
Editorial

BIOTECHNOLOGY – A NEW ERA, A KIND OF A SOLUTION?

According to the thorough analysis of S. YODA¹ from the mid eighties, the “explosive rate at which the world’s population continues to increase” (now 6 billion and perhaps by the year 2050 it will have reached 10–12 billion), due to “the accompanying and unavoidable increases in energy consumption and the resulting reality of the deterioration of the environment, the human race is faced with a triad of serious problems – economic growth, consumption of energy and resources, and conservation of the environment – in other words, the world finds itself facing a formidable Trilemma”.

This threefold system of demands undoubtedly requires new ideas, approaches, a totally new way of thinking of the mankind.

The continuing wasting application of energy resources, the large-scale mass production, large-scale consumption and large-scale disposal of refuse that made possible to permanently raise the living standard on one side of our Planet go together with the fact that there are many regions all over the world that simply suffer from shortage of food.

This can be interestingly and convincingly seen, if we look at the academic and industrial research problems that concern scientists of the western hemisphere: problems of the quality, packaging, ingredients like prebiotics and probiotics (generally the relationship of health and diet), functional foods and organic foods, while at the same time in the so-called “developing countries” the main problem is still to find the mode of satisfactory mass food production.

By the opinion of many analysts the forthcoming century will start a new age (side by side with the revolutionary Microelectronics) of development (or perhaps we are already in it): the Biosociety Era (very well foretold by K. Ereky, the “inventor” of the word biotechnology in 1919) in which every segment of human life will be strongly affected by bio-things (bioenergy, biomaterials and bioprocesses) and hopefully good contributions will be given to the solutions of the contradictions between rich and poor along with the trilemma of development.

This Biosociety considerably depends on the uprising biotechnology that is harnessing the natural biological processes of microbes, and plant and animal cells for specific industrial (including food) uses. As a matter of fact biotechnology is an “old wine in a new barrel” and it was a long long way from the beginning of the ancient beer production (can be seen on a fabulous Mesopotamian clay tablet in the Louvre) to the

¹ Yoda, S. (1996): Trilemma. Three major problems threatening world survival. Central Research Institute of Electric Power Industry, Tokyo, Japan

modern biotechnology, which amid the survival and further development of the classical biotechnology, involves recombinant DNA techniques, collectively known as genetic engineering.

After the aborted trials in the years 1960–1975 i.e. bacterial single-cell-protein production, the solution of the feeding problems, a new fight against starvation, could be the cautious application of GMO-s in food production.

Genetically modified (GM) food is almost exclusively derived using plant materials produced by genetic engineering, in which novel genes have been introduced into specific genomes to reach new or enhanced characteristics (higher yields, tolerancies and resistencies). Development, assessment and regulatory approval of GM foodstuffs are a long process involving many different private and public sector entities. Before the modified plant can be grown in large numbers under restricted conditions, approval is sought from the relevant authorities in a country such as a biosafety committee. Only after the required carefully designed agricultural, environment as well as health tests it is permitted to culture the given new plant in a farmland for commercial purposes. In the USA 40 permissions for the cultivation of transgenic plants have already been given by the FDA.

There are and certainly there will remain numerous debates on the food safety concerns regarding GMO-s but sooner or later they will inevitably be accepted by the society and they will be widely used all over the industrialized as well as developing countries.

While emphasizing the unquestionable significance and importance of the freedom of research, scientists have naturally great responsibility not only in elaborating the acceptable safety assessment methods evaluating GMO-s and the really safe GMO applications, but also in the positive influence of the public opinion in order to accept this kind of “artificially created” living materials. It is a rather difficult task to show the basic differences between cloning microbial plant or animal cells in order to produce some beneficial material and the inevitably dangerous human-cloning. As a matter of fact, recently mankind has been using hundreds of products originated from or produced by genetically modified organisms and the public does not feel a bit of fear using them. Antibiotics and many other pharmaceuticals were developed and produced by classical biotechnological methods, for instance from mutated microorganisms. Furthermore, it is obvious that crops grown from “hybrid” seeds also represent a genetic manipulation successfully and safely used for a long time. Now, actually most of these classical fermentation products have been massproduced with the application of genetic engineering; the modern biotechnology gradually and silently became the overwhelmingly leading strain developing technology of these (pharmaceutical, fine chemical, brewing) industries.

Are there alternatives to GM crops and biotechnology? Most agricultural scientists agree that biotechnology is needed if the world is to meet the demands for more food grown on the same (if not declining) land resource base, with less water and less labour.

Several tens of millions more people are added to the population of the Earth yearly, thus the number of people depending on the same land area has been increasing dramatically. The benefits of biotechnology to meet increases in food production, in a way that is environmentally friendly and safe for health, have been assessed by independent sources in several countries. Of course, like any new technology, biotechnology is not without risk, but the carefully assessed risks of it taking into account the necessary ethical requirements as well, can be managed to provide benefits for mankind.

In order to insure sustainable development for the entire human race, we will have to overcome the global threats and create a new civilization for the twenty-first century, and solve the problems that concern all people all over the globe.

The new era has started, let us exploit its potentials!

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