

BIO REACTORS

Recombinant DNA technology is the process that involves the introduction of a foreign piece of DNA into the gene of interest and the new DNA thus formed is the host genome. This gene that is introduced is the recombinant DNA and the technique is called recombinant DNA technology. Inserting the desired gene into the genome of the host is not as easy as it sounds. The ultimate aim of this process is to obtain desirable protein.

Let's learn how to obtain the foreign gene product using a bioreactor.

Obtaining the Foreign Gene Product

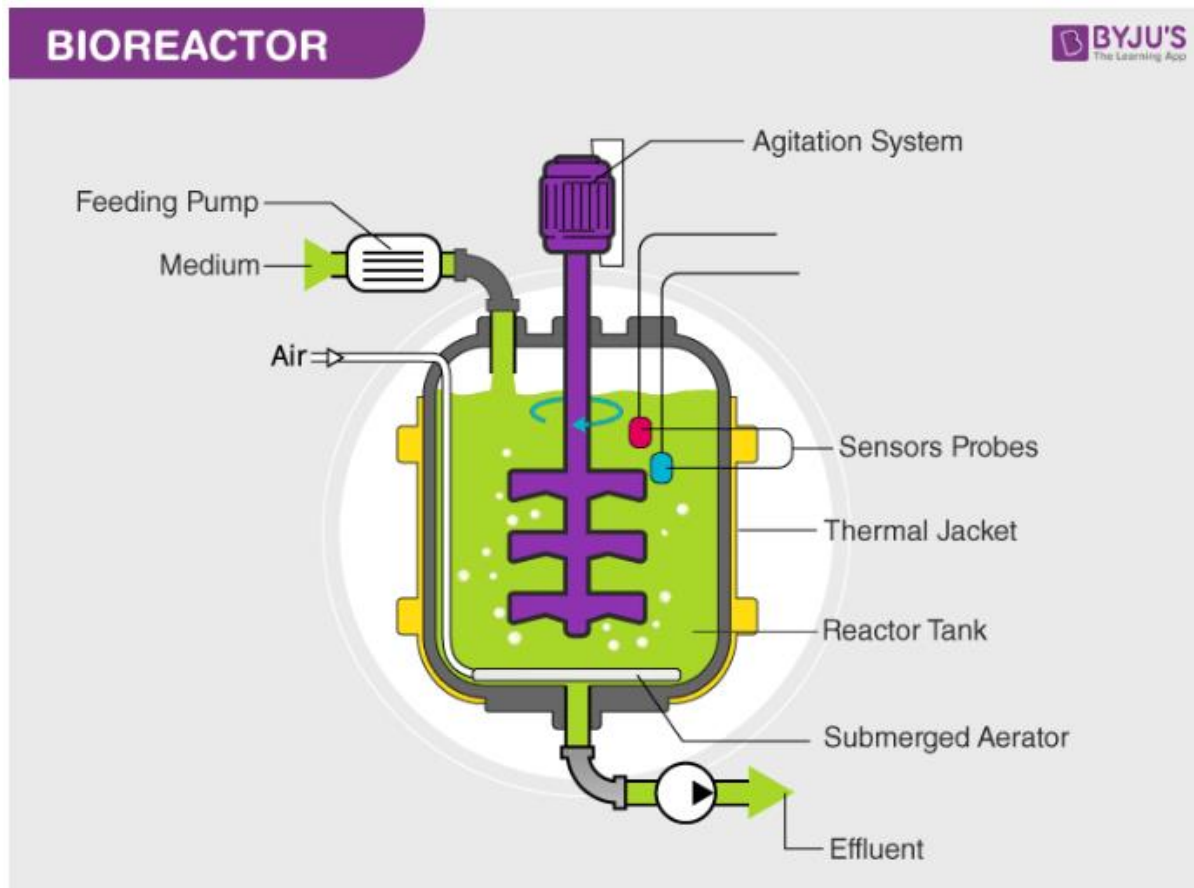
In recombinant technologies, the desired gene selected which is followed by selecting a perfect vector into which the desired gene has to be integrated and then recombinant DNA is formed by ligating the gene of interest with the vector. Once this foreign DNA is inserted, the host is multiplied and ultimately desirable protein is produced. The rDNA has to be maintained in the host and carried forward to the offspring. For the production of the desired protein, the gene encodes for it needs to be expressed. This happens only under optimized conditions. Not only the target protein has to be expressed but has to be produced on a large scale.

The recombinant cells can be multiplied on a large scale using a continuous culture system. Here the cells are cultured in a large vessel and the medium is refreshed on a regular interval to maintain the optimum conditions. This helps to culture a large mass of the desired protein. This can be achieved by using a bioreactor.

Bioreactor

A bioreactor helps to produce a large volume of culture. The bioreactor is a large vessel where the different cells such as human or plant, or animal cells can be cultured to obtain new biological products. It provides optimum conditions like temperature, pH, substrate, oxygen, etc required for the culturing of cells producing desired products. Simple stirred-tank bioreactor and sparged stirred-tank bioreactor are the two types of bioreactors used for this purpose.

Bioreactor



Downstream Processing

Downstream processing is a sequential step in which the isolation, purification and preservation of final products are done before it is marketed. In this stage, the final product is formulated with additives like preservatives, colours, etc., followed by clinical trials.

BIOPHARMING

Biopharming is the production and use of transgenic plants and animals genetically engineered to produce pharmaceutical substances for use in humans or animals. It often involves the insertion of gene constructs derived from humans. Biopharming exists on a spectrum of activity and is not clearly demarcated from its nearest neighbors. For example, genetically modified yeast, bacteria, and animal cell cultures have for some time been used to produce pharmaceutical substances in enclosed bioreactor systems, but are generally not included in the definition of biopharming. On the other hand, plant cell cultures, a newer development but also involving enclosed bioreactors, are typically included together with whole-plant methods in plant biopharming. While animals are also being genetically modified to alter their nutritional composition, to make them better models for human disease, and to provide more compatible organs.