

# Brief Introduction Future Challenges of Bio-Technology and Bio-Computing



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## Opinion

Given the continuous increase of the world's population, degree of pollution, and climate change, the human health and supply of healthy food to people all over the world is becoming one of the most critical challenges for all mankind. The governments in developing countries are under enormous pressure from their people who rightly demand proper provision of medical services and supply of healthy food, drinkable water, as well as the opportunities to farm and harvest live giving crops.

Corn, Wheat, Soya, Rice, Citrus are one of the most important commercial and nutritional fruit crops in the world. Each crop individually needs to be improved to cater to the diverse needs of consumers and crop breeders. One way to increase the crop production is a genetic manipulation through conventional techniques. However, any genetic crop manipulation by plant breeders, presents number of biological challenges and limitations. Most of the crops are very sensitive to temperature and moisture fluctuations and require particular time period for proper growth and maturation of fruit.

Countries in South East Asia, including Japan, South Korea are very conscious about preserving and farming a fruitful soil. Small pieces of soil in the areas of the large cities, or by the rail tracks and main roads are effectively converted to small gardens, where people plant crops, vegetables, and fruits. Each piece of fruitful soil is most valued and farmed most effectively. Unfortunately, there other regions of the world, where lot of potentially fruitful soil that is not farmed and wasted to some extent.

Good understanding and effective application of Biology fundamentals principles, contributes to creation of next generation of bio-computing technologies able to build a biological models, illustrating how the human brain works, how DNA works, how protein folding works, and sequencing of the human genome. Current advancements in implementing DNA databases provide a platform to model disease diagnosis, with very sophisticated analytical tools to predict disease

progression and potential healing processes. By definition, the Biotechnologies are applications of science and technology to living organisms.

They are based on three properties:

- A. Replication refers to the ability of microorganisms, plant and animal cells to reproduce identical copies.
- B. Molecular recognition is the capacity of living organisms to recognize and eliminate foreign structures and molecules.
- C. Enzyme catalysis is the mechanism by which simple or complex chemical reactions are accelerated by proteins known as enzymes.

The application of Biotechnologies is essential to human health, while having important role in the environment, agriculture, and food processing. The biotechnologies have great impact on the energy, materials, and chemical sectors [1].

The typical examples of biological tools used in biotechnologies include, microorganisms (bacteria, yeasts, molds), animal and plant cells, genes, enzymes (extracted from animal or plant tissue or from cultures of microorganisms), antibodies (proteins capable of recognizing molecules that are foreign to an organism). These biological tools may be improved through genetic or protein engineering, through synthetic biology, or through engineering of biological networks and systems [2].

Biotechnology applications are used in a variety of fields: medicine and health (so-called red biotechnologies), food-processing and chemistry (white biotechnologies), the environment (yellow biotechnologies), and agriculture (green biotechnologies). Biotechnology is essential to modern agriculture, food industry, and environment, human and animal health, regenerative medicine, synthetic biology, nanotechnology, chemical products, and manufacturing of biodegradable materials [2,3].

Given the current dynamic advancements in computing and information communications technologies (ICT), the effective implementation of the Internet of Things (IoT) and computing technologies may contribute to better agriculture in way of atmosphere monitoring. The advanced computing and ICT technologies, as well as mathematical tools could be effectively applied to global biological systems, food production and public healthcare.

The way we live and the way the humanity will continue to live on our wonderful Blue Planet is in the hands of all of us. Regardless of geographical location or, age, sex, education or position that one may have, we are all equally responsible for preserving life of our children, grandchildren and many generations to come after us.

Apart from technological advancement in bio-technologies and bio-computing, the political will of decision makers to

protect and preserve our wonderful Blue Planet for many future generations to come is critical.

The author discusses the importance of biotechnologies in support of human health, healthy food industry and live giving crops production. The author promotes application of bio-computing, ICT and IoT technologies in support of modern agriculture, environment and healthcare. The author also promotes further research and creation of global multidisciplinary research teams to build future sustainable biotechnologies that will support healthy food production for all mankind for many generations to come.

### References

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