

Long-Term Effects Of Engineered Food Products On Nutritional Value

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Abstract-

It has been several decades since people began utilizing genetically modified (GM) or altered food products. Foods that have been genetically modified (GM) are very frequently found in diets today. The rationale behind creating food goods using engineering was to support agriculture, lower expenses, save time, increase product shelf life, and fulfill demand for the product faster. Now the question is what foods have been engineered, and what are their primary use in our human lives? Engineered foods are food items with genetically modified organisms (GMOs) or have undergone various processing methods to change their composition or characteristics.

The primary goal of genetic engineering in food production is to introduce beneficial characteristics that improve productivity in agriculture, nutritional value, or other aspects important to food production and consumption.

These days, individuals believe that their daily bowl of mixed fruit muesli, which just requires two minutes to prepare, would provide their bodies with enough nutrition. What if I argue that these claims are untrue? Your busy daily schedule covers the truth behind the many promises made by various companies, which is not always what it seems. Examples of these claims include those concerning daily refreshing drinks or packed 0-preservative food items.

The long-term impacts of genetically modified foods on human health and nutritional value are examined in this research article. It looks at both positive and negative effects, including altered macronutrient profiles, risks associated with nutrient loss or alteration and consequences for gut flora. Positive elements include nutrient fortification, consumer awareness and education, and accessibility.

In order to ensure that altered food products eventually contribute positively and negatively to human well-being depending upon consumption, the discussion emphasizes the significance of balanced intake and continued research into the nutritional, health and environmental implications of these products.

Keywords; *Genetically modified (GM), Fortification, Human, Well-Being, Nutritional-Value, Engineered foods.*

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I. Introduction

In today's fast-paced technological world, the landscape of food production has undergone significant transformation with the advent of engineered food products. Due to our tight schedule and the time that is moving almost in the blink of an eye, our generations, like Millennials and Gen-Zs, are so dependent on these ready-to-eat and packaged foods that it takes hardly a few minutes to be ready. Fast Food consumption has become a global trend with India's fast-food industry expanding at the rate of 40% every year.¹ As a result of this, all the processed food companies have capitalized on this temporal uncertainty. These products, often promoted for their convenience to prepare, extended shelf life, and enhanced taste, represent a drastic transformation in how we cook and consume food. However, in parallel with these advancements, concerns have arisen regarding their impact on the long-term nutritional quality of human diets.

The deficiency of nutritional percentage in one's body is the home of chronic diseases. As engineered food products become more prevalent in our diets, questions arise regarding their hidden effects on the essential nutrients necessary for human well-being. Do these products maintain, enhance or inadvertently reduce essential minerals and other nutritional components required for a balanced diet?

¹ National Library of medicine. "Fast Food Consumption Pattern and Its Association with Overweight Among High School Boys in Mangalore City of Southern India." National Library of medicine

This research paper aims to investigate the following topics: “What are the ingredients should not be in your food that are causing dangerous diseases”, “Why we should be aware of the junk we and our family are consuming in the name of health”, “The long-term and Short-term effects of engineered food products on nutritional value” and “how processing and manufacture can impact your health.”

By examining existing data, food surveys, nutritional studies, and quantitative findings, this paper seeks to elucidate whether these engineered products contribute positively or negatively to the nutritional intake of consumers. Furthermore, it will analyze the repercussions of any observed changes in nutritional value on public health and human wellness.

Observing the impact of engineered food products on nutritional value is not merely an academic practice but a critical inquiry with significant repercussions for food product policy, public health strategies, and consumer choice. By exploring this topic, we hope to contribute to the enlarged discourse on sustainable and health-conscious food systems in the contemporary era.

II. How Food Manufacturing Affects Consumer Health –

To advance the food industry, food manufacturers frequently carry out practices that have a negative influence on consumer health.

Chemical additives- Food manufacturers use these additives to improve the flavour, texture, appearance, and life span of their products. Consuming these chemicals may result in chronic ailments, as some of them have been connected to a number of health issues. For instance, one of the most regularly used food additives in commercial meals is monosodium glutamate (MSG), which is primarily intended to increase taste. Besides enhancing the taste of food, these additives also stimulate a happy hormone ‘Dopamine’ which makes the consumer crave more junk foods like instant noodles, chinese food, and other packaged food items. This is not just one in a list of harmful substances we consume to satisfy our taste buds. It's a very long list ahead.

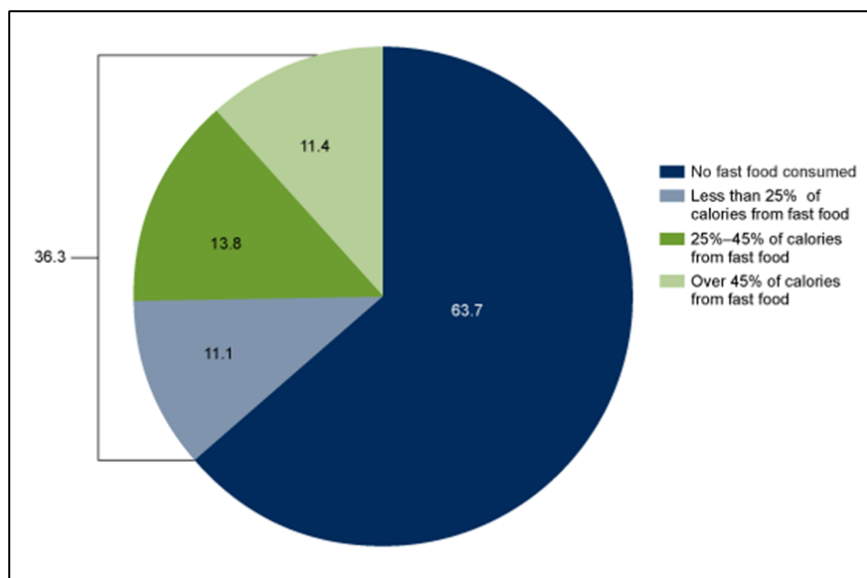
Artificial flavors and colors- The majority of food companies frequently use them to enrich the appearance and appearance of processed foods. On the other hand, allergic reactions, hyperactivity in children, long-term effects on neurological function, and an elevated risk of cancer are some of the detrimental consequences they have on consumer health. And in the advanced generation, we all are witnessing one such side effect, “Puberty”. Although there is no such proof, many studies say that there is a high chance that early puberty might be increasing because of fast food consumption.

Packaging materials- This is another crucial component that significantly impacts consumer health. The usage of plastic packaging materials can leach chemicals into food, especially when they are exposed to heat or certain acidic conditions.

This is how humans often get affected by chronic diseases and several health issues.

What percentage % of children and adolescents consume fast foods or unhealthy foods on a given day?

Percentage of children and adolescents aged 2–19 years who ate fast food on a certain day, represented as a percentage of total calories consumed: United States, 2015–2018.



SOURCE: National Center for Health Statistics, National Health and Nutrition Examination Survey, 2015–2018

III. Health Implications And Nutritional Content Of Engineered Foods –

We're all aware of the health risks that result from genetically modified food. But food that has been altered can potentially have certain nutritional benefits as well. The short- and long-term impacts of genetically modified foods and the nutritional value of engineered foods are listed below.

Short-Term Effects of Engineered Foods: Consuming packaged foods on a regular basis or very often can cause several health issues in your body and affect health, such as **blood sugar levels:** foods that are high in simple carbohydrates, such as sugary snacks, white bread, etc., can lead to high levels of insulin and sugar in your body.

Digestive health: Certain food items, particularly those high in fiber, such as fruits, vegetables, and whole grains, can promote healthy digestion through controlling gastrointestinal motions and preserving intestinal health. On the other hand, diets high in fat or lacking in fiber might cause dysfunctions or pain in the digestive system.

Long-Term Effects of Engineered Foods: Foods we often intake in the diet that are considered healthy or tasty can cause several issues in your body and affect health because of their ingredients or making process, such as **gut health;** the balance of beneficial bacteria in the gut is influenced by diet. A diet high in fiber and probiotics (found in fruits, vegetables, and whole grains) supports a diverse and healthy gut microbiome, which is linked to improved digestion, immunity, and overall health. **Chronic Disease Risk:** A diet high in unhealthy fats, saturated and trans fats, refined sugars, and low in protein and fiber is associated with an increased risk of chronic diseases like cardiovascular disease, type 2 diabetes, hypertension, and certain cancers.

Nutritional Content of Engineered Foods: Golden Rice and Biofortified Maize are designed to address nutritional deficiencies in regions where staple foods are central to diets. Beta-carotene-enriched golden rice addresses vitamin A insufficiency in populations dependent on rice. Biofortified maize varieties aim to boost essential nutrients like vitamin A, zinc, and iron. Similarly, GM soybeans offer improved fatty acid profiles for potential health benefits.

Indeed, there are so many effects of engineered food, but that only affects our health when we use it extensively. *The nutritional content of engineered foods,* we can see that fortified foods not only have negative aspects but also positive aspects. It all depends on how we consume it.

Following is the list of some of the diseases that caused by some specific food items-

Types of Junk Food	Harmful components consumption	Long-Term Impact on Health	Short-Term Impact on Health
Fish Sauce and Soya Sauce	Monosodium Glutamate	Overweight, Brain lesions, obesity, diabetes, neurotoxic effects, endocrine disorders	blood pressure, water retention, and strain on the heart and kidneys.
Sweetened Soda and Soft Drinks	High Fructose Corn Syrup	Weight gain and Diabetes, Hypertension, atherosclerosis, coronary heart disease, vascular resistance in the kidneys	Dehydration, Digestive Discomfort: blood sugar, dental issues etc.
Margarine, French fries, Doughnut, Pastry, Ice-cream	Trans Fat	Increase in Inflammatory markers (Heart Risk), T2DM, cancer and diabetes, cardiovascular disease	Weight Gain, Blood Sugar Spikes High in Unhealthy Fats and spikes LDL (bad) cholesterol
Buns, Bagels, flour bleaching agent and a dough conditioner.	Azodicarbonamide	Asthma, carcinogenicity	Increase hunger, mood swings, and energy crashes
French Fry cardboard sleeves, Burger and sandwich wrappers, Bread wrappers, containing Fluorine	Per/poly fluoroalkyl substances (PFAS)	Breast cancer, Fertility, Weakened Immune system,	Immune System Effects and Endocrine Disruption

IV. Ingredient Sourcing Practices –

We all know that most farmers who want to benefit from organic farming choose hybrid or inorganic farming, which is heavily reliant on chemicals and pesticides, because organic farming requires a lot more time and effort than conventional farming.²

² Apnikheti. "Organic vs Inorganic Farming."Apnikheti

Difference between organic and conventional farming;

Organic Farming - Also known as ecological or biological farming, emphasizes crop rotation and companion planting while using fertilizers derived from organic sources, like compost manure, green manure, and bone meal.

Composite Farming- Artificial fertilizers are applied to promote plant growth and development. This man-made process for the rapid growth of plants is one of the reasons behind bad gut health and indigestion in consumers.

Outcomes of Opting on Different Farming Products and Their Impacts on Our Health- Using organically farmed products might be pricey for numerous pockets as they're more susceptible to spoilage. While we talk about hybrids and inorganic farmed products, they contain artificial color for shine, pesticides, and chemicals for rapid growth.

V. Consumer Awareness And Education Accessibility

Making informed decisions is greatly influenced by education. Customers are better prepared to make ethical conclusions that fit their goals and beliefs when they are well-informed about items and their effects.

Role of Education in Promoting Balanced Diets: Exploring the role of education and initiatives in promoting balanced diets that include both engineered and non-engineered food choices. Nowadays multiple food bloggers, health awareness and educational youtube channels are really doing commendable jobs as they have cracked what our generation needs to know and which is the best median for it.

Approaches for Increasing Public Understanding of Engineered Foods: Suggesting various techniques to improve public understanding of the benefits, risks, and implications of engineered foods through education, communication, and transparency. And one should be aware of the ingredients list before consuming any engineered food.

Crucial Role of Sensible Choices of Food: Focusing on the importance of customer awareness and education in making informed decisions about the intake of genetically modified and processed foods.

In sum, accessibility to education ensures that information reaches a wider audience, empowering individuals to navigate the marketplace confidently and responsibly. This combination fosters a culture where consumers can advocate for sustainable practices and make choices that benefit both themselves and the environment.

VI. Conclusion

To sum it up briefly, from a nutritional perspective, modified food products are a double-edged sword. These food products offer remarkable ease, convenience and extensive shelf life, which attract more consumers but in the results there are some serious concerns about their long shelf-life as it is giving high risk of several diseases and more on our daily intake of nutritions. This research paper has examined the benefits, including improved availability and nutrient fortification, as well as the drawbacks, like potential risks to health from additives and changed macronutrient compositions.

Understanding the complexities of these engineered food products which is also known as GMFP (genetically modified food products) requires a strong initiative to educate and raise awareness among users. Efforts to improve public health awareness of these products through clear labeling, educational programs, and easily accessible information are necessary to help people in making informed food choices. As we all know, not all consumers know scientific terms, so it's crucial to label food ingredients in plain, easily understandable language. Moreover, it is crucial to investigate the nutritional value of each food product, health and environmental effects of genetically modified foods to ensure their potential to improve human health in the long-term.

To encourage long-lasting and health-conscious food systems going forward, legislators, medical professionals, and food producers must work together. In the coming years, this cooperative endeavor will play a pivotal role in reducing dangers and optimizing the advantages of modified food items, ultimately advancing public health and wellbeing.

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