CONSEQUENCES OF BIOTECHNOGENIC AND COEVOLUTIVE DEVELOPMENT IN THE PROCESS OF BIOTECHNOLOGICAL EVOLUTION (in a socio-philosophical perspective)

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Annotation: This article analyzes the socio-philosophical consequences of biotechnological evolution, biotechnogenic and coevolutionary development. The historical formation of biotechnology, genetic engineering, artificial biosystems, and synthetic biology are examined. Particular attention is paid to the economic, environmental, and social aspects of biotechnology, as well as its current and future prospects.

Keywords: Biotechnological evolution, biotechnogenic development, coevolution, genetic engineering, artificial biosystems, synthetic biology, socio-philosophical reflection.

Introduction. Today, rapidly developing biotechnology shows that it has a place and role in many areas of the world, from economic, social, political, environmental, health care, agriculture and industrial production. In developed countries of the world, scientific research is being carried out in a number of prestigious research institutes aimed at developing this area, and social proposals and recommendations are being made. It is no exaggeration to say that interest in this area was very high in the former Soviet period. In particular, a number of scientific research laboratories were operating in animal husbandry, horticulture, cotton growing, cocoon growing and even the development of biological weapons. For example: The city of Arol-7 or Kantubek was built on one of the islands in the Aral Sea, which was then full of water - Revival Island. The plan to build a biochemical test site on the island was already in the 1930s. World War II accelerated this process. To prevent it from falling into German hands, the Soviets evacuated the biological laboratory on Gorodoml Island in Lake Seliger, Tver Oblast, first to Kirov, then to Saratov, and finally to the Island of the Resurrection.

Today, it may seem that research on biotechnology has slowed down a bit in our country. However, since the years of independence, a number of scientific research works have been carried out in this area. The Institute of Microbiology, established under the Academy of Sciences of the Republic of Uzbekistan, conducts research in the field of microbiological biotechnology. Scientists of the Institute of Genetics and Experimental Biology of Plants, established under the Academy of Sciences of the

Republic of Uzbekistan, have developed and successfully tested a biotechnology for growing winter wheat without mineral fertilizers.

Department of Biotechnology, Jizzakh Branch of the National University of Uzbekistan named after Mirzo Ulugbek: This department, which has been operating since 2020, is becoming one of the basic specialty departments in the republic in training qualified biotechnologists for various sectors of the economy.

Also, in accordance with the Decree of the President of the Republic of Uzbekistan No. PQ-4899 dated November 25, 2020, a comprehensive set of measures was established to develop biotechnology and improve the country's biological safety system. As a result, international standards in the field of biotechnology were approved and implemented.

Literature review. Several foreign scientists have conducted research on coevolutionary development and its transformation into biotechnological evolution. In particular, Thomson conducted scientific research on the topic of "The Geographical Mosaic of Coevolution", and Konin conducted scientific research in his works entitled "The Randomness of Logic: The Nature and Origin of Biological Evolution". Pimentel presents his views on genetic engineering in the field of biotechnological evolution in his work entitled "The Economic and Ecological Benefits of Biological Diversity". The scientific achievements of Church and Regis in the field of artificial biosystems and synthetic biology are worthy of praise.

M.A. Aitkhozhin, A.A. Bayev, R.G. Butenko, G.P. Gorgiyev, Yu.Yu. Gleba, V.G. Debabov, G.K. Skryabin, J.A. Musayev, O. Toshmuhamedov, A.F. Kholmurodov and others have made a great contribution to the formation and development of biotechnology as a science, but no significant Uzbek scientists have conducted scientific research on the biotechnogenic consequences of biotechnology and its philosophical observation.

Research Methodology. The research used methods of historicity, objectivity, period consistency, comparative, critical, logical and chronological, semantic and pragmatic analysis.

Analysis and results. Biotechnology is an interdisciplinary field that integrates knowledge from science, health, biology, chemistry, engineering, and the sciences, encompassing fields such as agriculture, industry, and physics. Modern genetic engineering and molecular biology have their roots in ancient developmental practices such as fermentation and selective breeding.

By studying the growth of mining in different regions, including Europe and Iran, he explains how biotechnology has adapted to solve local problems, as well as its scientific aspects, such as contributing to global advances in health, food security, and environmental sustainability.

Today, modern biotechnology blends biology, chemistry, physics, and engineering, and has become a driving force for innovation in medicine, sustainable agriculture, and a source of ecological solutions.

The origins of biotechnology date back to ancient human practices, namely the manipulation of biological processes for practical purposes. Early forms of biotechnology are believed to have emerged through the manipulation of microorganisms, particularly in the production, preservation, and use of food. One of the oldest biotechnological methods dates back to the era of fermentation.

About 6000 BC, ancient civilizations used it to make bread, alcohol, and beverages, and to produce dairy products such as yogurt and cheese.

These early practices laid the foundation for future advances in the use of natural biological processes to improve food products.

In particular, Jared Mason Diamond's work "Guns, Germs, and Steel: The Fate of Human Societies" [3:46] explains this in its positive and negative aspects as follows: first, the main reason for the rise of industrial societies in the field of biotechnology is the increasing needs and the reasons for their satisfaction.

Storage and production, although their molecular mechanisms were not yet known, also showed the early roots of agriculture, in the early application of biotechnology in selective breeding and farming. By selectively breeding plants and animals, desirable traits such as increased productivity and increased disease resistance were developed by ancient societies without knowing the genetic makeup of organisms [2:41]. The next important stage in the evolution of biotechnology has come, namely the contribution of microbiology and genetics, which provided the necessary scientific understanding, in connection with the improvement of early practices. This process was initiated in the 19th century by scientists such as Louis Pasteur.

Pasteur's work revolutionized the production of food and beverages through microbial fermentation. The development of pasteurization, the process of heating liquids to kill harmful microorganisms, prevented spoilage. The discovery of DNA in the early 20th century, followed by the discovery of its double-helix structure by James Watson and Francis Crick in 1953, marked another important scientific development, setting the stage for a paradigm shift in the history of biotechnology. This led to the understanding of the molecular basis of heredity and the advancement of molecular biology and genetic engineering.[4:32] The transition from these early practices to modern biotechnology was a giant leap forward.

The independent socio-economic development of Uzbekistan is a humanistic economy that acquires new qualitative products based on the production, distribution, consumption and exchange of material goods in accordance with the laws of a socially oriented market economy. As Professor Sh. Negmatova said: “A humanistic economy is a socially oriented economy based on healthy competition, satisfying all human

needs for material and spiritual goods, and preventing sharp stratification of society" [11].

With the advent of recombinant DNA technology in the mid-20th century, methods for isolating and manipulating DNA were developed. It allows combining different genetic materials and creating recombinant DNA molecules.

Coevolutionary development is - "In biology, coevolution occurs when two or more species interact with each other's evolution through the process of natural selection. This term is sometimes used for two traits of one species that affect each other's evolution, as well as for the coevolution of gene culture" [5].

First gen culture is defined in context as "Culture", "Socially learned behavior", and "Social learning" is defined as acquiring behavior by copying observed behavior in others or by being taught by others.

In social philosophy, understanding and explaining education is like a system of repeating a certain pattern by an artist, and is a means for various socially learned cultural tools to find their place in society and achieve high performance in various fields. For example, Charles Darwin's "Origin of Species" posits that "every evolution must be superior to the superior in intellectual capacity, or rather superior in intelligence, in order to destroy the inferior" [1:50]. This has led to the acceptance of coevolution as one of the main factors that create coevolutionary development.

First, the evolution of biotechnology is deeply shaped by different regional contributions, developing unique approaches to solving local problems and promoting global development. It plays a crucial role in the early history of genetics, in particular in understanding the laws of heredity, and later in the development of the field of molecular biology. In particular, the discoveries of Gregor Mendel were the main foundation for the development of biotechnology. He is considered the father of genetics and had a great influence on biotechnology with his laws of heredity. Along with Gregor Mendel's discoveries, the work of German biochemists and microbiologists laid the foundation for the development of biotechnology.

All of the above are discoveries and paradigms that led to the emergence of biotechnology today. It is no exaggeration to say that biotechnology has reached its peak, surpassing all previous achievements. This is because, as a result of the coevolutionary development of biotechnology, it has penetrated not only the plant world in nature, but also the animal and human nature. For example, let's turn to the reports of the grandviewresearch research center: The global market for artificial insemination was estimated at $ 2.26 billion in 2023 and is projected to grow at a CAGR of 8.6% from 2024 to 2030. The prevalence of infertility, increasing awareness and social acceptance are increasing the demand for artificial insemination. Sperm freezing and other Advances in technology are making the procedure more effective, and as disposable incomes increase, more couples are able to afford this treatment,

further fueling market growth [6]. This means that advances in genetic engineering, a new field in biotechnology, have become an integral part of all of humanity today.

The development of biotechnology itself is causing biotechnogenic consequences. Although modern biotechnology has created a number of conveniences for humanity, its improper or uncontrolled use is causing significant environmental and biological problems. Biotechnogenic consequences are negative situations that arise as a result of the impact of biotechnology on the natural environment, biodiversity and human health. We can cite the following as negative consequences of biotechnology:

firstly, the reduction of genetic diversity, that is, as a result of the widespread spread of genetically modified organisms (GMOs), natural genetic diversity is under threat. For example, genetically modified plants can mix with wild species, disrupting their natural genetic pool. This increases the likelihood that ecosystems will reduce their ability to adapt in the future;

secondly, the disruption of ecosystems, biotechnological interventions can affect ecosystems and disrupt the natural balance. In particular, GMO crops that produce insecticides can lead to a decrease in the population of pollinating insects. This threatens the stability of the entire food chain;

third, genetic engineering and the overuse of antibiotics used in biotechnology, as a result of the increase in antibiotic-resistant bacteria, increase drug resistance among bacteria. This situation poses a serious problem for modern medicine and makes it difficult to treat some infectious diseases;

fourth, the uncontrolled spread of artificial organisms, when genetically modified organisms (for example, microbes or plants) are released into the natural environment, their ecological consequences may not be fully assessed in advance. Artificially created organisms can adapt to the natural environment and harm wildlife.

Conclusion/Recommendations Based on the above ideas and considerations, the following conclusion was made:

Firstly, biotechnology is a field of knowledge that is emerging as a result of the purposeful impact on nature and humans to create useful products for them, as well as new chemical technologies and a number of other practical achievements in the field of natural sciences.

Secondly, biotechnology, in the process of its formation and development as a science, encompasses various areas of science. As a result of coevolutionary development, biotechnological evolution occurs, and great achievements are achieved in the fields of agriculture, medicine, industry and ecology. However, the rapid development of biotechnology can also cause biotechnogenic consequences, which requires a careful approach to the environment and human health.

Thirdly, studies show that coevolutionary development can be seen as an impetus for the development of biotechnology. Thus, biotechnological evolution

leads to the formation of such areas as genetic engineering, recombinant DNA technology, microbiology and synthetic biology. The processes of genetic manipulation and the creation of artificial biosystems will lay the foundation for the next stage of biotechnology, which will be based on common features such as sociality, healthy competition between forms of property, continuity, and systematic action as the main factor of social development of society in production.

Fourth, biotechnology has caused revolutionary changes in the fields of agriculture, medicine and ecology. Artificial insemination, genetic engineering and the production of biotechnological drugs today serve to facilitate human life. At the same time, in order to prevent the side effects of biotechnology, it is necessary to thoroughly study its impact on the environment and society.

Fifth, biotechnological innovations can have both positive and negative effects on the environment. On the one hand, technologies that ensure environmental sustainability are being developed, including biofuels and biological cleaning methods. On the other hand, genetically modified organisms and biotechnological waste can pose a threat to the ecological balance. Therefore, controlling the environmental impact of biotechnology is essential for its sustainable development.

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