

FOOD BIOTECHNOLOGY - SUSTAINABLE DEVELOPMENT STRATEGY

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Abstract: *Biotechnology is the integral application of biological and engineering sciences for the technological use of living organisms, biologically active acellular structures and molecular analogues for the production of goods and services. The role of biotechnology is very important in the food industry; this is a biotechnology because agro-food raw materials are biological products and therefore their conservation until consumption, fresh or industrialization involves the control of the enzymatic activity of the vegetal and animal tissues or of the microflora contamination.*

Keywords: food biotechnology, sustainable development

1. INTRODUCTION

Considered as the last major technological revolution of the century, biotechnology is closely linked to issues of greatest interest in human development: the diagnosis and cure of diseases, food security and safety, and the protection of the environment.

Biotechnology will become one of the most important weapons of the fight against hunger, malnutrition of the population.

Biotechnology is a new science based on biology, the purpose of which is to use in the microorganisms or products derived therefrom cultures of plant and animal cells for the production of substances useful in agriculture and in the food, pharmaceutical, etc. industry the use of human activity.

Applications of biotechnologies:

- Agriculture (agricultural biotechnology)
- Food, food biotechnologies are industrial processes for processing vegetables and fruits, milk and dairy products, meat
- Medicine (veterinary medicine, public health, medicines, vaccines)
- Energy generation (energy generation from waste)
- Pollution control (methods and technologies for treatment)

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The relationship between agriculture and food is becoming more and more obvious, because largely "civilization diseases" are attributed to a qualitatively inadequate nutrition, due to the excessive use of chemistry in intensive technologies and as such the product market, Bio "is the most sought after and appreciated.

Organic farming is today a modern practice, with results based on scientific data that create a new concept of life, work and agriculture, with increased efficiency and can deliver products in line with demanding consumer requirements. (Figure 1.1.).

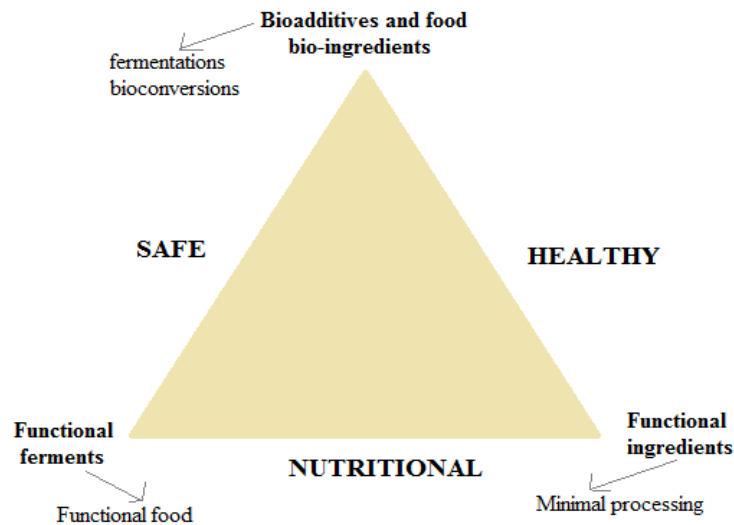


Fig. 1. Food relationship - agriculture - biotechnology-health

2. ROLE OF FOOD BIOTECHNOLOGY

Food biotechnologies include industrial processes for processing vegetables and fruits, milk and dairy products, and meat, generally targeting the fermenting aspects underlying them.

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Food biotechnology refers to the industrial processing of various raw materials with the help of microorganisms and their own enzymes or biological agents (microorganisms, enzymes) added to produce products or to improve technological processes.

The role of biotechnology is overwhelming in the food industry. In fact, the food industry is a biotechnology because agri-food raw materials are biological products and therefore their conservation until consumption, fresh (in the case of fruits and vegetables) or until industrialization (all agrifood products) implies control of the enzymatic activity of the vegetal tissues and animal or microflora contaminated contamination. Enzymes for plant and animal tissues are essential in the transformation of agro-food products: the maturation of fruits and vegetables, cereals and flours, or various food products based on germinated cereals, cheese maturation, maturation of meat. Enzymes may also have a deleterious role with implications in modifying the sensory characteristics and nutritional value of agro-food raw materials to their thermal processing. Also, the role of microorganisms is crucial, some of which have harmful action, others play an essential role in producing foods due to their fermentative action: acidic dairy products, cheeses, beer, wine, spirits, bread, raw salami, fermented cereals and legume. The microorganisms interfere with the fermentation of vegetable products: cabbage, pickles, olives, cucumbers, cocoa, etc.

3. THE BENEFITS OF FOOD BIOTECHNOLOGIES IN THE CONTEXT OF SUSTAINABLE DEVELOPMENT

- **Combating the global food crisis.** According to the United Nations, food production will have to increase by 50 percent by 2030 to cover the needs of a growing population (Figure 3). Agricultural biotechnology has been shown to increase agricultural output by seven to ten times in some developing countries, which far exceeds the production capacities of traditional agriculture, and this has not remained unnoticed at the level of the global community.

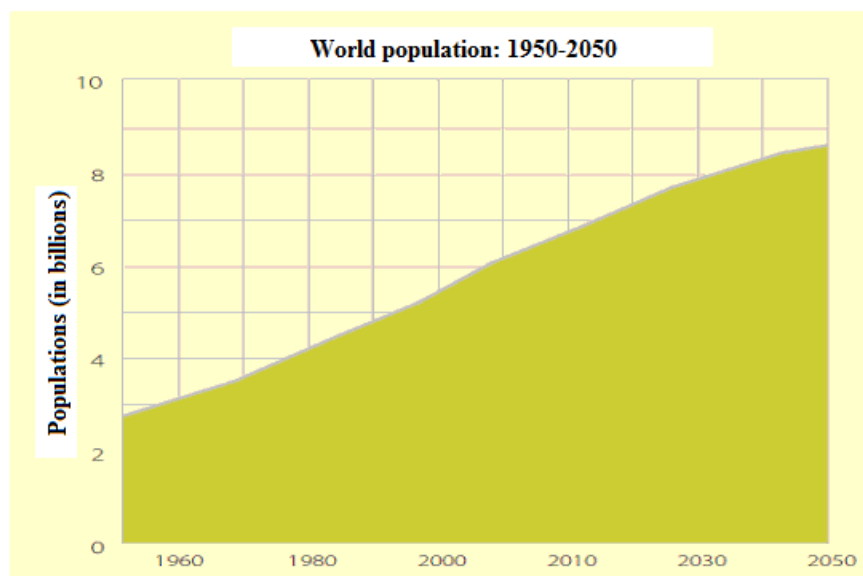


Fig. 3. Growth of the world population

- **Improving the characteristics of the crops themselves to the selection of features that would benefit consumers' health.** Soybeans are a good example in this respect, with over a dozen soybean varieties with benefits for human health to be launched shortly on the market. Beneficial features include replacing hydrogenated vegetable oil with alternative substances, reducing saturated fat and increasing omega 3 fatty acids. Consumers can be confident that agricultural biotechnology provides safety. These cultures have undergone numerous studies and have been declared safe by expert groups around the world. Over the 15 years since the biotech crops were introduced into the market, there has been no single proven case of affecting an ecosystem or a person's illness due to these foods.
- **Real and meaningful benefits to farmers, consumers and the environment.** Probably the most important impact of biotech crops on the environment has been determined by the adoption of unpolluted agriculture or agriculture with a minimal system of soil work. Herbicide-resistant crops, such as biotechnology soybeans, enable farmers to almost completely eliminate soil work, which contributes to improving soil health and

preservation, better water retention in soil, reducing soil erosion processes, and To reduce herbicide leakage. (figures 4 and 5)

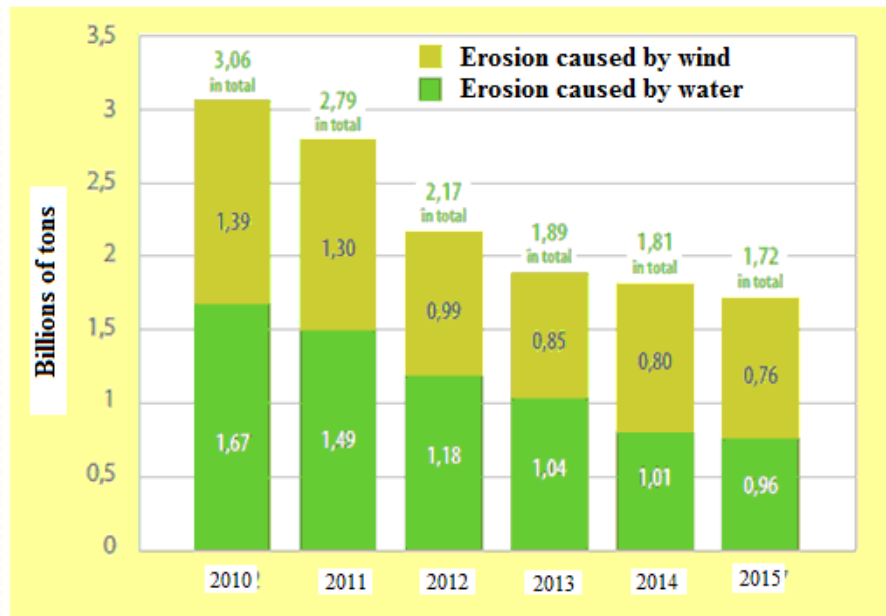


Fig. 4. Erosion of agricultural land worldwide

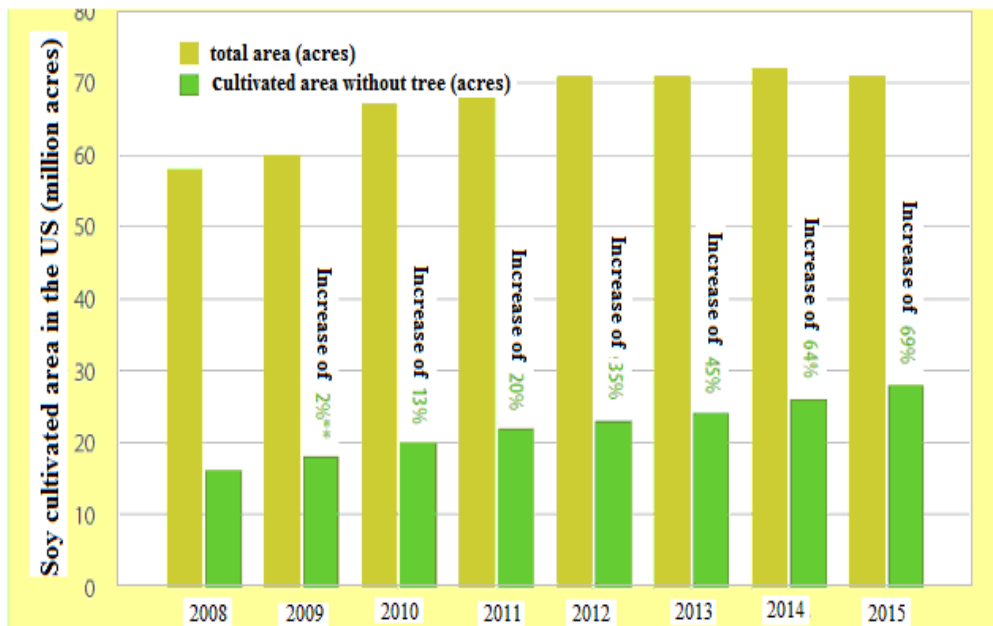


Fig.5 Untreated US agriculture, soybean crops

- ***Developing a sustainable agricultural system*** as it allows for the production of a larger amount of food with less environmental impact than conventional agriculture.
- ***Increase in production and plantations.*** Biotech plants are resistant to pests, illness and adverse climatic conditions, which reduces unnecessary resource consumption and avoids the loss of millions of tons of agri-food products each year.
- ***Cost reduction due to reduced pesticide/herbicide use.*** The use of pesticides worldwide has fallen by more than 8.9 percent over the 14 years since the introduction of biotech crops, leading to the removal of 393 million kg (867 pounds) of active ingredients Underpin pesticides.
- ***Food safety through biotechnology.*** High yield crops developed by agricultural biotechnology can help achieve the goal of raising global food production by 50 percent by 2030 to meet the growing food demand expected by the United Nations. Rich crops of nutrients developed through agricultural biotechnology can meet the specific nutritional needs of consumers such as increasing the intake of Omega-3 fatty acids or reducing the consumption of saturated fats. These improved crops have been repeatedly declared safe by the most important regulatory bodies and scientific institutions around the world, which is why consumers can safely consume foods containing ingredients obtained through biotechnology.
- ***Reduction of greenhouse gases.*** Non-crop farming reduces the use of agricultural machinery on plantations, which leads to a significant reduction in greenhouse-gas emissions from agricultural equipment. Thus, crops obtained by agricultural biotechnology have led to a significant reduction in carbon dioxide (CO₂) emissions in the environment.
- ***Soil maintenance and conservation.*** Thanks to crops resistant to biotechnical herbicides, farmers have been able to almost completely eliminate the work on the fields cultivated with them, resulting in significant health and soil conservation benefits, better water retention in the soil, thus reducing the process Soil erosion, as well as reducing herbicide spills.

4. CONCLUSIONS

The role of biotechnology is very important in the food industry; this is a biotechnology because agro-food raw materials are biological products and therefore their conservation until consumption, fresh or industrialization involves the control of the enzymatic activity of the vegetal and animal tissues or of the microflora contamination.

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