

# Importance of Food Biotechnology

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## ABSTRACT

Multiple recent advancements in the food industry attest to the exceptional work of food biotechnology. Flavour, shelf life, nutrition, and quality of sustenance are all improved with Genetic modified life forms. GM fermentative microbes and alike, on other hand, are used to make proteins for food sector. Biotechnological techniques specifically genetic engineering are used to produce GM foods. External standard of passion for living person is hereditary construction object. Aim of such outside working class is to improve quality and quantity of sustenance. So such techniques may be employed to delete starvation from needy individuals in developing world specifically Africa. Other than optimistic views, there are a few questions. We're altering DNA that may be beneficial, harmful, or neutral, resulting in variety of unintended consequences. Health problems may be present in such results. Any people are opposed to nutrition nanotechnology because of other concerns. Biologists are also opposed to the use of food biotechnology. Inherited construction is, as they say, facilitating of nature.

**Keywords:** Biotechnology, Food industry, DNA, GM yeast, Nourishment biotechnology

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## INTRODUCTION

Hereditarily adjusted nourishment is blended utilizing biotechnological devices. As a result, such strategies may be used to eliminate hunger in the developed world, especially in Africa. There are a few issues in addition to constructive viewpoints. We're changing DNA in ways that can be positive, negative, or indifferent, with a slew of unintended effects.

Such outcomes may indicate health issues. People object to diet nanotechnology for variety of reasons. The usage of biotechnology is still criticised by biologists. Like they claim, inherited architecture facilitates existence [1-3].

This is also beneficial to the digestion process. But, in the third word, biotechnology is helpful in eradicating starvation, malnutrition, and diseases from developing countries. Since today's biotechnology products are cost-effective, they will help to boost the agriculture as well as the food market, resulting in increase in the wages of poor farmers.

## FOOD BIOTECHNOLOGY ROLE IN PROCESSING OF FOODS

### Fermentation

Distilleries are integrated into the maturing process. At the industry stage, different yeasts are used to make brewing function. People can now render lightweight wine thanks to inherited construction. Except performance coding lipase causes hereditary changes in yeast. Glucoamylase, which transforms carbohydrate to glucose, is communicated by yeast and during maturing process.

Yeast strains exploited for wine amalgamation are perfect for malo-lactic maturation. Wine incorporation comprises of dual stages: 1) first maturation brings about alteration of glucose into liquor utilizing yeast. 2) Second maturation utilizes microorganisms and its product is lactic corrosive and this leads the ascent in level of acidity. For defeating the present issue various methodologies are utilized which are expensive. Such issue was comprehended *via* inclusion of malolactic quality in modern yeast strain. Quality brings down the malate transformation thus bringing down causticity level of wine [4-6].

### Enzymes

Compounds are utilized underway and handling of nourishment things explicitly created at modern stage. From decade ago of 20<sup>th</sup> century, nourishment handling organizations utilizing chemicals that were delivered *via*

hereditarily altered creatures. This catalyst contains proteases and carbohydrases. Qualities for such compounds were cloned for obtaining higher creation in short timeframe. Such proteins are utilized for developing cheddar, curd and seasoning nourishment things. Significant level of such proteins utilized in nourishment industry, eg US over half of proteases and carbohydrases are utilized nourishment trade. Such catalysts incorporate rennin and  $\alpha$ -amylase.

Few of genetically modified enzymes utilized are:

- Catalase utilized in mayonnaise generation and evacuates hydrogen peroxide.
- Chymosin helpful in cheddar generation since it coagulates milk.
- $\alpha$ -amylase changes over starch into maltose and utilized in preparing for sweetness.
- Protease utilized for meat tenderization procedure, preparing and dairy items.

### $\alpha$ -amylase

The production of corn syrup relies on mixture. This formulation offers multi nonstop process that provides higher return. Such density may be increased by up to 94% by disinfection. Grant devised mechanism to produce  $\alpha$ -amylase by inherited construction, using *Bacterium subtilus* as substrate, in 1996. The variable was a polymerase called pCPC720. The same year, the FDA approved this genetic layout to mix  $\alpha$ -amylase for use at a highest stage.

### Renin

Rennin is compound that is part of the rennet material used in the dairy industry. It's a protease protein that's used to make curd and stilton cheese. Curd formation is caused by hydrogenation of peptide bond of milk casein proteins, resulting in denaturation of these enzymes.

This compound has also been extracted from the stomachs of calves and utilized to congeal milk. In any scenario, smaller sum was obtained by this regular technique. However, bacteria (*Escherichia coli*) and lesions (*Aspergillus niger*) are currently hereditarily engineered to deliver exact amount at commercial stage.

### Shell life

Numerous succulent organic products have smaller shell life. For instance *Solanum lycopersicum* is utilized everywhere throughout globe. So to deliver, *Solanum lycopersicum* ought to be grabbed during develop green stage. In the wake of grabbing, they are exposed to ethylene for aging. Greater temperatures leads to early maturing while lower temperature devastates its flavour.

Californian organization named Calgene hereditarily designed *Solanum lycopersicum* to sift through this issue. They built up *Solanum lycopersicum* named *Flavr Savr Solanum lycopersicum*. A catalyst named polygalacturonase separates gelatin leading maturing, relaxing. Researchers hereditarily adjusted tomatoes to

lessen measure of this compound. They utilized antisense RNA for such reason. Less measure of the compound outcomes in lower breakage of gelatin and cell divider bringing about firmer tomatoes.

### BIOTECHNOLOGY USES IN YIELD IMPROVEMENT

Milk is of the nourishment thing utilized everywhere throughout the world because of its dietary benefit. Somatotropin, also known as cow-like somatotropin, is a protein secreted from the pituitary gland. It boosts milk production. This protein has also been eliminated from the minds of butchered calves. However, this results in small volume. In *E. coli*, scientists inserted performance cow-like Somatotropin. This protein is now available in greater quantities. This protein increases milk yield by around 15% to 20%.

By 2050, the world's population would have grown to nine billion people. As a result, more yields would be needed on the same field. Biotechnology is perhaps the most effective innovation for combating the problem of food yield. Africa has the highest degree of desirability and appetite. This increased appetite and deteriorating health lead to infections such as kwashiorkor and rickets that result in large number of deaths. Biotechnology has greatest ability to rid Africa of hunger, malnutrition, shortage of safe food, and diseases. It has the potential to improve people's outlook on life and reduce the mortality rate. Burundi, Sri Lanka, and Ethiopia are three countries in Africa that have recently benefited from changes in biotechnological strategic planning. For example, using GM essential nutrients invention, Burkina Faso's 0.2 million farmers increased crop yields by 128% [7-9].

The range of GM food innovation necessitated system for commercial delivery of GMO foods, as well as checks for mutagenicity, digestibility, and toxic content of GM food. Africa should be supported by the United States and the European Union in the region. A biosafety structure is needed in a number of African countries. In order for this structure to be successfully adopted, African countries should make biosecurity law making and support a priority.

Significant stumbling block in adoption of GM food technology is a lack of preparation. Kenyans are very concerned about GM food innovation, and that they have questioned it. Due to a massive lack of education, Kenyans have a negative attitude toward biotechnology. Scientists should organise workshops and other activities to educate people about the benefits and drawbacks of GM food technology.

### FOOD BIOTECHNOLY IN NUTRITION ENHANCEMENT

Each nourishment thing doesn't contain every basic segment. That is the reason each nourishment article isn't having immaculate sustenance. For instance rice is staple nourishment in numerous parts of globe. Utilization of Biotechnological systems has tackled these issues through presentation of remote nutrient quality.

Plant proteins are responsible for maximum of all protein synthesis, but they lack certain essential amino acids such as lysine and sulphur-comprising amino acids. Corn has been genetically modified to interact proteins provided by *Bacillus thuringiensis*, a soil microscopic

organism. Different nanotechnology sub-atomic techniques are used to overcome scarcity of essential amino acids, as detailed below. Table 1 represents modified crops with amino acid genes, source of gene of interest and modification frame.

**Table 1. Modified crops with amino acid genes, source of gene of interest and modification pathway.**

Name of transgenic plant	Molecular pathway for modification	Enhanced Essential amino acids	Fore incorporated IGN genes
Tobacco	Synthetic gene approach	Overall amino acids	<i>Aspl</i>
Sunflower seed	Manipulation of gene expression	Sulphur containing amino acid (MET)	Gene encoding 2S albumin
Potato	Manipulation of homologous	Mostly amino acids	AMA1

### Nutrients and minerals

It is essential part of diet, which is why transgenic technology is used to prevent their deficiency. Rice is among the basic foodstuffs in many countries around the globe. Regardless, rice is unquestionably not an acceptable staple food due to the lack of Vitamin A. Crtl and psy performance from microorganisms and dahlias were fused to create the key anti-transgenic rice. Unhealthiness and vision loss can be eliminated from developing countries and the third world with a variety of baller rich grain. Researchers are dealing with presentation of different nutrients and macronutrients (iron, zinc and so forth.) qualities in nutrient inadequate nourishment articles.

### Iron

Iron is among most important minerals available for a solid body. The nations that use grain as a staples food are progressively powerless toward iron loss because grain is insufficient of iron. Rice is modified with outside material coding iron-containing largest producer ferritin to decide this matter. When compared to non-modified rice, modified rice has double the content of rice substance.

### Starches and lipids

Transgenic plants can change carbohydrates and lipids. Cultivation was used to produce amylopectin-enhanced potatoes and lauric-corrosive-enhanced canola oil in the twentieth century. Potatoes were genetically modified by encoding chemical involved in starch biosynthesis process from microbes. The starch content of such GM potatoes is increased by 35-65%.

### TASTE ENHANCEMENT BY BIOLOGICAL TECHNIQUES

Biotechnology has enabled researchers to create natural products with enhanced flavor. GM nourishments with enhanced flavour incorporate seedless watermelon, tomato, eggplant, pepper and fruits and so forth. End of seed from these nourishment articles brought about progressively solvent sugar content improving sweetness. Maturation pathways are changed utilizing biotechnology to include fragrance in win.

### Biotechnology in education

Individuals contradicting biotechnology and GMOs are performing in absence of applicable information. Researchers must direct courses to develop individuals mindful of benefits and de benefits of nourishment biotechnology for settling on decision shrewdly.

Biotechnology ought to be educated at secondary school level to make young people increasingly mindful of progressions and prospective upsides and downsides of biotechnology. Training is the important part that may create inspirational frame of mind toward biotechnology. It's duty of researchers to develop layman mindful of entire perspectives comprising potential dangers of biotechnology [10]. It creates trust in nourishment clients.

Potential dangers of nourishment biotechnology incorporate unfavourably susceptible responses. A few instances of unfavourably susceptible responses have been accounted for by neighbourhood labs. A few looks into demonstrating GM nourishment allergenic have been directed in neighbourhood labs. Global establishments of biotechnology ought to work together with nearby labs to appropriately demonstrate or misrepresent these outcomes.

### POTENTIAL RISKS OF BIOTECHNOLOGY

#### Risk to GM crops

GM nourishment ought to be marked appropriately so individuals can settle on their decision all alone. There is no universal naming framework. Basically two letters GM are utilized that are truncation of hereditarily changed. Individuals all around the globe need straightforward framework for naming. This marking must be sure. For viable naming, all-inclusive benchmarks ought to be created. Worldwide marking models will likewise influence exchange decidedly

Research is required to demonstrate or negate cases of nearby researchers against utilization of GM nourishment. At the point when layman poses inquiry about potential dangers forced by GM nourishment against biological system and human wellbeing, not many researcher can answer. For what reason is so?? Primary explanation is absence of research identified with these

territories. So to market GM nourishment, researchers ought to have most extreme certainty to help GM nourishment and contend with individuals.

### Risk to health

A few cases are learned at neighbourhood level that indicated some unfavourably susceptible responses after use of GM products. GM nourishment comprise outside qualities that can cause excessive touchiness and hypersensitive responses. Cry9, a remote enzyme coded by greatly encouraged in soil microbial species, is one of them. For animal feed, *Bacillus thuringiensis* was shown to be allergenic. Another distant protein, OVA, according to one of authors, can induce inappropriate immune reactions (decrease in level of Histamine and drop in systolic circulatory strain). In any event, further evidence is needed to back this up.

### Risk to environment

Additional potent hazard is flat quality exchange. Transgenic creatures presented to indigenous habitat may move qualities to different living beings bringing about spread transgene all over the place. Results of this spread can decimate biological system and different life forms. Level exchange has been recorded in lab.

### CONCLUSION

GM food science is among most slicing innovations of our day, with potential to address problems such as a shortage of nutritious food, hunger, and penury. Notwithstanding a great deal of headways, still an enormous number of individuals restrict GM nourishment. Individuals ought to be developed mindful of potential upsides and downsides *via* conduction of workshops. Biotechnology ought to instruct at secondary school level to prepare individuals increasingly mindful. Biotechnology can possibly tackle numerous wellbeing and nourishment related issues of individuals of creating nations and third world. Establishments like WHO, FDA and so forth ought to help out administrations of third globe to develops biosafety laws and commercialization of GM nourishment.

Marking is a delicate territory in world of essential nutrients biotechnology. For commercial production of GM food, valid and effective labelling is needed. Another weak spot is lack of analysis. Many experts are unable to respond to questions about possible risks of biotechnology. To prove or refute arguments against biotechnology, studies should be carried. To increase people's trust and confidence in GM food, conversations and lessons should be held.

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