BIOTECHNOLOGY AND ITS APPLICATIONS

ETHICAL ISSUES

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The manipulation of living organisms by the human race cannot go on any further. without regulation. Some ethical standards are required to evaluate the morality of all human activities that might help or harm living organisms.

Going beyond the morality-of such issues, the biological significance of such things is also important. Genetic modification of organisms can have unpredicatable results when such organisms are introduced into the ecosystem.

Therefore, the Indian Government has set up organisations such as GEAC (Genetic Engineering Approval Committee), which will make decisions regarding the validity of GM research and the safety of introducing GM-organisms for public services.
The modification/usage of living organisms for public services (as food and medicine sources, for example) has also created problems with patents granted for the same.

GM crops are already in cultivation in U.S.A, Europe and several other countries. In India, some insect resistant cotton varieties expressing cry genes have reached the farmers, fields. It has been argued that transgenic crops may be harmful to the environment. The two points, Firstly, the transgene may be transferred through pollen from these crops to their wild relatives secondly GM crops may pollute the envionnent.

BIO – PATENT

A patent is a right granted by a government to an inventor to prevent others from commercial use of his invention. A patent is granted for-

(A) An invention [including product]
(B) An improvement in an earlier invention
(C) The process of generating products and
(D) A concept or design

There is growing public anger that certain companies are being granted patents for products and technologies that make use of the genetic materials, plants and other biological resources that have long been identified, developed and used by farmers and indigenous people of a specific region/country.

Rice is an important food grain, the presence- of which goes back thousands of years in Asia's agricultural history. There are an estimated 200.000 varieties of rice in India alone. The diversity of rice in India is one of the richest in the world. Basmati rice is distinct for its unique aroma and flavour and 27 documented varieties of Basmati are grown in India. There is reference to Basmati in ancient texts, folklore and poetry, as it has been grown for centuries. In 1997, an American company got patent rights on Basmati rice through the US Patent and Trademark Office. This allowed the company to sell a 'new' variety of Basmati, in the US and abroad. This 'new' variety of Basmati had actually been derived from Indian farmer's varieties. Indian Basmati was crossed with semi-dwarf varieties and claimed as an invention or a novelty. The patent extends to functional equivalents, implying that other people selling Basmati rice could be restricted by the patent. Several attempts have also been made to patent uses, products and processes based on Indian traditional herbal medicines, e.g,. turmeric neem. If we are not vigilant and we do not immediately counter these patent applications, other countries/individuals may encash on our rich legacy and we may not be able to do anything about it.

BIOPIRACY:

- Multinational companies and some organisations exploit and / or patent biological resources or bioresources of other nations without proper authorisation from the countries concerned, this is called **biopiracy**.
- Institutions and companies of industrialised nations are poor in biodiversity and traditional knowledge related to the utilisation of the resources but are rich in technology and financial resources whereas developing countries are rich in biodiversity and traditional knowledge related to bioresources but poor in technology and financial resources.
- All those organisms that can be used to derive commercial benefits represent biological resources. Traditional knowledge related to bioresources in the knowledge developed by various communities over long periods of history, regarding the utilisation of the bioresources.
- **Pentadiplandra brazzeana** is a West African plant. It produces **brazzein protein** that is approximately **2000 times as sweet as sugar**. Local people have been using the super-sweet berries of this plant for centuries. But the protein brazzein was patented in U.S.A. The gene encoding brazzein was also isolated, sequenced and patented in U.S.A. It is proposed to transfer the brazzein gene into maize and express it in maize kernels. These Kernels will then be used for the extraction of brazzein. This development could have serious implications for countries exporting large quantities of sugar.
- Institution and companies of industrialised nations are collecting and exploiting the bioresources, as follows

(i) They are collecting and patenting the genetic resources themselves. For example, a patent granted in U.S.A. covers the entire **'basmati' rice** germplasm indigenous to our country.

(ii) The bioresources are being analysed for identification of valuable biomolecules. A biomolecule is a compound produced by a living organism. The biomolecules are then patented and used for commercial activities.

(iii) Useful genes are isolated from the bioresources and patented. These genes are then used to generate commercial products.

(iv) The traditional knowledge related to bioresources is utilised to achieve the above objectives. In some cases, the traditional knowledge itself may be the subject of a patent.