

A critical review of the concept of transgenic plants: insights into pharmaceutical biotechnology and molecular farming

ABSTRACT

Using transgenic plants for the production of high-value recombinant proteins for industrial and clinical applications has become a promising alternative to using conventional bioproduction systems, such as bacteria, yeast, and cultured insect and animal cells. This novel system offers several advantages over conventional systems in terms of safety, scale, cost-effectiveness, and the ease of distribution and storage. Currently, plant systems are being utilised as recombinant bio-factories for the expression of various proteins, including potential vaccines and pharmaceuticals, through employing several adaptations of recombinant processes and utilizing the most suitable tools and strategies. The level of protein expression is a critical factor in plant molecular farming, and this level fluctuates according to the plant species and the organs involved. The production of recombinant native and engineered proteins is a complicated procedure that requires an inter- and multi-disciplinary effort involving a wide variety of scientific and technological disciplines, ranging from basic biotechnology, biochemistry, and cell biology to advanced production systems. This review considers important plant resources, affecting factors, and the recombinant-protein expression techniques relevant to the plant molecular farming process.

Keyword: Bioproduction; Transgenic plants; Agricultural; Plant products