So, What’s So Bad About Soybeans?

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A little History:

~1100 BC – Domesticated in Southeast Asia
   Consumed mostly after precipitation and fermentation

1765  1st planting in the US – Georgia Colony

1851  First plantings in the Corn Belt (Illinois)

1870’s Popular as livestock forage  (Thrived in hot, humid climate)

1904  George Washington Carver
      Soybean Oil

1929  William Morse,
      10,000 Chinese varieties imported

1935  Henry Ford, Soy plastic in cars
1940’s  Soy Cultivation increases after WWII  
Discovery of Vitamin B12  
Increases in meat consumption  
1950’s  Soy becomes a primary protein source for livestock,  
esp. Poultry and Swine

“Soybeans are not fed to any extent to poultry. They are a vegetable protein concentrate but are not so valuable as the soybean oil meal.” Gustave Heuser, 1955, *Feeding Poultry*, p 118.

Reference: www.soystat.com/2012

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**U.S. Soybean Meal Use (1980-2012)**

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**World Soybean Production (2011/12 Projected)**

Soybean Problems

Anti-Nutritional factors

- Enzyme inhibitors
- Oligosaccharides
- Phytates etc.

Isoflavones – genistein daidzein

Phytoestrogens

Genetically Modified Organism – GMO (GM)
Commercial US Soy ~ 90%

High Phytic Acid (Phytates): Reduces assimilation of calcium, magnesium, copper, iron and zinc. Phytic acid in soy is not neutralized by ordinary preparation methods such as soaking, sprouting and long, slow cooking, but only with long fermentation. High-phytate diets have caused growth problems in children.

Trypsin inhibitors: Interferes with protein digestion and may cause pancreatic disorders. In test animals, trypsin inhibitors in soy caused stunted growth.

Goitrogens: Potent agents that block synthesis of thyroid hormones and can cause hypothyroidism and thyroid cancer. In infants, consumption of soy formula has been linked with autoimmune thyroid disease. Goitrogens interfere with iodine metabolism.
Anti nutritional factors

Soy processing reduces
the problems
heating
oil extraction

Don’t fed
raw Soy

Phytoestrogens/Isoflavones: Plant compounds resembling human estrogen can block your normal estrogen and disrupt endocrine function, cause infertility, and increase your risk for breast cancer

Most data suggest that these compounds have more positive effects than negative
Other “Internet induced” Soybean problems

**Hemagglutinin:** A clot-promoting substance that causes your red blood cells to clump, making them unable to properly absorb and distribute oxygen to your tissues.

**Synthetic Vitamin D:** Soy foods increase your body's vitamin D requirement, which is why companies add synthetic vitamin D2 to soymilk (a toxic form of vitamin D).

Other Internet induced Soybean problems

**Vitamin B12:** Soy contains a compound resembling vitamin B12 that cannot be used by your body, so soy foods can actually contribute to B12 deficiency, especially among vegans.

**Protein Denaturing:** Fragile proteins are denatured during high temperature processing to make soy protein isolate and textured vegetable protein (TVP). Chemical processing of soy protein results in the formation of toxic lysinoalanine and highly carcinogenic nitrosamines.

**MSG:** Free glutamic acid, or MSG, is a potent neurotoxin. MSG is formed during soy food processing, plus additional MSG is often added to mask soy's unpleasant taste.

**Aluminum and Manganese:** Soy foods contain high levels of aluminum, which is toxic to your nervous system and kidneys, and manganese, which wreaks havoc on your baby's immature metabolic system.
1990’s
Genetic Modifications begin – Monsanto

Agrobacterium tumefaciens
Naturally infects plant cells with its own DNA

A: Agrobacterium tumefaciens
B: Agrobacterium genome
C: Ti Plasmid: a: T-DNA, b: Vir genes, c: Replication origin, d: Opines catabolism genes
D: Plant cell
E: Mitochondria
F: Chloroplast
G: Nucleus
New evidence suggests that the blue egg gene was added to the chicken genome via a natural insertion by a retrovirus.

Simplified Genetic Engineering; Moving genes from one organism to another. *Agrobacterium tumefaciens*
Other, earlier uses of GMO Technology

Humulin – 1978
Human insulin gene into E.coli

Interferon – 1980
Human interferon gene into Bacteria or Yeast cells

Irina Ermakova
Institute of Higher Nervous Activity and Neurophysiology of the Russian Academy of Sciences

25 of the 45 (55.6%) rats from the GM soy group died compared to only 3 of 33 (9%) from the non-GM soy group and 3 of 44 (6.8%) from the non-soy controls.
Molecular Biology Professor at Caen University France

Gilles-Eric Seralini

Up to 50% of males and 70% of females suffered premature death.

- Rats that drank trace amounts of Roundup (at levels legally allowed in the water supply) had a **200% to 300% increase in large tumors**.

- Rats fed GM corn and traces of Roundup suffered **severe organ damage** including liver damage and kidney damage.

(NaturalNews) GMOs may be the new thalidomide.

The Seralini Affair or Seralini Tumor-Gate

Dr. Judy Carman
Associate Professor in Health and the Environment, School of the Environment, Flinders University in South Australia

Journal of Organic Systems

No differences seen between pigs fed the GM and non-GM diets for feed intake, weight gain, mortality, and routine blood biochemistry measurements.

GM diet had a higher rate of severe stomach inflammation - 32 percent of GM-fed pigs compared to 12 percent of non-GM-fed pigs.

“The study’s conclusions don’t really stand up to statistical scrutiny…” Prof David Spiegelhalter, Winton Professor of the Public Understanding of Risk at the University of Cambridge
“Chicken (sic) are GENETICALLY MODIFIED with hormones, carcinogens, GMOs, corn pills, arsenic and drugs so they become LARGER FASTER and as a result they often CRIPPLE under their own weights”

Seattle Organic Restaurants
http://www.seattleorganicrestaurants.com/vegan-whole-foods/genetically-modified-chickens/
Dr. Sally McKenzie, professor in the Agronomy and Horticulture Department at the University of Nebraska-Lincoln offers another perspective:
“... genetic modification simply introduces a new protein to the plant. Proteins are digested and the amino acids (from the proteins) are absorbed into the digestive system. So, there is virtually no way that the GM protein would ever be recognizable by the human system after it has passed through the chicken or cow that ate the GM corn or soybeans. If the protein is not a human allergen in its intact state, there is no reasonable way that it would become an allergen after ingestion by a cow.”

Dr. Denneal Jamison-McClung of the College of Biological Sciences at the University of California-Davis explains how the allergen content and nutritional profile of food products from animals that consume GM feed cannot be different from animals consuming conventional feed:
“... the digestive tracts of animals break down nucleic acids (genes) and proteins into biological building blocks (nucleotides and amino acids), whether these molecules are derived from GM or conventional feed. Movement of whole GM nucleic acids and proteins from GM feed into the milk, meat and eggs of animals that eat GM feed is not physiologically possible.”
British author and environmentalist Mark Lynas, who helped form the anti-GM movement in the 1990s, announced a change of heart in January 2013: “... my conclusion here today is very clear: the GM debate is over. It is finished. We no longer need to discuss whether or not it is safe – over a decade and a half with three trillion GM meals eaten there has never been a single substantiated case of harm. You are more likely to get hit by an asteroid than to get hurt by GM food…”

Conclusion: Research consensus is that Soy is safe.

Reality: There will always be skeptics of technology

$10/doz