DOWNLOAD PDF SCOPE AND DRIVERS FOR INDUSTRIAL BIOTECHNOLOGY

Chapter 1 : Biotechnology Engineering scope, jobs, salary and course details-Apnaahangout

Introduction: Scope and drivers for industrial biotechnology (Future Prospects for Industrial Biotechnology) Industrial biotechnology has achieved spectacular new growth and interest in recent years, mainly as a result of global interest in biofuels.

Read this article to learn about the scope and applications of biotechnology. The applications of biotechnology includes plant tissue culture, production of transgenic in animal and plants, applications in medicine as tools and therapeutics, creation of new enzymes and their immobilization for industrial use, development of monoclonal antibodies and control of pollutions, etc. The document focuses on the development and application of modern biotechnology based on new enabling techniques of recombinant-DNA technology, often referred to as genetic engineering. The history of biotechnology begins with zymotechnology, which commenced with a focus on brewing techniques for beer. By World War I, however, zymotechnology would expand to tackle larger industrial issues, and the potential of industrial fermentation gave rise to biotechnology. The oldest biotechnological processes are found in microbial fermentations, as born out by a Babylonian tablet circa B. In about B. The Sumerians were able to brew as many as twenty types of beer in the third millennium B. In the 14th century, first vinegar manufacturing industry was established in France near Orleans. In Antony Van Leeuwenhoek first observed yeast cells with his newly designed microscope. In , Louis Pasteur highlighted the lactic acid fermentation by microbe. By the end of 19th century large number of industries and group of scientists were involved in the field of biotechnology and developed large scale sewage purification system employing microbes were established is Germany and France. In to , Delbruck, Heyduck and Hennerberg discovered the large-scale use of yeast in food industry. In the same period, acetone, butanol and glycerin were obtained from bacteria. In , Alexander Fleming discovered penicillin and large scale manufacturing of penicillin started in Fermentation to Produce Foods: Fermentation is perhaps the most ancient biotechnological discovery. Over 10, years ago mankind was producing wine, beer, vinegar and bread using microorganisms, primarily yeast. Yogurt was produced by lactic acid bacteria in milk and molds were used to produce cheese. These processes are still in use today for the production of modern foods. However, the cultures that are used have been purified and often genetically refined to maintain the most desirable traits and highest quality of products. In the discovery that enzymes from yeast can convert sugar to alcohol lead to industrial processes for chemicals such as butanol, acetone and glycerol. Fermentation processes are still in use today in many modern biotech organizations, often for the production of enzymes to be used in pharmaceutical processes, environmental remediation and other industrial processes. Drying, salting and freezing foods to prevent spoilage by microorganisms were practiced long before anyone really understood why they worked or even fully knew what caused the food to spoil in the first place. The practice of quarantining to prevent the spread of disease was in place long before the origins of disease were known. However, it demonstrates early acceptance that illness could be passed from an infected individual to another healthy individual, who would then begin to have symptoms of the disease. Crop improvement, by selecting seeds from the most successful or healthiest plants, to obtain a new crop having the most desirable traits, is a form of early crop technology. Farmers learned that using only the seeds from the best plants would eventually enhance and strengthen the desired traits in subsequent crops. In last fifteen years progress have been made by microbiologists and genetic engineers, and we are hopeful to solve many fold problems of the present day, specially energy and food crisis to cater the need of growing population of the world. Microorganisms can be used to enhance to recovery of metals from low-grade ores and from effluents containing undesirable quantities of heavy metals or other toxins. When these technologies are applied at industrial level, they constitute bio-industry Table Genetic engineering in biotechnology stimulated hopes for both therapeutic proteins, drugs and biological organisms themselves, such as seeds, pesticides, engineered yeasts, and modified human cells for treating genetic diseases. Biotechnology is the applied science and has made advances in two major areas, viz. The scientists are now diverting themselves toward biotechnological companies; this has caused the development of many biotechnological industries. In world, USA, Japan, and many countries of Europe are leaders in biotechnological researchers encouraged by industrialists. These companies are working for human welfare and opted following areas for research and development: The advances in recombinant DNA technology have occurred in parallel with the development of genetic processes and biological variations. The development of new technologies have resulted into production of large amount of biochemically-defined proteins of medical significance and created an enormous potential for pharmaceutical industries. Biotechnology in itself is a vast subject and its scope is extended to various branches of biology. This includes plant tissue culture, production of transgenic in animal and plants, applications in medicine as tools and therapeutics, creation of new enzymes and their immobilization for industrial use, development of monoclonal antibodies and control of pollutions, etc. Industrial Applications of Biotechnology: The industrial application of molecular biotechnology is often subdivided, so that we speak of red, green, gray or white biotechnology. This distinction relates to the use of the technology in the medical field in human and animal medicine , agriculture, the environment and industry. Some companies also apply knowledge deriving from molecular biotechnology in areas that cut across these distinctions e. Biotechnology products for therapeutic use include a very diverse range of products, as outlined in Tables Some products are intended to mimic the human counterpart, whereas others are intended to differ from the human counterpart and may be analogues, chemically modified e. Most of these products are regulated as medicinal products; however, the regulatory status of others such as some cell therapies and tissue: Different areas of medicine in which biotechnology is used to develop diagnostic kits and cure are presented in the Figure Biotechnology-derived pharmaceuticals may be derived from a variety of expression systems such as Escherichia coli, yeast, mammalian, insect or plant cells, transgenic animals or other organisms. The expressed protein or gene may have the identical amino acid or nucleotide sequence as the human endogenous form, or may be intentionally different in sequence to confer some technical advantage such as an optimized pharmacokinetic or pharmacodynamics profile. The glycosylation pattern of protein products is likely to differ from the endogenous human form due to the different glycosylation preferences of the expression system used. Furthermore, intentional post-translation modifications or alterations may be made such as pegylation. It is important for the toxicologist to be aware of the nature of the product to be tested in terms of primary, secondary and tertiary structure, and any post-translational modifications such as glycosylation status, particularly as these may be altered if the manufacturing system is modified. Within the field of red biotechnology, which deals with applications in human and animal medicine, there are various further distinctions that can be made: In the field of biopharmaceutical drug development, it is the development of therapeutic human proteins by recombinant methods. As mentioned above, recombinant human insulin was the first recombinant medicine in the world, produced by Genentech and brought to market in Today, recombinant human insulin has almost completely driven the other preparation of insulin isolated from human or animal tissues from the market. The first therapeutic antibodies, especially monoclonal antibodies, have been on the market since the late s. In , antibodies were along with vaccines the most important therapeutic class of drugs under development and there are also more recent market studies more than antibodies or antibody fragments were at the clinical development stage in and research and development is being carried out on around more in about companies around the world Table Since the introduction of therapeutic antibodies onto the market, they have achieved significant turnovers, which are growing continually. Today, in addition to proteins, which currently play the most significant role in the biopharmaceutical field, new types of drugs based on RNA antisense drugs, ribozymes, aptamers, Spiegelmers and RNA interference are also being developed on the basis of advances in knowledge on molecular biotechnology. Closed linked to the development of therapeutic agents are the means of achieving their targeted delivery to their site of action. These drug delivery systems are mainly used for drugs whose physical and chemical characteristics make them insufficiently stable in reaching their site of action intact. They can also be used to transport drugs in a targeted way to particular sites of action tissue specific targeting , or to overcome biological barriers such as the intestinal wall or the blood-brain barrier. Green biotechnology is the application of biotechnology processes in agriculture and food production. They are concentrating considerable attention on molecular plant biotechnology, which is seen as a future growth factor in agro-industry. The traditional pesticide market, on the other hand has been stagnating for years. The main emphasis in modern plant biotechnology is the production of transgenic plants. The first use of gene technology to bring about changes in plants became possible at the beginning of the s, around ten years after the first experiment with bacteria. The market value of transgenic plants is estimated to be in excess of 2 billion euros, according to the calculation of the German Federal Office for the Environment. These figures relate to transgenic crop plants, which were being grown on an area totaling about 40 million hectares worldwide in and Novel and Functional food: New types of foodstuffs with novel properties are often called functional food. Another category that is often mentioned in this context is nutraceuticals. These are foods that have a medicinal effect. Modern biotechnology is being employed commercially to introduce novel performance features in productive livestock. The transgenic specimens then display for example different wool characteristics for sheep, or improved milk characteristics in cattle. The terms Grey and White Biotechnology have been coined for the application of biotechnological processes in environmental and industrial production contexts. The latter is primarily focused on the production of fine chemicals, in particular technical enzymes. Modern biotechnology already dominates the technical enzymes market. They can be found as proteases, lipases, celluloses and amylases for example in modern detergents, where the serve, amongst other purposes as protein and fat solubilizes. There are a number of safety issues relating to biotechnology products that differ from those raised by low molecular weight products and need to be taken into account when designing the safety evaluation programme for a biotechnology derived pharmaceutical product. The quality and consistency of the product requires careful control in terms of product identity, potency and purity because of concerns about microbiological safety, impurities arising from the manufacturing process e. The immunogenic nature of heterologous proteins, vectors, cells, tissues and process contaminants must also be considered in the design of the safety evaluation programme and appropriate monitoring for anti-product antibodies, particularly neutralizing antibodies included in toxicity studies to aid interpretation of the findings. For gene transfer products, there are concerns about the distribution and persistence of vector sequences, the potential for expression of vector sequences in non-target cells: In , the Food and Drug Administration FDA became aware that preclinical studies from multiple clinical trial applications indicated evidence of vector DNA in animal gonadal tissues following extra gonadal administration. These positive polymerase chain reaction PCR signals were for DNA extracts from whole gonads subsequent to vector administration. The observations involved multiple classes of vectors, formulations and routes of administration.

DOWNLOAD PDF SCOPE AND DRIVERS FOR INDUSTRIAL BIOTECHNOLOGY

Chapter 2 : Biotechnology Market Size, Share | Industry Analysis Report

This publication examines the international drivers, the enabling technologies fast-tracking industrial biotechnology, industry trends, some of the products that are appearing on the market, industry structure and finance, and finally policy measures and trends.

Presence of room for partnerships in the sector is expected to drive significant progress in the industry. The companies are focusing on the development of novel techniques and their implementation by collaborating with the other participants. Rise in demand for these therapeutics and diagnostic solutions on principles of red biotechnology, DNA sequencing, and recombinant technology is anticipated to fuel growth. Increasing prevalence of diseases such as hepatitis B, cancer, and other orphan disorders is expected to fuel demand in this space. China biotechnology market by application, - USD Billion Rise in the demand for food and agricultural products including sugarcane, rice, beans, and wheat owing to the growing population base in U. Decreasing prices of DNA sequencing is expected to serve this sector as a high impact rendering growth driver. The optimization of sequencers and their software, as well as the involvement of governments and collaborations between these companies and medical specialists, will be of utmost importance for the success of DNA-sequencing technology. Application Insights Health associated applications accounted for the largest share as a result of the higher use of associated products in healthcare industry. Growing prevalence of chronic diseases heightening the demand for new drug development is one of the key factors accounting for the aforementioned conclusion. Moreover, growing demand for personalized medicine and biosimilars is also expected to drive segment growth during the forecast period. Bioinformatics is expected to witness the fastest growth in the coming years as a consequence of substantial developments in this field. Substantial developments include algorithm designing for efficient storage and management of genomic and proteomic data generated through the studies carried out on plant, animal or human genomes. Nanobiotechnology finds major application in drug delivery therapies for chronic disorders such as cancer. It involves the development of nanoparticle based chemotherapeutic drugs, gold nanoparticles, and quantum dots for molecular diagnosis and nanobiosensors which help in optical imaging and drug delivery. Bioinformatics is expected to witness the fastest growth in the coming years. Uptake of cloud based solutions which effectively and robustly manage the parallelization and distribution of input data and user code on many computer nodes is attributive for estimated growth in the bioinformatics based methods. The introduction of cloud computing environment for processing NGS generated data has played a great role as a driving force in current scenario. Regional Insights North America dominated the overall market in terms of revenue in at The aforementioned fact supports the estimated share of biotechnology market. Asia Pacific on the other hand, is expected to gain market share during the forecast period owing to the presence of patient awareness, rapidly improving healthcare infrastructure, and rising healthcare expenditure levels in the emerging markets. These markets include the developing economies of China and India. Competitive Insights The industry is fragmented in nature. This market encompasses several small and emerging players along with well-established major players. Large firms are targeting small firms with an operating strategy of acquisition in order to sustain position in the market. This acquisition by the company aimed at an addition of recombinant based influenza vaccine to its product portfolio.

Chapter 3 : Scope of Biotechnology and Industrial Microbiology PowerPoint Presentation, PPT - DocSlides

TABLE OF CONTENTS - 5 Table of contents Executive summary 9 Chapter 1. Introduction - Scope and drivers for industrial biotechnology 11 Global drivers

There are many definitions of biotechnology. Some of these include the use of microorganisms to make the antibiotic, penicillin or the dairy product, yoghurt; the use of microorganisms to produce amino acids or enzymes are also examples of biotechnology. Developments in molecular biology in the last two decades or so, have vastly increased our understanding of the nucleic acids in the genetic processes. This has led to applications of biological manipulation at the molecular level in such technologies as genetic engineering. Industrial microbiology may be defined as the study of the large-scale and profit motivated production of microorganisms or their products for direct use, or as inputs in the manufacture of other goods. Thus yeasts may be produced for direct consumption as food for humans or as animal feed, or for use in bread-making; their product, ethanol, may also be consumed in the form of alcoholic beverages, or used in the manufacture of perfumes, pharmaceuticals, etc. Industrial microbiology is clearly a branch of biotechnology and includes the traditional and nucleic acid aspects. The discipline of microbiology is often divided into sub-disciplines such as medical microbiology, environmental microbiology, food microbiology and industrial microbiology. The boundaries between these sub-divisions are often blurred and are made only for convenience. Bearing this qualification in mind, the characteristics of industrial microbiology can be highlighted by comparing its features with those of another sub-division of microbiology,medical microbiology. The sub-disciplines of industrial microbiology and medical microbiology differ in at least three different ways. First is the immediate motivation: In medical microbiology, the immediate concern of the microbiologist or laboratory worker is to offer expert opinion to the doctor about, for example the spectrum of antibiotic susceptibility of the microorganisms isolated from a diseased condition so as to restore the patient back to good health. The generation of wealth is of course at the back of the mind of the medical microbiologist but restoration of the patient to good health is the immediate concern. The second difference is that the microorganisms per se used in routine medical microbiology have little or no direct economic value, outside the contribution which they make to ensuring the return to good health of the patient who may then pay for the services. The third difference between the two sub-disciplines is the scale at which the microorganisms are handled. In industrial microbiology, the scale is large and the organisms may be cultivated in fermentors as large as 50, liters or larger. In routine medical microbiology the scale at which the pathogen is handled is limited to a loopful or a few milliliters. If a pathogen which normally would have no economic value were to be handled on the large scale used in industrial microbiology, it would most probably be to prepare a vaccine against the pathogen. Under that condition, the pathogen would then acquire an economic value and a profit-making potential; the operation would properly be termed industrial microbiology. Multi-disciplinary or Team-work Nature of Industrial Microbiology: Unlike many other areas of the discipline of microbiology, the microbiologist in an industrial establishment does not function by himself. He is usually only one of a number of different functionaries with whom he has to interact constantly. In a modern industrial microbiology organization these others may include chemical or production engineers, biochemists, economists, lawyers, marketing experts, and other high-level functionaries. They all cooperate to achieve the purpose of the firm, which is not philanthropy, at least not immediately but the generation of profit or wealth. Some of his functions include: Obsolescence in Industrial Microbiology: As profit is the motivating factor in the pursuit of industrial microbiology, less efficient methods are discarded as better ones are discovered. Indeed a microbiological method may be discarded entirely in favor of a cheaper chemical method. This was the case with ethanol for example which up till about was produced by fermentation. When cheaper chemical methods using petroleum as the substrate became available in about , fermentation ethanol was virtually abandoned. From the mids the price of petroleum has climbed steeply. It has once again become profitable to produce ethanol by fermentation. Several countries notably Brazil, India and the United States have officially announced the production of ethanol by fermentation for blending into gasoline as gashol Free Communication of Procedures in Industrial Microbiology: Many procedures employed in industrial microbiology do not become public property for a long time because the companies which discover them either keep them secret, or else patent them. For this reason, industrial microbiology textbooks often lag behind in describing methods employed in industry. Patents, especially as they relate to industrial microbiology, will be discussed below. All over the world, governments set up patent or intellectual property laws, which have two aims. For most patent laws an invention is patentable: For the purposes of the above: Patents cannot be validly obtained in respect of: Principles and discoveries of a scientific nature are not necessarily inventions for the purposes of patent laws. In some cases it has been necessary to go to the law courts to decide whether or not an invention is patentable. It is therefore advisable to obtain the services of an attorney specializing in patent law before undertaking to seek a patent. The laws are often so complicated that the layman, including the bench-bound microbiologist may, without proper guidance, leave out essential details which may invalidate his claim to his invention. The exact wording may vary, but the general ideas regarding patentability are the same around the world. An examination of the patent laws of a number of countries will show that they often differ only in minor details. For example patents are valid in the UK and some other countries for a period of 20 years whereas they are valid in the United States for 17 years. International laws have helped to bridge some of the differences among the patent practices of various countries. The Paris Convention for the protection of Industrial Property has been signed by several countries. This convention provides that each country guarantees to the citizens of other countries the same rights in patent matters as their own citizens. The treaty also provides for the right of priority in case of dispute. Following from this, once an applicant has filed a patent in one of the member countries on a particular invention, he may within a certain time period apply for protection in all the other member countries. The latter application will then be regarded as having been filed on the same day as in the country of the first application. Another international treaty signed in Washington, DC came into effect on 1 June, This latter treaty, the Patent Cooperation Treaty, facilitates the filing of patent applications in different countries by providing standard formats among other things. A wide range of microbiological inventions are generally recognized as patentable. Such items include vaccines, bacterial insecticides, and mycoherbicides. On 16 June, a case of immense importance to the course of industrial microbiology was decided in the United States Court of Customs and Patent Appeals. Ananda Chakrabarty then an employee of General Electric Company had introduced into a bacterium of the genus Pseudomonas two plasmids using techniques of genetic engineering discussed in Chapter 7 which enabled the new bacterium to degrade multiple components of crude oil. This single bacterium rather than a mixture of several would then be used for cleaning up oil spills. Claims to the invention were on three grounds. Process claims for the method of producing the bacteria b. Claims for an inoculum comprising an inert carrier and the bacterium c. Claims to the bacteria themselves. The first two were easily accepted by the lower court but the third was not accepted on the grounds that i the organisms are products of nature and ii that as living things they are not patentable. As had been said earlier the Appeals Court reversed the earlier judgment of the lower court and established the patentability of organisms imbued with new properties through genetic engineering. A study of the transcript of the decision of the Appeals Court and other patents highlights a number of points about the patentability of microorganisms. In other words it is the organism-inert material complex which is patented, not the organism itself. An example is a US patent dealing with a bacterium which kills mosquito larva granted to Dr L J Goldberg in , and which reads thus in part: It is the combination of the bacterial larvicide and the carrier which produced a unique patentable material, not the larvicide by itself. In this regard, when for example, a new antibiotic is patented, the organism producing it forms part of the useful process by which the antibiotic is produced. Today most countries including those of the European Economic Community accept that the following are patentable: Patents resulting from the above were in general regarded as process, not substance, patents. The above terms all relate to genetic engineering and are discussed in Chapter 7. The current US law specifically defines biotechnological inventions and their patentability as follows: A a process of genetically altering or otherwise inducing a single- or multi-celled organism to- i express an exogenous nucleotide sequence, ii inhibit, eliminate, augment, or alter expression of an endogenous nucleotide sequence, or iii express a specific physiological characteristic not naturally associated with said organism; B cell fusion procedures yielding a cell line that expresses a specific protein, such as a monoclonal antibody; and C a method of using a product produced by a process defined by subparagraph A or B , or a combination of subparagraphs A and B. The rationale for the deposition of culture in a recognized culture collection is to provide permanence of the culture and ready availability to users of the patent. The cultures must be pure and are usually deposited in lyophilized vials. The deposition of culture solves the problems of satisfying patent laws created by the nature of microbiology. In chemical patents the chemicals have to be described fully and no need exists to provide the actual chemical. In microbiological patents, it is not very helpful to describe on paper how to isolate an organism even assuming that the isolate can be readily obtained, or indeed how the organism looks. More importantly, it is difficult to readily and accurately recognize a particular organism based on patent descriptions alone. Finally, since the organism is a part of the input of microbiological processes it must be available to a user of the patent information. A fuller list is available in the World Directory of Cultures of Micro-organisms. Culture collections and methods for preserving microorganisms are discussed in Chapter 8 of this book. Fourth, where a microbiologist-inventor is an employee, the patent is usually assigned to the employer, unless some agreement is reached between them to the contrary. The patent for the oil-consuming Pseudomonas discussed earlier went to General Electric Company, not to its employee. Fifth, in certain circumstances it may be prudent not to patent the invention at all, but to maintain the discovery as a trade secret. In cases where the patent can be circumvented by a minor change in the process without an obvious violation of the patent law it would not be wise to patent, but to maintain the procedure as a trade secret. Even if the nature of the compound produced by the microorganisms were not disclosed, it may be possible to discover its composition during the processes of certification which it must undergo in the hands of government analysts. The decision whether to patent or not must therefore be considered seriously, consulting legal opinion as necessary. It is for this reason that some patents sometimes leave out minor but vital details. As much further detail as the patentee is willing to give must therefore be obtained when a patent is being considered seriously for use. In conclusion when all necessary considerations have been taken into account and it is decided to patent an invention, the decision must be pursued with vigor and with adequate degree of secrecy because as one patent law states: The right to patent in respect of an invention is vested in the statutory inventor, that is to say that person who whether or not he is the true inventor, is the first to fileâ€¦ the patent application.

Chapter 4 : Industrial Biotechnology | Mary Ann Liebert, Inc., publishers

OECD (), Future Prospects for Industrial Biotechnology, OECD Publishing. Introduction - Scope and drivers for industrial biotechnology Chapter 2. Emerging.

Photo courtesy of Umberto Salvagnin This article discusses what Biotechnology is all about, the scope of Biotechnology in India and abroad and the various prospects this field has to offer in terms of jobs and higher studies. What is Biotechnology all about? Biotechnology is a highly interdisciplinary field that combines biological sciences with engineering technologies to manipulate living organisms and biological systems to produce products that advances healthcare, medicine, agriculture, food, pharmaceuticals and environment control. Biotechnology can be classified into two broad categories: The biological sciences aspect deals with research and development in areas such as Microbiology, Cell biology, Genetics, Molecular Biology etc. The industrial processes aspect deals with the production of drugs, vaccines, biofuels and pharmaceuticals on an industrial scale using biochemical processes and techniques. Some of the best innovations and developments that have come out of Biotechnology and allied fields are: Tech degree in Biotechnology encompasses both the biological sciences as well as the engineering aspect of Biotechnology. A BSc degree on the other hand focuses more on the biological sciences aspect of Biotechnology. There is no such thing as B. Tech being better than BSc or vice versa. Students must choose a course that aligns with their long term goals. You can later on pursue your PhD if interested. If you want to keep your options open, then go for B. Tech students who do not find jobs in biotech sector shift to software, management etc. So, this is an added bonus for biotech students and this kind of transition will be tougher with a BSc and MSc degree in Biotechnology. Scope of Biotechnology for BTech students: Any student who is contemplating on pursuing a career in Biotechnology must be aware that this field is still developing in India. Therefore, the number of job openings and pay packages are both very low when compared with IT and CS fields. After a BTech degree, students can find jobs in pharmaceutical companies, research labs and institutions in India. However, most Indian students tend to go abroad to pursue their masters or doctorate studies in Biotechnology and allied fields. Some students also shift to MBA and enter the world of business, finance and banking as their engineering background gives them the required quantitative skills to excel in these sectors. Also, many students shift to software through on-campus placements. Talking about on-campus placements, since the number of job openings is very less in Biotechnology, the number of companies coming for placements will be very less. If your university is not reputed nationally or state wise, chances of any biotech or pharmaceutical company coming for placements sessions will be close to nil. Since this field is highly research oriented, vast and diverse, it is highly recommended that students pursue their graduate studies in Biotechnology, Biomedical sciences, Biological sciences, Bioprocess Engineering etc. For more details on B. Tech course in Biotechnology, please read this article. Scope of Biotechnology for BSc students: If you are a BSc student in biotechnology or any other biological sciences related fields, it is highly recommended that you pursue your MSc. The job opportunities for BSc graduates in a highly research oriented field as biotechnology is very less and most students tend to pursue their MSc in Biotechnology or a specialized discipline of biotechnology. With an MSc degree, most students tend to work in research labs and industries as research assistants. The pay package is also quite less for MSc graduates. Since India is still developing, it is highly recommended that you do your MSc in a reputed institution for good campus placements and job opportunities. If your university is not reputed, chances of any biotech company coming for placements will be zero. Many MSc students tend to pursue their PhD degrees in Biotechnology or related fields as a PhD degree opens up more avenues both in India and worldwide. A PhD degree will give you the ability to start your own research lab, become a professor or head of the department in universities or be the lead for a team of research scientists. If your goal is to create a niche for yourself in Biotechnology, then your best bet will be to get a PhD. Since Biotechnology is in its nascent stages in India, many students tend to get disillusioned with the limited opportunities.

DOWNLOAD PDF SCOPE AND DRIVERS FOR INDUSTRIAL BIOTECHNOLOGY

However, since the past decade, the Indian government has set up numerous research institutions of national repute conducting research in Cancer Biology, Stem Cells, Genetic Engineering, Biomedical Sciences etc. Companies, institutions and labs: Following is a list of companies, universities and research institutions that are renowned in India and worldwide for their work in Biotechnology and allied fields. Universities and research institutions: Cerner corporation, Unitedhealth Group. For more details on the scope of Biotechnology and Biomedical Sciences, please read this interview.

Chapter 5 : Biotechnology: Introduction, Scope and Applications of Biotechnology

Scope and drivers for industrial biotechnology Industrial biotechnology has achieved spectacular new growth and interest in recent years, mainly as a result of global interest in biofuels. This chapter reviews the drivers for this growth spurt.

Overview The global biotechnology market is mainly driven by the surge in the demand for food, depleting natural resources, government regulatory support, and technological advancements of various solutions to counter fatal diseases. The advent of stem cell technology, nanotechnology, and cloning has also propelled this market substantially and is expected to continue aiding to this market in the years to come. However, the dearth of awareness among consumers regarding biotech products and the long duration between research and commercial production of these products may act as a restraint to this market over the next few years. Apart from this, the market will also face challenges from the ethical and social issues with clinical trials in the near future. Biotechnology finds extensive application in several industries, such as agriculture, pharmaceuticals, downstream chemical processing, and bioservices. The pharmaceuticals industry has emerged as the main application area of biotechnology with biopharmacy surfacing as the leading segment of the global biotechnology market. The industrial application of biotechnology is also on the horizon with the rising demand for biofuels and bioenzymes in a number of applications. The agriculture sector is anticipated to primarily apply biotechnology for the genetic modification of crops and the production of bioseeds over the forthcoming years. Biotechnology is the employment of organisms and living systems in order to develop products or a technological application that further uses derivatives, living organisms, and biological systems thereof, in order to create or modify processes or products for specific use. Relying on the applications and tools, it at times overlays with related fields such as molecular engineering, biomanufacturing, biomedical engineering, and bioengineering. Biotechnology draws from cellular and biomolecular processes in order to formulate several products ranging from industrial enzymes to drugs. The application of biotechnology is also rising in the agricultural sector in order to protect the crops against insects and pests. The existence of government organizations such as the Department of Biotechnology DBT and many other government funded institutions such as National Biotechnology Board NBTB and several other independent institutions working in the field of biotechnology are boosting in funds in order to support initiatives related to product development and research and development regarding advanced in biotechnology. These factors are expected to bring in more funds for biotechnology research. Trends and Opportunities Growing demand for new technologies such as tissue engineering, fermentation, recombinant technology, and DNA sequencing is expected to magnify the size of the biotechnology industry. Rising demand for food for meeting the unmet needs of the incessantly growing population across the globe and low availability of natural resources that are non-renewable is expected to fuel the growth of the global biotechnology market. Genetic modification and genetic engineering has applications in agricultural food items and is thus is likely to stimulate the adoption of biotechnology further. Moreover, declining prices of technologies related to DNA sequencing is anticipated to trigger the commencement of research and development activities in order to understand genetic variations better and developing therapeutic solutions. However, the growth of the global biotechnology market is likely to be hampered by due to the high risks associated with genetically modified crops and organisms and also due to ethical issues regarding clinical trials. Lack of understanding of biosystems creates difficulties in predicting the nature of the artificial organisms made from biotechnology experiments. However, the sector can expect more funds owing to the growing need for understanding chronic diseases at a molecular level and conduct novel diagnostic and therapeutic procedures. In June , BASF signed an agreement in order to acquire Chemetall, a developer and producer of treatment and system solutions for surface treatment. Another major merger occurred of DuPont with the Dow Chemical Company in order to diversify to diversify its seed and crop protection portfolio. Regional Outlook North America and Europe are expected to emerge prominent in the global biotechnology market. This progress can be attributed to the rising initiatives in terms of research and development by prime industry players and growing awareness among private and public research institutions. Even the market in Asia Pacific is likely to exhibit lucrative growth opportunities in the coming years owing to favorable regulatory scenarios. Vendor Landscape Leading players in the market are adopting strategies in terms of acquisitions and mergers and strategic collaborations in order to maintain a strong hold in the market. Some of the leading players in the market are Sanofi, Lonza, Novartis, F. The study presents reliable qualitative and quantitative insights into:

Chapter 6 : Scope of Biotechnology in India | Peshaa

Read this article to learn about the scope and applications of biotechnology. The applications of biotechnology includes plant tissue culture, production of transgenic in animal and plants, applications in medicine as tools and therapeutics, creation of new enzymes and their immobilization for industrial use, development of monoclonal antibodies and control of pollutions, etc.

Chapter 7 : Biotechnology Markets in China

Industrial Biotechnology Contents Chapter 1. Introduction Ã¢â,¬" Scope and drivers for industrial biotechnology Chapter 2. Emerging synthetic enabling technologies.

Chapter 8 : SCOPE OF BIOTECHNOLOGY & INDUSTRIAL MICROBIOLOGY

The industrial application of biotechnology is also on the horizon with the rising demand for biofuels and bioenzymes in a number of applications. The agriculture sector is anticipated to primarily apply biotechnology for the genetic modification of crops and the production of bioseeds over the forthcoming years.

Chapter 9 : Future Prospects for Industrial Biotechnology - OECD

sir.i want to knowlage for industrial biotechnology, my branch is ibt (industrial biotechnology),calendrierdelascience.com so plz sugges me for trainning and also job.