

# [Biotechnology](https://assignbuster.com/biotechnology-essay-samples-6/)

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Running Head: BIOLOGY UNIT 4 DB Biology Unit 4 DB   
Biotechnology is a broad term that applies to all practical uses of living   
  
organisms-anything from microorganisms used in the traditional fermentation of beer to   
  
the today's most sophisticated and complex applications of gene therapy and monoclonal   
  
antibodies. According to the United Nations Convention on Biological Diversity,   
  
" Biotechnology means any technological application that uses biological systems, living   
  
organisms, or derivatives thereof, to make or modify products or processes for specific   
  
use." (Article 2. Use of Terms, 1992, para. 3). Since Biotechnology is a generic term used   
  
to describe practical uses of living organisms hence it combines a wide range of   
  
biological disciplines like genetics, molecular biology, biochemistry, embryology and   
  
cell biology which are in turn linked to practical disciplines like genetic engineering,   
  
chemical engineering, biochemical engineering, bio-process engineering, biosystem   
  
engineering and even information technology and robotics. As a result it has strong   
  
impact on a number of sectors including health care, crop production and agriculture,   
  
none food uses of crops (e. g. biodegradable plastics, vegetable oil, biofuels).   
  
Although each of above mentioned practical discipline of biotechnology has its   
  
importance and application yet genetic engineering, is considered to be an area of   
  
tremendous interest and importance. Based on the artificial manipulation and transfer of   
  
genetic material from one organism to another, genetic engineering can be used to modify   
  
the genetic composition of plants, animals, and microorganisms to have better yield and   
  
tolerance against damaging factors. An important example of applications of genetic   
  
engineering is commercially available insect-tolerant plants. These plants contain a   
  
naturally occurring soil bacterium called Bacillus thuriengensis, referred as Bt: a highly   
  
effective toxin for many pest organisms, like beetles and moth larva, but not toxic to   
  
mammals and most other non-target organisms. Bacillus thuriengensis produces a protein   
  
that is incorporated into the genetic material of crops by recombinant DNA using   
  
bacterial plasmids and a " clone" or an identical copy of the gene that can produce the   
  
toxic protein is produced (Gallo & Fulford, 2003, pp. 1-2).   
  
Field and greenhouse tests of different Bt crops like rice, maize etc. produced by   
  
public institutions have confirmed the effectiveness of Bt technology in controlling the   
  
respective crop pests in many countries particularly in China, India and Pakistan. Unlike   
  
chemical insecticides, Bt crops effectively controls Lepidopteron pests without inducing   
  
the emergence of other friendly pests, such as brown plant hopper. As a component of   
  
integrated pest management systems, Bt technology has the potential to increase yields   
  
and greatly reduce the use of different insecticides to control the damage caused by pests   
  
(Toenniessen, et al. pp. 192-193).   
  
Every technology can have both positive and negative attributes. Biotechnology is   
  
no exception. The application of genetic engineering techniques to transfer genetic   
  
materials from one organism to another is not accomplished through traditional breeding   
  
procedures and as a result, genetically engineered specimen may contain components not   
  
normally found in the traditional versions of that specimen. For example to increase the   
  
freezing tolerance of vegetables, scientists have transferred genes for antifreeze proteins   
  
from arctic fish to tomatoes. Similarly, insect resistant plants have been created by   
  
adding a gene from soil bacteria. The incorporation of genes from other organisms may   
  
change specific properties of an altered species and surely a concern about its effects. For   
  
example, genetically engineered tomatoes could potentially contain a protein gene from   
  
wheat that could cause an allergic reaction in some people. Also some people believe it is   
  
not ethically or morally acceptable to alter the natural properties of any species as they   
  
believe that this act is a direct interference in natural phenomenon (Martin & Riepe, n.   
  
d., p. 6).   
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
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