

# What's in our Food?

## Genetically Modified Organisms: Considering the Risks

An Analysis and Summary of Relevant Research on the field of GMOs (John Burnett, Vicca Chang, Laura Gilmour, and Jen shragge) 2002.



<http://www.flag-sa.org/betablog>

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Do you know what you are truly eating?...

# What are Genetically Modified Organisms?

- An organism whose genetic characteristic have been altered by the insertion of a modified gene or a gene from another organism using the technique of genetic engineering.
  - Recombinant DNA
    - DNA molecules from different sources, which are then combined into one molecule. This creates a new set of genes.
  - Transgenic organisms
    - Inserted DNA that originated in a different species
- Different types of GMOs: livestock, agriculture, insects
  - Use of GM products in crop production

# History of GMOs

- 1982, first experiments
  - Tobacco plants
    - Tobacco plant DNA had been previously researched
- 1994, 1<sup>st</sup> GMO Product
  - A tomato that was engineered to ripen more slowly so it could be easily shipped
  - FlavrSavr



<http://www.google.com/imgres?imgurl=http://1.bp.blogspot.com/>

# How does this relates to you?

- What did you eat for breakfast today?
  - Approximately 1/3 of us ate GM food with out even knowing it.
- Approximately 85% of all soybean, cotton, and corn in the US are Genetically Modified
- Potential health risks, unknown consequences



# A National Debate

- Two general perspectives
  - In support of GM technology, beliefs that such a practice could relieve global concerns (world health) and provide beneficial aspects
  - Opposed, challenging that GM technology will conclude in irreversible consequences



# Perspective: Advocate

- Believe that GMOs will help solve the problem of world hunger.
  - GM crops could be enhance to produce higher yields or food values
- Could have a major impact on deforestation and desertification.
  - Over 35% of the arable land in Nigeria has been lost to deforestation. Attempts to reverse this tend have been unsuccessful because of drought.

# Advantages

- Increased production of food (addresses World Hunger concern)
  - World population is over 6 billion, estimated to double in the next 50 years
  - Decrease in price, increase in supply (of food)
- Pest resistant and herbicide tolerant
  - Decreased use of herbicides and pesticides
- Disease resistance

# Advantages

- Cold tolerance
- Drought tolerance
  - Increase crop and tree production thus decreasing the amount of CO<sub>2</sub>
- Nutrition
  - Added Vitamins
  - Higher protein level
    - “golden rice,” third world countries



<http://india.indymedia.org/en/2005/03/210191.shtml>



# Perspective: Opposed



<http://www.cheeseslave.com>

- Increase food produce could lead to:
  - increase in population
  - Decrease in food quality
- Issues with regulations
  - Not mandatory to label GM foods in the US.
- Unknown consequences; potential irreversible damage
  - Health risks
  - Disruption to the natural system/ecosystems

# Disadvantages

- Environmental hazards
  - Unpredictable
    - Pests may become resistant to GM crop
  - Hard to regulate
    - Can transfer through pollen
    - Cross-pollinate
      - Super-weeds
    - Issue with legal regulation
  - Unintended negative consequences to other organisms
    - Modified corn
      - produces a pollen that kills insect larvae
      - Thus killing monarch butterfly caterpillars.

# Disadvantages

- Human Health Risks unknown
  - Immune and endocrine disorders
  - Accelerated aging
  - Organ damage and reproductive issues
  - No clinical study conducted in the US
  - Emergence of new diseases, or infections that are antibiotic resistant

# Regulation

- FDA
  - Controls the labeling aspect
- USDA
  - Voluntary process verification services and programs to standardize testing methodology
  - Regulatory Services for Animal and Plant Health Inspection Service to regulate field testing
  - Biotech-related research
- EPA
  - Provides the community with modern genetic tools for evaluating long-term risk of GM crops.
- Consumer rights?

<http://www.fda.gov/food/guidancecomplianceregulatoryinformation/guidancedocuments/foodlabelingnutrition/ucm059098.htm>

<http://www.epa.gov/eerd/19119.htm>

<http://www.usda.gov/documents/BIOTECHNOLOGY.pdf>

# Pros and Cons to the Primary Paper

- Pros

- Not opinionated or bias
- Presented both sides
- Used many other research papers to support ideas

- Cons

- 8 year old paper
- Lacks scientific numbers and statistics to back up their claims.

# Questions?

