

# Applicaton of biotechnology including its benefits and potential risks assignment...

[Technology](#)



Discuss the applications of biotechnology including its benefits and potential risks. We all talk of biotechnology these days but the question that we need to ask is; what do we really understand by this term? Different definitions have come up with time and one of them is: "The use of microorganisms, such as bacteria or yeasts, or biological substances, such as enzymes, to perform specific industrial or manufacturing processes." It is a field of biology that involves the use of living things in engineering, technology, medicine... nowadays it is most commonly known as genetic engineering or as cell and tissue culture technology.

But in a simple term we can refer biotechnology as the use of living organisms or their products by man to modify the human health and the human environment. Biotechnology has always been existed since the beginig of mankind. When the first human beings learned that they could grow their own plants or breed their own animal, it was the birth of biotechnology. However as time pass by and man was evolving, the concept of biotechnology itself has changed.

Nowadays it encompasses a wider range and history of procedures for modifying living organisms according to human purposes, going back to domestication of animals, cultivation of plants and "improvements" to these through breeding programs that employ artificial selection and hybridization. We have not only been able to look at the surrounding universe and the depths below with the advancement of tools and techniques but we also have been able to live there. The advancement tools and techniques are now allowing us to look at the universe of atoms.

Biotechnology is utilizing the sciences of biology, chemistry, physics, engineering, computers, and information technology to develop tools and products that hold great promise and concern. Humans have always been “manipulating” organisms to their advantage, but now we are able to manipulate life and materials at the atomic level through nanotechnology. Some applications of biotechnology are: 1. The health sector 2. Food and drinks 3. Environment 4. Manufacturing and Bio-processing 5. Agriculture 6. Aqua culture and marine biotechnology 7. Mining 8. Production of synthetic hormones . Bio-conversion of organic waste 10. Help in cleaning the environment through the use of genetically modified bacteria to clean up oil spill. In modern terms, biotechnology has come to mean the use of cell and tissue culture, cell fusion, molecular biology, and in particular, recombinant deoxyribonucleic acid (DNA) technology to generate unique organisms with new traits or organisms that have the potential to produce specific products. Biotechnology is being used in many areas of medicine. It has been precious in the production of more effective drugs with minimum side effects.

It has also helped in the improvement of tests and producing better diagnosis through the gene therapy and producing organs for transplant. Scientists believe that biotechnology is the key that will help them to find cures to diseases like Alzheimer’s, cancer, heart disease, HIV/AIDS, malaria among others. It is also used in the production of antibiotcis in order to fight infections and help the immune system to be more resistant in the future. However the risk that super viruses are being created exists and this can lead to a global infection.

Gene-enhanced bacteria can cure cancer but the same can mutate into the next plague, which would be more lethal. Another risk that exists is the possibility of allergens or the risk of incompatibility during an organ transplant. Biotechnology is also widely used in the pharmacogenomics industry where it helps in the development of medications, in determining the accurate methods to provide the appropriate dosage of medications. In the agricultural field, biotechnology has helped in the crossbreeding of crops so as to create new plants that are more resistant to drastic climatic changes and to insects' attack.

It also provides the opportunity to increase the quantity, quality and reliability of food supply. No huge investment will be made in terms of pesticides and other chemical substances since the plants themselves will possess the resistance to these attacks. It is also a way to help alleviate poverty and reduce starvation in developed countries. Nevertheless there exist some disadvantages linked to the application of biotechnology in agricultural sector. One of them is that some people may be that some people might be allergic to genetically modified substances.

There is also the case that some people think that GM may be poisonous to the wildlife and thus they would try to hinder its development. Another application of biotechnology is that it helps to promote aqua-culture. It helps scientists to identify and combine traits in fish and shellfish so as to increase productivity by increasing quality and quantity so as to meet the global food demand. It is also helping in developing vaccines and immunostimulants to

increase the disease resistance in fish against viral diseases and other pathogens and also in detecting new pathogens.

Successful developpment and application is only possible when much research has been carried out. This is so because any mistakes even the smallest one can lead to the destruction of the marine ecosystem and even to the extinction of some species. Furthermore biotechnology is also present in food production where productivity and cost-effectiveness is being improved by producing more efficient enzymes and thus the amount of raw materials can be reduce but the yield obtain is much more.

In addition to this companies can produce “ tailor made enzymes”; that is the produce enzymes that will meet a specific criteria that will meet the customers demand. The manufacturers can supply enzymes in large quantities to match the requirements of the customers and thus they can have a wide variety of enzymes to choose from resulting in producing different type of products. But still it has some drawbacks. Since it concerns foodstuff, we have risk of people getting infected if they are allergetic to some of these GM enzymes.

Also some companies might not respect the state and federal marketing requirements but still they are marketed. We can also have cases of misleadind information where the wrong labellings have been attached to an article. This might result in having the population intoxicated or suffer other types of diseases since they have consumed that product. Through biotechnology, scientists have been able to genetically modify some

bacteria, microoganisms and some plants that will be used to clean up toxic wastes from industrials production and also oil spills if there is a shipwreck.

Biotechnology has also been implemented in the forestry and aquaculture industries. These strategies offer hope for conservation biologists and it also helps in the detection of endangered species. Genetic analysis can help botanics to improve their breeding programs by offering the possibility to determine the genetic diversity of various plants. This can also be used to determine the different types of animals' population. Nowaydays, scientists are invsting a lot in cloning. The technic can be said to have been mastered and now they are working on human cloning.

Through animal cloning, endangered species can be saved by “ forcing the reproduction “ of the specie. Even the food industry can benefit from animal cloning since selective breeding can be carried out. Therefore we will have animals that can produce more milk and are more resistant to diseases and other infections in the same way as biotechnology is being used in the growing of plants. Biotechnology is even helping in protecting nature from being destroyed due to our irresponsible acts and other natural catastrophes.

It helps in the cleaning of oil spill not only on the ocean surface but even on road. Thus it helps protecting and preserving the flora and fauna (marine and local) and also the natural habitats and create health problems to the local inhabitants. The process of cleaning and removal of oil spills on gravels is very expensive and time consuming. In order to overcome these problems, oleophilic fertilisers are being developed which allow rapid growth and

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multiplication of microbes that will lead to the increase in the biodegradation process for oil removal.

It also protects the environment and thus helps to protect and preserve endangered species. It aids not only in the cleaning oil spills in oceans, as well as leaching of metal from the soil for cleaner mining. Currently, research is being conducted that concentrates on improving processes in discovering landmines and other metal contamination. A lot of debate is going on the excessive use of chemical herbicides, pesticides and fertilizers.

They become an environmental hazard because they undergo degradation by microorganisms and ultraviolet light which releases toxic chemicals in the environment. Using biotechnology, bacterial pesticides and viral pesticides are being developed which will help in reducing the use of chemical pesticides. Some advantages of using biofertilisers are: ??? Improve the tolerance of plants against toxic heavy metals. ??? It is possible to reclaim saline or alkaline soil by using biofertilizers. ??? Use of biofertilizers helps in controlling environmental pollution. Fertility of soil is increased year after year. ??? Low cost and easy to produce. Some of the risks associated to these are: ??? The creation or spread of zoonotic diseases through xenotransplantation and this may lead to great havoc if the species in question is to be extincted. The whole food chain would be disturbed. ??? Is the food made from clone animals safe for human consumption? Much research need to be carried out on these foods and see whether they are liable to be place on the market. e need to focus on the aspect that how will these foods react with our system. Since cloning is a new concept, it is

difficult for scientists to define all the risks that may rised from these clones. Thus there is the fear that we find ourselves fighting a new type of disease or infection and by the time it is identified, studied, developed vaccines and see what are the side effects and all, the death toll mignt be very alarming. ??? Social, ethical and cultural conflicts might also cause a problem to the lauching of the cloning process on the world scale.

People who believe in religion and on the idea that the natural process of reproduction must not be tempered with will try to hinder the cloning process. Another reason is that most people would not accept the idea of eating “ cloned food” since they are new to this type of product. ??? Animal protection groups can also hinder the process. Together with idealist they will come forward with arguments to prevent the cloning of animals from takein place. This might lead to clashes and violent behaviour between the two groups; that is the pro’s cloning ant those against the rocess.

Biotechnology is one of the most important discovery of our life andit will keep on evolving. It is already present in most fields of works. It also helps a lot in forensic sciences where DNA is being dealt with. This has help in elucidating many crimes and even complex ones. Biotechnology is also of great help in the study of nanotechnology as it helps understand the behaviour of molecules and atoms. Biotechnology is what will make mankind progress in his attempt to “ conquer” the world.