

Applications of biotechnology assignment

[Technology](#)



Applications of Biotechnology in Medicine Biotechnology is a very huge field and its applications are used in a variety of fields of science such as agriculture and medicine. Medicine is by means of biotechnology techniques so much in diagnosing and treating various diseases. It also gives opportunity for the populace to defend themselves from hazardous diseases.

The advent of biotechnology, genetic engineering, has introduced techniques like gene therapy, recombinant DNA technology and polymerase chain reaction which employ genes and DNA molecules to make a diagnosis of diseases and put in new and strong ones in the body which put back the injured cells. There are some applications of biotechnology which are live their part in the turf of medicine and giving good results: I Pharmaceutical By means of the technique of biotechnology, the drugs pharmaceuticals were synthesized. There are no chemicals concerned in the combination of these drugs, but microorganisms have completed it likely to expand them.

Large molecules of proteins are typically the source opportunistically. They when under attack in the body attack the hidden mechanisms of the disease and wipe out them. Now scientists are endeavoring to expand such pharmaceutical drugs which can be treated against the diseases like hepatitis, cancer and heart diseases. I Gene therapy Gene therapy is one more technique of biotechnologist which is used to delicacy and diagnoses diseases like cancer and Parkinson disease. The apparatus of this technique is that the fit genes are under attack in the body which either obliterate the injured cells or replace them.

In some cases, the fit genes make corrections in the genetic information and that is how the genes start performance in the favor of the body. | |

Pharmacologists Pharmacologists is an additional genetically modified method which is used to learn the genetic information of a personality. It analyzes the body's reply to sure drugs. It is the mixture of pharmaceuticals and genomics. The aspire of this field is to expand such drugs which are inserted in the person according to the genetic information there in the individual.

| Genetic testing Genetic testing is a technique of heredity which is used to conclude the genetic diseases in parents, sex and carrier screening. The technique of genetic testing is to use DNA probes which have the sequence alike to the mutated sequences. This technique is also used to recognize the criminals and to test the parenthood of the child. Let is completed that no field of science can be winning until it uses the expand new drugs and vaccines and are also judgment cures for the diseases which were not easy to treat in the past decade. Biotechnology is a field of miracle.

| Biotechnology is frequently deliberated the similar with the biomedical investigate, but there are a group of other industries which take advantage of biotech method for studying, cloning and varying genes. We have turn out to be familiar to the Hough of enzymes in our everyday lives and a lot of people are recognizable with the argument adjacent the use of Smog in our foods. The agricultural industry is at the middle of that debate, but since the days of George Washington Carver, agricultural biotech has been producing innumerable new products that have the possible to alter our lives for the improved.

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1. Vaccines | Oral vaccines have been in the works for much existence as a likely solution to the increase of disease in immature countries, where costs are excessive to extensive vaccination. Hereditary engineered crops, frequently fruits or vegetables, planned to array antigenic proteins from transferable pathogens that will activate an immune reply when injected. An example of this is a patient-specific vaccine for treating cancer. An anti-lymphoma vaccine has been made using tobacco plants carrying RNA from cloned malignant a-cells.

The resultant protein is then used to vaccinate the patient and boost their immune system beside the cancer. Tailor-made vaccines for cancer treatment have shown substantial promise in preliminary studies. | 2.

Antibiotics | Plants are used to create antibiotics for both human and animal use. An expressing antibiotic protein in stock feed, fed straight to animals, is less expensive than traditional antibiotic production, but this practice raise many bioethics issues, because the result is widespread, possibly needless use of antibiotics which may encourage expansion of antibiotic-resistant bacterial strain.

Quite a few rewards to using plants to create antibiotics for humans are condensed costs due to the larger quantity of product that can be produced from plants versus a fermentation unit, ease of purification, and condensed risk of contamination compared to that of using mammalian cells and culture media.. 3. Flowers | There is extra to agricultural biotechnology than Just hostility disease or civilizing food quality. There is some simply aesthetic application and an example of this is the use of gene recognition and

transfer techniques to improve the color, smell, size and other features of flowers.

Similarly, biotech has been used to make improvement to other common ornamental plants, in particular, shrubs and trees. Some of these changes are similar to those made to crops, such as enhancing cold confrontation of a breed of tropical plant, so it can be grown in northern gardens. | 4. Biofuels | The agricultural industry plays a big role in the biofuels industry, as long as the feedstock for fermentation and cleansing of bio-oil, bio-diesel and bio-ethanol.

Genetic engineering and enzyme optimization technique are being used to develop improved quality feedstock for more efficient change and can minimize relative costs associated with harvesting and transportation (per unit of energy derived), resulting in higher value fuel products. | 5. Plant and Animal Reproduction | Enhancing plant and animal behavior by traditional methods like cross-pollination, grafting, and cross-breeding is time-consuming. Biotech advance let for specific changes to be made rapidly, on a molecular level through over-expression or removal of genes, or the introduction of foreign genes.

The last is possible using gene expression control mechanism such as specific gene promoters and transcription factors. Methods like marker-assisted selection improve the efficiency of “ directed” animal breeding, without the controversy normally associated with Smog. Gene cloning methods must also address species differences in the genetic code, the presence or absence of introns and post-translational modifications such as

metrication. 6. Pesticide-Resistant Crops Not to be mystified with pest-resistance, these plants are broadminded of pesticides, allow farmers to selectively kill nearby weeds with no harming their crop.

The most well-known example of this is the Roundup-Ready technology, urbanize by Monsanto. First introduced in 1998 as GM soybeans, Roundup-Ready plants are unaffected by the herbicide glyphosate, which can be applied in copious quantity to get rid of any other plants in the field. The profit to this is savings in time and costs associated with conservative tillage to reduce weeds, or multiple applications of efferent types of herbicides to selectively eliminate exact species of weeds. The probable drawbacks include all the controversial arguments against Smog. | 7.

Nutrient Supplementation | In an attempt to get better human health, mainly in immature countries, scientists are creating hereditary distorted foods that hold nutrients known to help fight disease or starvation. An example of this golden Rice, which contain beta-carotene, the forerunner for Vitamin A manufacture in our bodies. People who eat the rice create more Vitamin A, and necessary nutrient lacking in the diets of the poor in Asian countries. Three genes, two from daffodils and one from a bacterium, proficient of cataloging four biochemical reactions, were cloned into rice to make it “golden”.

The name comes from the color of the transgenic grain due to over expression of beta-carotene, which gives carrots their orange color. | 8. A biotic strain confrontation | A lesser quantity of than 20% of the earth is arable land but some crops have been hereditary altered to make them more

liberal of conditions like salinity, cold and drought. The detection of genes in plants in charge for sodium uptake has lead to growth of knock-out plants able to grow in high salt environments. Up- or down- regulation of record is usually the method used to alter drought-tolerance in plants.

Corn and rapeseed plants, capable to thrive under lack conditions, are in their fourth year of field trials in California and Colorado, and it is predictable that they'll reach the marketplace in 4-5 years. | 9. Manufacturing power
Fibers | Spider silk is the strongest fiber known to man, stronger than several (used to make bullet-proof vests), with an advanced tensile power than steel. In August 2000, Canadian company Annex announces growth of transgenic goats that formed spider routines, the agenda was shelve when scientists couldn't figure out how to spin them into fibers like spiders do.

By 2005, the goats be up for sale to anyone who would take them. While it seem the spider silk design has been put on the shelf for the time- being, it is a technology that is sure to appear again in the future, once more information is gather on how the silks are woven. | Application of biotechnology to food processing in rising countries is a subject of debate and deliberations for a long time. Biotechnological study as practical to preprocessing in the size of rising countries, targets growth and development f customary fermentation processes.

However there are a few issues which need to be discussed in rising countries while using the technology for various applications. | Socio-economic in addition to cultural factors Traditional fermentation processes engaged in most developing countries are short input, suitable food

processing technologies with negligible investment necessities. These process are, however, often unrestrained, unhygienic and inefficient and usually result in products of variable quality and small shelf lives.

Fermented foods, nevertheless, find wide consumer getting in developing countries ND add considerably to food security and nutrition.. I

Infrastructural and logistical factors Corporal infrastructural necessities for the produce, allotment and storage (e. G. By refrigeration) of microbial cultures or enzymes on an incessant basis is generally obtainable in urban areas of many developing countries. However, this is not the case in most rural areas of developing countries. Should research be oriented to ensure that individuals at all levels can benefit from request of biotechnology in foodstuff fermentation processes?

What is necessary for the level of fermentation cosmologies and procedure controls to be upgrade in order to increase competence, yields and the quality and safety of fermented foods in increasing countries? I I

Nourishment and foodstuff security Fermentation process improve the dietary value of foods from side to side the biosynthesize of vitamins, necessary amino acids and proteins, through improving protein and fiber digestibility; enhancing encountering availability and humiliating anti-nutritional factors.

I Intellectual property rights (APRs) The processes used in the higher areas of agricultural biotechnology tend to be enclosed bylaws this apply also to biotechnology process used in food processing. On the other hand, many of the traditional fermentation processes applied in mounting countries are

base on traditional knowledge | Green Revolution For other uses, see Green Revolution (disambiguation). Increased use of various technologies such as pesticides, herbicides, and fertilizers as well as new breeds of high yield crops were employed in the decades after the Second World War to greatly increase global food production.

Green Revolution refers to a series of research, development, and technology ranches initiatives, occurring between the sass and the late sass, that increased agriculture production worldwide, particularly in the developing world, beginning most markedly in the late sass. [1] The initiatives, led by Norman Burglar, the “ Father of the Green Revolution” credited with saving over a billion people from starvation, involved the development of high-yielding varieties of cereal grains, expansion of irrigation infrastructure, modernization of management techniques, distribution of hybridism seeds, synthetic fertilizers, and pesticides to farmers.

The ERM “ Green Revolution” was first used in 1968 by former United States Agency for International Development (SAID) director William Gaud, who noted the spread of the new technologies: “ These and other developments in the field of agriculture contain the makings of a new revolution. It is not a violent Red Revolution like that of the Soviets, nor is it a White Revolution like that of the Shah of Iran. I call it the Green Revolution. “[2] History[edit] In 1961 India was on the brink of mass famine. 3] Burglar was invited to India by the adviser to the Indian minister of agriculture M. S. Examination.

Despite bureaucratic rudder imposed by Indian’s grain monopolies, the Ford Foundation and Indian government collaborated import wheat seed from <https://assignbuster.com/applications-of-biotechnology-assignment/>

COMMIT. Punjab was selected by the Indian government to be the first site to try the new crops because of its reliable water supply and a history of agricultural success. India began its own Green Revolution program of plant breeding, irrigation development, and financing of agrochemicals. 4] India soon adopted AIR – a semi-dwarf rice variety developed by the International Rice Research Institute (AIR) that could produce more grains of rice per plant when grown with certain fertilizers and irrigation. In 1968, Indian agronomist S. K. De Data published his findings that AIR rice yielded about 5 tons per hectare with no fertilizer, and almost 10 tons per hectare under optimal conditions. This was 10 times the yield of traditional rice. [5] AIR was a success throughout Asia, Wheat yields in developing countries, 1950 to 2004, kg/HA baseline 500.

The steep rise in crop yields in the U. S. Began in the sass. The percentage of growth was fastest in the early rapid growth stage. In developing countries maize yields are still rapidly rising. [6] In the sass, rice yields in India were about two tons per hectare; by he mid-sass, they had risen to six tons per hectare. In the sass, rice cost about \$550 a ton; in 2001, it cost under \$200 a ton. [7] India became one of the world's most successful rice producers, and is now a major rice exporter, shipping nearly 4. 5 million tons in 2006.

AIR and the Philippines[edit] In 1960, the Government of the Republic of the Philippines with Ford and Rockefeller Foundations established AIR (International Rice Research Institute). A rice crossing between Dee-Gee-woo-gene and Peta was done at AIR in 1962. In 1966, one of the breeding lines became a new cultivar, AIR. [8] AIR required the use of fertilizers and suicides, but produced substantially higher yields than the traditional

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cultivar. Annual rice production in the Philippines increased from 3.7 to 7.7 million tons in two decades. 9] The switch to AIR rice made the Philippines a rice exporter for the first time in the 20th century. [10] But the heavy pesticide use reduced the number of fish and frog species found in rice paddies. [11] CIGAR[edit] In 1970, foundation officials proposed a worldwide network of agricultural research centers under a permanent secretariat. This was further supported and developed by the World Bank; on 19 May 1971, the Consultative Group on International Agricultural Research was established, co-sponsored by the FAO, ' FAD and UNDO.

CIGAR, has added many research centers throughout the world. CIGAR has responded, at least in part, to criticisms of Green Revolution methodologies. This began in the sass, and mainly was a result of pressure from donor organizations. [12]Methods like Agrochemicals Analysis and Farming System Research have been adopted to gain a more holistic view of agriculture. Methods like Rapid Rural Appraisal and Participatory Rural Appraisal have been adopted to help scientists understand the problems faced by farmers and even give farmers a role in the placement process.

Problems in Africa[edit] There have been numerous attempts to introduce the successful concepts from the Mexican and Indian projects into Africa. [13] These programs have generally been less successful. Reasons cited include widespread corruption, insecurity, a lack of infrastructure, and a general lack of will on the part of the governments. Yet environmental factors, such as the availability of water for irrigation, the high diversity in slope and soil types in one given area are also reasons why the Green Revolution is not so successful in Africa. 14] A recent program in western <https://assignbuster.com/applications-of-biotechnology-assignment/>

Africa is attempting to introduce a new high-yield variety of rice known as “New Rice for Africa” (NERICA). Americas yield about 30% more rice under normal conditions, and can double yields with small amounts of fertilizer and very basic irrigation. However the program has been beset by problems getting the rice into the hands of farmers, and to date the only success has been in Guiana where it currently accounts for 16% of rice cultivation. 15]

After a famine in 2001 and years of chronic hunger and poverty, in 2005 the small African country of Malawi launched the “Agricultural Input subsidized nitrogen fertilizer and maize seeds. Within its first year, the program was reported with extreme success, producing the largest maize harvest of the country’s history; enough to feed the country with tons of maize left over.

The program has advanced yearly ever since. Various sources claim that the program has been an unusual success, hailing it as a “miracle”. 16]

Agricultural production and food security[edit] Technologies[edit] New varieties of wheat and other grains were instrumental to the green revolution. The Green Revolution spread technologies that had already existed before, but had not been widely used outside industrialized nations. These technologies included odder irrigation projects, pesticides, synthetic nitrogen fertilizer and improved crop varieties developed through the conventional, science-based methods available at the time.

The novel technological development of the Green Revolution was the production of novel wheat cultivar. Agronomists bred cultivar of maize, wheat, and rice that are generally referred to as Has or “high-yielding varieties”. Has have higher nitrogen-absorbing potential than other varieties. Since cereals that absorbed extra nitrogen would typically lodge, or fall over

before harvest, semi-dwarfing genes were bred into their genomes. A Japanese dwarf wheat cultivar Nor 10 wheat), which was sent to Washington, D. C. Y Cecil Salmon, was instrumental in developing Green Revolution wheat cultivar. AIR, the first widely implemented HOW rice to be developed by AIR, was created through a cross between an Indonesian variety named “ Peta” and a Chinese variety named “ Dee-gee-woo-gene. ” With advances in molecular genetics, the mutant genes responsible for Rapidness thaliana genes (GA 20-oxides,[17] gal gal-3[19]), wheat reduced-height genes (Art) [20] and a rice semiarid gene (SD)[21] were cloned. These were identified as gibberellins biosynthesize genes or cellular signaling component genes.

Stem growth in the mutant background is significantly reduced leading to the dwarf phenotype. Photosynthetic investment in the stem is reduced dramatically as the shorter plants are inherently more stable mechanically. Assimilates become redirected to grain production, amplifying in particular the effect of chemical fertilizers on commercial yield. Has significantly outperform traditional varieties in the presence of adequate irrigation, pesticides, and fertilizers. In the absence of these inputs, traditional varieties may outperform Has.

Therefore, several authors have challenged the apparent superiority of Has not only compared to the rotational varieties alone, but by contrasting the monoculture system associated with Has with the voluptuary system associated with traditional ones. [22] Production increases[edit] Cereal production more than doubled in developing nations between the years 1961- 1985. [23] Yields of rice, maize, and wheat increased steadily during that period. [23] The production increases can be attributed roughly equally

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to irrigation, fertilizer, and seed development, at least in the case of Asian rice. 23] While agricultural output increased as a result of the Green Revolution, the energy input to produce a crop has increased faster,[24] so that the ratio of crops produced to on chemical fertilizers, pesticides and herbicides, some of which must[citation needed] be developed from fossil fuels[clarification needed], making agriculture increasingly reliant on petroleum products. [25][dead link]Proponents of the Peak Oil theory fear that a future decline in oil and gas production would lead to a decline in food production or even a Malthusian catastrophe. 26] World population 1950-2010 Effects on food security[edit] Main article: Food security The effects of the Green Revolution on global food security are difficult to assess cause of the complexities involved in food systems. The world population has grown by about four billion since the beginning of the Green Revolution and many believe that, without the Revolution, there would have been greater famine malnutrition. India saw annual wheat production rise from 10 million tons in the sass to 73 million in 2006. [27] The average person in the developing world consumes roughly 25% more calories per day now than before the Green Revolution. 23] Between 1950 and 1984, as the Green Revolution transformed agriculture around the globe, world grain production increased by over 250%. 28] The production increases fostered by the Green Revolution are often credited with having helped to avoid widespread famine, and for feeding billions of people. [29] There are also claims that the Green Revolution has decreased food security for a large number of people. One claim involves the shift of subsistence-oriented cropland to cropland oriented towards production of grain for export or animal feed.

For example, the Green Revolution replaced much of the land used for pulses that fed Indian peasants for wheat, which did not make up a large portion of the peasant diet. [30] Criticism[edit] Food security[edit] Malthusian criticism[edit] Some criticisms generally involve some variation of the Malthusian principle of population. Such concerns often revolve around the idea that the Green Revolution is unsustainable,[31] and argue that humanity is now in a state overpopulation with regards to the sustainable carrying capacity and ecological demands on the Earth.

Although 36 million people die each year as a direct or indirect result of hunger and poor nutrition,[32] Malthusian' more extreme predictions have frequently failed to materialize. In 1798 Thomas Malthusian made his prediction of impending famine. [33] The world's population had doubled by 1923 and doubled again by 1973 without fulfilling Malthusian' prediction. Malthusian Paul R. Earlier, in his 1968 book *The Population Bomb*, said that “ India couldn't possibly feed two hundred million more people by 1980” and “ Hundreds of millions of people will starve to death in spite of any crash programs. [33] Relish's warnings failed to materialize when India became self-sustaining in cereal production in 1974 (six years later) as a result of the introduction of Norman Borlaug's dwarf wheat varieties. [33] agriculture is largely reliant on petroleum energy. [34] Since supplies of oil and gas re essential to modern agriculture techniques,[35] a fall in global oil supplies could cause spiking food prices in the coming decades. [36] Famine[edit] To some modern Western sociologists and writers, increasing food production is not synonymous with increasing food security, and is only part of a larger equation.

For example, Harvard professor Mammery Seen claimed large historic famines were not caused by decreases in food supply, but by socioeconomic dynamics and a failure of public action. [37] However, economist Peter Brick disputes Ken's theory, arguing that Seen relies on inconsistent arguments and contradicts available information, including sources that Seen himself cited. [38] Brick further argues that Ken's views coincide with that of the Bengal government at the time of the Bengal famine of 1943, and the policies Seen advocates failed to relieve the famine. 38] Quality of diet[edit] Some have challenged the value of the increased food production of Green Revolution agriculture. Miguel A. Alter, (a pioneer of chronology and peasant-advocate), writes that the comparison between traditional systems of agriculture and Green Revolution agriculture has been unfair, because Green Revolution agriculture reduces monoculture's of cereal grains, while traditional agriculture usually incorporates polyesters. [citation needed] These monoculture crops are often used for export, feed for animals, or conversion into befoul.

According to Mile Frisson of Perversity International, the Green Revolution has also led to a change in dietary habits, as fewer people are affected by hunger and die from starvation, but many are affected by malnutrition such as iron or vitamin-A deficiencies. [14] Frisson further asserts that almost 60% of yearly deaths of children under age five in developing entries are related to malnutrition. [14] High-yield rice (HER), introduced since 1964 to poverty-ridden Asian countries, such as the Philippines, was found to have inferior flavor and be more glutinous and less savory than their native varieties. Citation needed] This caused its price to be lower than the average market

value. [39] In the Philippines the introduction of heavy pesticides to rice production, in the early part of the Green Revolution, poisoned and killed off fish and weedy green vegetables that traditionally coexisted in rice paddies. These were nutritious food sources for many or Filipino farmers prior to the introduction of pesticides, further impacting the diets of locals. [40] Political impact[edit] A major critic[citation needed] of the Green Revolution, U.

S. Investigative journalist Mark Eddie, writes:[citation needed] The primary objective of the program was geopolitical: to provide food for the populace in undeveloped countries and so bring social stability and weaken the fomenting of communist insurgency. Citing internal Foundation documents, Eddie states that the Ford Foundation had a greater concern than Rockefeller in this area. [41] There is significant evidence that the Green Revolution weakened socialist movements in many nations.

In countries such as India, Mexico, and the Philippines, technological solutions were sought as an alternative to expanding agrarian reform initiatives, the latter of which were often linked to socialist Socioeconomic impacts[edit] The transition from traditional agriculture, in which inputs were generated on-farm, widespread establishment of rural credit institutions. Smaller farmers often went into debt, which in many cases results in a loss of their farmland. [12][44] The increased level of mechanization on larger farms made possible by the Green

Revolution removed a large source of employment from the rural economy. [12] Because wealthier farmers had better access to credit and land, the Green Revolution increased class disparities, with the rich-poor gap widening

as a result. Because some regions were able to adopt Green Revolution agriculture more readily than others (for political or geographical reasons), interregional economic disparities increased as well. Many small farmers are hurt by the dropping prices resulting from increased production overall. Citation needed] However, large-scale farming companies only account for less than 10% of the total farming capacity. This is a criticism held by many small producers in the food sovereignty movement. The new economic difficulties of small holder farmers and landless farm workers led to increased rural-urban migration. The increase in food production led to a cheaper food for urban dwellers, and the increase in urban population increased the potential for industrialization. Citation needed]

Globalization[edit] In the most basic sense, the Green Revolution was a product of globalization as evidenced in the creation of international agricultural research centers that shared information, and with transnational funding from groups like the Rockefeller Foundation, Ford Foundation, and United States Agency for International Development (SAID). Additionally, the inputs required in Green Revolution agriculture created new markets for seed and chemical corporations, many of which were based in the United States.

For example, Standard Oil of New Jersey established hundreds of distributors in the Philippines to sell agricultural packages composed of HOW seed, fertilizer, and pesticides. [citation needed] Environmental impact[edit] Increased use of irrigation played a major role in the green revolution. Pesticides[edit] Green Revolution agriculture relies on extensive use of pesticides, which are accessory to limit the high levels of pest damage that

inevitably occur in monogramming – the practice of producing or growing one single crop over a wide area.

Biodiversity[edit] The spread of Green Revolution agriculture affected both agricultural biodiversity and wild biodiversity. [40] There is little disagreement that the Green Revolution acted to reduce agricultural biodiversity, as it relied on just a few high-yield varieties of each crop. This has led to concerns about the susceptibility of a food supply to pathogens that cannot be controlled by agrochemicals, as well as the permanent loss of many valuable genetic traits bred into traditional varieties over thousands of years.