A Brief Note on Plant Synthetic Biology

Chandini Puvvala *

Department of Agricultural Sciences, Centurion University Technology and Management, Orissa, India

Perspective

Received: 06-Apr-2022, Manuscript No. JBS- 22- 61907**; Editor assigned:** 11- Apr-2022, PreQC No. JBS- 22- 61907 (PQ); **Reviewed:** 25- Apr -2022, QC No. JBS- 22- 61907 **Revised:** 28- Apr-2022, Manuscript No. JBS- 22- 61907 (R); **Published:** 09-May-2022, DOI: 10.4172/ 2320-0189.11.4.005

***For Correspondence:**

Chandini Puvvala, Department of Agricultural Sciences, Centurion University Technology and Management, Orissa, India

E-mail:

FathimaAhmed410@gmail.com

ABOUT THE STUDY

Synthetic biology (SynBio) is a multidisciplinary field of study that aims to produce novel biological parts, gadgets, and systems, as well as redesigning natural systems. Advances in microbial synthetic biology have been applied to health and industrial challenges, such as the development of environmentally controlled cancer cell-invading bacteria and antibiotic adjuvants based on defense-enhancing bacteriophages. Gene switches and designer cells for predicted metabolic and therapeutic functions were created as synthetic biology moved to yeast (*Saccharomyces cerevisiae*) and mammalian cells. Production of chimeric antigen receptor-modified T cells in non-immune cells, as well as RNA and cell-based vaccines, are examples. Synthetic biology strives to apply engineering ideas to the design and modification of natural systems, as well as the *de novo* creation of predictable biological devices and systems. In certain circumstances, synthetic biologists may regard their fledgling subject as more engineering than biology. Biology is concerned with scientific research and analysis, whereas engineering is concerned with design and synthesis; in other words, understanding versus construction. We address the engineering-biology ideas that underpin synthetic biology and apply them to plants in this paper. Synthetic biology research can be classified into broad categories based on how it approaches the topic at hand: standardisation of biological parts, bio-molecular engineering, genome engineering, and metabolic engineering, to name a few.

Engineers consider biology to be a type of technology. Synthetic biology encompasses a broad redefinition and expansion of biotechnology with the ultimate goal of being able to design and build engineered live biological systems that process information, manipulate chemicals, fabricate materials and structures, produce energy, provide food, maintain and enhance human health, and advance fundamental knowledge of biological systems and our environment. Plant synthetic biology is based on integrating the modules of nature in novel ways and generating new modules, as opposed to traditional plant biotechnology, which relies mostly on recombinant DNA technology and concentrates on recombination of existing heterologous genes and promoters. Synthetic biology, like systems biology, is concerned with the interconnections and dynamic behaviours of a system's (natural or manufactured) components. Plant synthetic biology employs the most fundamental core engineering principles: decoupling, abstraction, and standardisation, to reduce the inherent high degree of plant complexity and redundancy. Decoupling allows complex problems to be broken down into smaller chunks that can be addressed individually. Engineers, for example, isolate a design from its fabrication. They may also disassemble a vehicle to reveal its drivetrain, electronics, and interior. Each level of the hierarchy is encased in a more complicated level that gives context. Materials such as DNA, parts, gadgets, and systems are examples of abstraction layers. After being installed into a plant, DNA is the primary chemical substance that may be rationally organised to build parts that are merged into devices that fulfil a certain function and make up the synthetic system.

Synthetic biology can be utilised to make nanoparticles that can be employed for medicine delivery and other applications. Synthetic cells that imitate the functions of biological cells are being developed as a result of complementary research and development. Designer nanoparticles can be used in medicine to cause blood cells to eat away at parts of atherosclerotic plaque that cause heart attacks from the inside out. As hydrogen economy biotechnology, synthetic micro-droplets for algae cells or synergistic algal-bacterial multicellular spheroid microbial reactors, for example, could be utilised to manufacture hydrogen. Plant synthetic biology has made significant progress in using microbial synthetic biology principles and approaches for the introduction of synthetic promoters, genes, pathways, and characteristics into plants for human and environmental benefits. Plant synthetic biology is projected to play a bigger role in stress tolerance and boosting the production of food, biofuels, metabolites, medicines, and even totally synthetic life forms in the future. However, advancement is now slow, expensive, and time-consuming. The modelling, construction, and fine-tuning of synthetic gene networks are fundamentally limiting not just the availability of well-characterized and interchangeable parts and modules, but also the growth of plant synthetic biology.