the informational gap between producers and consumers, satisfying consumer demand for broader and more stringent quality assurance criteria, and ultimately create value for both consumers and producers. Despite these potential benefits, process labeling often has serious unintentional consequences. For instance, labeling the benefits of a process for a
What about the Consumer?
Top attributes consumers say they look for: ¹

1. Natural (85%)
2. “Clean” label (84%)
3. Sourced in USA (82%)
4. High protein (81%)
5. Low sodium (78%)
6. Antioxidants (78%)
7. Trans fat-free (78%)
8. Organic (68%)
9. Non-GMO (66%)

Less than 35%, however, are willing to pay more for any of these

¹ Source: Mintel, 2016
Taste continues to have the greatest impact on the decision to buy foods and beverages. Sustainability is up from 2015.

How much of an impact do the following have on your decision to buy foods and beverages? (% Rating 4 to 5 on 5-point scale, from No Impact to A Great Impact)

Source: International Food Information Council, 2016 Food and Health Survey

Note: Arrows indicate significant (.95 level) differences vs. 2015.
What’s driving this?

- Increasing interest in health and wellness
- Desire for more transparency
- Food activism
  - Much of it irresponsible, promoting fallacies that exploit consumer fears and lack of technical/scientific training
Fallacious arguments that influence consumers

• Appeal to Nature (argumentum ad naturam)
  • Everything *natural* is *good*
  • Everything *unnatural* is *bad*

• Appeal to Emotion
  • Fear (of chemicals; of the unknown)
    • "If you can’t pronounce it, don’t eat it"
  • Disgust ("yuck" factor)
SUBWAY AGREES TO REMOVE PLASTIC CHEMICAL FROM THEIR BREAD

Don't eat it until they do it!

North America VS UK, EU, Australia

Subway uses Azodicarbonamide in their 9-Grain Wheat, 9-Grain Oat, Honey Oat, Italian Whole Wheat, Herbs & Cheese, and Oregano Sour. Subway does not use Azodicarbonamide in their bread in other regions.

KEEP THE PRESSURE ON! SIGN THE PETITION:
foodbabe.com/subway #NoWaySubway

R. Tarté – 29 Jun 2017
Lab-made meat rebranded ‘clean meat’ to address ‘yuck’ factor

By Oscar Rousseau+, 09-Sep-2016

Related topics: Products, Environment, Analysis, Beef, Pork, Lamb, Poultry, Game

Bosses at high-tech food companies producing meat in laboratories have stopped using terms ‘lab-grown’ or ‘cultured meat’ over concerns this puts people off the revolutionary protein.

The alternative meat industry is growing at an accelerated pace and as companies like SuperMeat and Memphis Meat garner more publicity, the companies want to use new terminology to make their products more appealing.

When the industry now talks about meat produced through tissue engineering, they want people to associate this with ‘clean meat’ – not cultured or lab-grown meat like has been the case hitherto.

Bruce Friedrich, executive director of the Good Food Institute, explained the thinking behind the strategy on his blog: “First, ‘clean meat’ is a more accurate way of describing real meat grown without animal slaughter. Second, ‘clean meat’ is similar to ‘clean energy’ in that it immediately communicates important aspects of the technology - both the environmental benefits and the decrease in food-borne pathogens and drug residues.”

Support for clean meat

“At SuperMeat we don’t use lab-grown meat, but cultured meat, and we are 100% supportive of the term clean meat,” said Koby Barak, the co-CEO and co-founder of SuperMeat.

There have also been a few misconceptions made about meat produced in a lab, when it’s referred to as ‘cultured meat’. Food scientists at an Institute of Food Technologists conference in the US thought it meant canned, salted, cured or aged meat, according to Friedrich.

But moving to clean meant accurately communicates what meat produced in a laboratory is all about: that it could be better for people and the planet.

Whilst having lab-grown protein readily available for consumers is a long way off (Supermeat won’t even have a single lab-grown chicken breast for another two years). A change of tact from the companies involved in the world-changing
Fallacious arguments that influence consumers

• Appeal to Nature
  • Everything *natural* is *good*
  • Everything *unnatural* is *bad*

• Appeal to Emotion
  • Fear (of chemicals; of the unknown)
    • “If you can’t pronounce it, don’t eat it”
  • Disgust (“yuck” factor)
  • Guilt (“....you’re feeding *that* to your child?”)
  • Nostalgia (“...things were better in the good old days”)
Fallacious arguments that influence consumers

- Appeal to Intuitiveness and Simplicity
  - If it *seems* that way, it *is* that way (appeal to the senses and not the intellect)
  - “Don’t bother me with the facts”
Fatal attraction: the intuitive appeal of GMO opposition

Stefaan Blancke1, Frank Van Breusegem2,2, Geert De Jaeger2,2, Johan Braeckman1, and Marc Van Montagu2,2,4

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2 Department of Plant Systems Biology, VIB, 9000 Ghent, Belgium
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Relapse into biased thinking. Lay people are often unable or are simply not interested in investing large amounts of time and energy to acquire a profound grasp of complex technologies. Therefore, when lay people are confronted with and have to evaluate information about GMOs and the risks involved, they will predominantly rely on their intuitive mind. As a result, lay people tend to prefer GMO representations that are most in line with their intuitive expectations and, thus, are easier to understand and remember. Anti-GMO groups have successfully tapped
Fallacious arguments that influence consumers

- Appeal to Intuitiveness and Simplicity
  - If it *seems* that way, it *is* that way (appeal to the senses and not the intellect)
  - “Don’t bother me with the facts”
- Argument by Repetition
  - If I hear it often, it must be true
- Appeal to Corporate Size
  - BIG is BAD (...*and EVIL*)
Fallacious arguments that influence consumers

Catalyzed by the internet and social media, they lead to fear of science and mistrust of scientists
Major Gaps Between the Public, Scientists on Key Issues

Despite broadly similar views about the overall place of science in America, there are striking differences between the views of the public and those of the scientific community connected to the American Association for the Advancement of Science (AAAS) on a host of science-related issues, from whether genetically modified foods are safe to eat to whether the world’s growing population will be a major problem. See how their views differ by clicking on the topics below.

Despite broadly similar views about the overall place of science in America, there are striking differences between the views of the public and those of the scientific community connected to the American Association for the Advancement of Science (AAAS) on a host of science-related issues, from whether genetically modified foods are safe to eat to whether the world’s growing population will be a major problem. See how their views differ by clicking on the topics below.
Nitrate  Fats  Hormones  Diacetate
Pesticides  Organic  Phosphates  Animal Rights
Processed  Cancer  Erythorbate  Nitrite
Fertilizers  GMOs  LACTATE  Artificial
Chemicals  Sodium  Antibiotics  WHAT, ME WORRY?
MAD
Labeling Trends in the Food Industry

- Simplicity
  - Limited or no artificial and unfamiliar ingredients or preservatives
- Natural
- Organic
- Process Labeling
- “Clean Label”
  - Term adopted by industry in mid-2000s
  - No clear definition, encompasses a number of things
  - Driven by concern over additives and desire for “natural”
Natural/“Clean Label” Approaches in Processed Meats

- Replacement of unfamiliar or chemical-sounding ingredients with natural sources of the same
  - e.g., sodium nitrite → celery juice
- Replacement of familiar ingredients with more “clean” label or natural versions of the same
  - e.g., sugar → evaporated cane juice
# Targeted Ingredients in Processed Meats

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Function(s)</th>
<th>Natural source(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium nitrite</td>
<td>Cured flavor</td>
<td>Celery; Swiss chard (NO₃⁻ reduced to NO₂⁻ via fermentation)</td>
</tr>
<tr>
<td></td>
<td>Cured color</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Microbial control</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Antioxidant</td>
<td></td>
</tr>
<tr>
<td>Sodium erythorbate</td>
<td>Reductant (cure accelerator)</td>
<td>Cherry powder</td>
</tr>
<tr>
<td>Sodium ascorbate</td>
<td></td>
<td>Acerola powder</td>
</tr>
<tr>
<td>Sodium lactate</td>
<td>Microbial control (food safety, shelf-life)</td>
<td>Vinegar, Microbial fermentates (cultured sugar, cultured dextrose, etc.)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lemon juice &amp; solids</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Plant extracts</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Physical processes (high-pressure; post-package pasteurization)</td>
</tr>
</tbody>
</table>
## Targeted Ingredients in Processed Meats

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Function(s)</th>
<th>Natural source(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium phosphates</td>
<td>Meat protein solubilization (texture, processing yields)</td>
<td>???</td>
</tr>
<tr>
<td></td>
<td>Metal chelation (antioxidant)</td>
<td></td>
</tr>
</tbody>
</table>

R. Tarté – 29 Jun 2017
## Targeted Ingredients in Processed Meats

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Function(s)</th>
<th>“Clean” label version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sugar</td>
<td>Sweetener</td>
<td>Evaporated cane juice</td>
</tr>
<tr>
<td></td>
<td>Sugar source for fermentation</td>
<td>Turbinado sugar</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Raw cane sugar</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Molasses</td>
</tr>
<tr>
<td>Salt</td>
<td>Protein solubilization</td>
<td>Sea salt</td>
</tr>
<tr>
<td></td>
<td>Flavor enhancement</td>
<td></td>
</tr>
<tr>
<td>Modified starches</td>
<td>Binder</td>
<td>Starches (native)</td>
</tr>
<tr>
<td>Carrageenan</td>
<td>Binder</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>Texturizer</td>
<td></td>
</tr>
</tbody>
</table>
Wouldn’t it be great if all lunchmeat didn’t contain preservatives? We think so. That’s why we make HORMEL® NATURAL CHOICE® lunchmeat with no preservatives and nothing artificial. Leaving just great tasting lunchmeat. Naturally.

We match a portion of the electricity used to prepare and package this product with renewable energy certificates.
Main challenges of “clean” label ingredients

• **Efficacy**
  • Active molecule usually not as effective as conventional and/or not present in high enough concentrations

• **Flavor**
  • Less refined ingredients sometimes carry objectionable flavor contributors
Main challenges of “clean” label ingredients

- **Cost-in-use**
  - = price x usage level
  - Driven by cost/price and functionality
  - Prices tend to be high; functionality tends to be low

**Example:**

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Price/lb.</th>
<th>NO$_2^-$ content</th>
<th>NO$_2^-$ cost/lb.</th>
<th>Cost-in-use (per lb. meat)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conventional curing salt</td>
<td>$0.35</td>
<td>6.25%</td>
<td>$5.60</td>
<td>$0.0007</td>
</tr>
<tr>
<td>Celery powder</td>
<td>$30.00</td>
<td>2.25%</td>
<td>$1,333</td>
<td>$0.1600</td>
</tr>
</tbody>
</table>

* To achieve a level of 120 ppm on a meat basis
Potential Implications

• **Food safety**
  • Fewer antimicrobial options

• **Food security**
  • Shorter shelf-life
  • No GMOs, fertilizers, pesticides

• **Food affordability**
  • Lower yields
  • Costlier ingredients & processes
Potential Implications

• **Food diversity**
  • Decrease in product innovation due to fewer ingredients in the toolbox

• **Ongoing trust in science**
Appendix
Natural/“Clean Label” Labeling Requirements in Processed Meats

- Uncured
- Natural
- Organic
- Process Labeling

Note: these requirements are in addition to the basic USDA labeling requirements for meat & poultry products previously discussed.
Labeling Requirements: “Uncured”

• Products in which nitrate or nitrite is permitted or required may be prepared without them and must contain the following label statements:
  • “Uncured”. (9 CFR 319.2)
  • “No Nitrate(s) or Nitrite(s) Added”. (9 CFR 317.17(c)(1))
  • “Not Preserved—Keep Refrigerated Below 40°F At All Times” unless they have been thermally processed to $F_0$ of 3 or more, have been fermented or pickled to pH of 4.6 or less, or have been dried to a water activity of 0.92 or less.” (9 CFR 317.17(c)(2))
Labeling Requirements: “Uncured”
Labeling Requirements: “Uncured”
Labeling Requirements: “Natural”

• The term “natural” may be used provided that product¹:
  1. Does not contain any artificial flavor or flavoring, coloring ingredient, or chemical preservative (as defined in 21 CFR 101.22), or any other artificial or synthetic ingredient; and
  2. Its ingredients are not more than minimally processed.
• Therefore, sodium nitrate or nitrite are not allowed and products must be labeled “uncured”.

¹ USDA-FSIS Food Standards and Labeling Policy Book
Labeling Requirements: “Natural”

• **Minimal processing** may include\(^1\): (a) those **traditional processes** used to make food edible or to preserve it or to make it safe for human consumption, e.g., smoking, roasting, freezing, drying, and fermenting, or (b) those **physical processes** which do not fundamentally alter the raw product and/or which only separate a whole, intact food into component parts, e.g., grinding meat, separating eggs into albumen and yolk, and pressing fruits to produce juices.

\(^1\) USDA-FSIS Food Standards and Labeling Policy Book
Labeling Requirements: “Natural”
Labeling Requirements: “Natural”
Labeling Requirements: “Organic”

- Governed by Organic Foods Production Act (1990) and managed by the National Organic Program (NOP)
  - Establishes prohibited practices, requirements and allowed substances
- Synthetic and non-organic substances that may be used are listed in the National List of Allowed and Prohibited Substances (7 CFR 205.605 and 606)
  - Sodium nitrate or nitrite specifically prohibited
    - Products must, therefore, be labeled “uncured”.
Labeling Requirements: “Organic”

- “100% Organic”
  - Only organically-produced ingredients and processing aids
  - Water and salt are excluded
  - Can use USDA organic seal

- “Organic”
  - 95%+ organically-produced ingredients, excluding water and salt
  - Can use USDA organic seal

- “Made with Organic Ingredients”
  - 70+ organically-produced ingredients
  - Cannot use USDA organic seal
Labeling Requirements: “Organic”