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Editorial

Biotechnology – current achievements and future challenges

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Nowadays biotechnology is one of the most significant area of science and industry. This is due to the fact that biological processes are required, among others, in production of pharmaceuticals or food as well as they play important role in environmental protection and medicine [1]. There are several proposals of classification of biotechnology, but one of the most often used is division proposed by DaSilva [2], where 10 colors such as red, yellow, blue, green, brown, dark, purple, white, gold and grey were used to classify and categorize various areas of biotechnology. For example, green biotechnology, also called agricultural biotechnology, is mainly focused on agriculture food and industrial plants, such as rapeseed, soybean and cotton [2,3]. Furthermore, green biotechnology compromises environmental protection, especially bioremediation, where microorganisms and plants are used for removal of contaminants from the soil, water and air [4]. The second area of biotechnology, strongly connected to the green one, is yellow biotechnology, which covers production of food and nutrition science, especially fermentation processes. Moreover, this kind of biological processes can minimize environmental exploitation in terms of meat production, due to making plant alternatives for famous meat dishes [5]. The next branch of biotechnology, which is worth paying attention, is health, representing by red color. This area is mainly focused on production of various pharmaceuticals, such as antibiotics, antitumor agents, immunosuppressive agents and enzyme inhibitors [6]. Within health area, the production of 'smart' polymers is of particular interest, which might be applied for production of biocompatible medical implants. The example of 'smart polymer' could be chitosan. As was found, the chitosan could be applied for production of heart valves or dressing for wound healing using

biotechnological approach [7]. Moreover, biopolymers of various shape and morphology are also used for fabrication of drug delivery systems [8].

Despite great potential and applicability of biological processes, new challenges are being faced by industrial biotechnology. For instance, one of them is low stability of microbes and enzymes in harsh process conditions, what causes that chemical process can be more competitive with the biological ones [9]. Therefore, methods for increasing of biomolecules stability are still being sought. One of them could be immobilization, which consists of attachment of biomolecules to the stable support, insoluble in the reaction medium [10]. Moreover, genetic engineering seems to be the solution of problems regarding low efficiency of biological processes. For example, it is possible to design organisms, such as plants, which can grow in specific conditions, for example under limited supply of water or mineral deficiencies in the soil [11].

Taking into account the disadvantages of biological processes or processes concerning use of living organisms, it should be emphasized that biotechnology and wide variety of biotechnological tools, could be a solution for these problems making biotechnology a green alternative to chemical processes. In this framework, the main aim of this Special Issue is to present recent achievements and future challenges in the area of both, scientific and industrial biotechnology and to highlight the importance of this study for development of a numerous of various branches of everyday life, science and industry. Another goal of this Special Issue is to present interdisciplinary reports on application of biotechnological approach including use of proteins, enzymes, microorganisms and other living cells to improve the efficiency and operationability of the biological processes. Study on biotechnological processes is inherently interdisciplinary including chemical, biological, physical, mathematical and even information technology processes. Further, each of this research area used its own terminology, tools and techniques. Therefore, it is extremely important to clearly present each approach, its limitations and disadvantages and possible solution to avoid contradictions and misunderstandings and to clearly highlight the importance of biotechnology in numerous of practical applications. Moreover, further studies are still of the highest interest, as the design and development of innovative biotechnological approaches with designed properties will not only result in their more frequent application but also act as a driving force for the improvement of numerous of various fields. This Special Issue welcomes high-impact research and review articles related to the application of biotechnology in various branches of science and industry.

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