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Edible Vaccine Concept Preparation and Application

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Abstract: *Vaccines are one of the most effective tools for controlling human and animal diseases, yet their widespread use is limited in developing countries due to high production costs, cold chain requirements, and the need for trained personnel for administration. Edible vaccines, produced in transgenic plants, offer a promising alternative by combining biotechnology with immunology. Such vaccines eliminate the need for refrigeration, enable oral delivery, reduce costs, and allow large-scale production in locally grown crops. Various plants including bananas, rice, maize, potatoes, tomatoes, soybeans, and tobacco have been successfully engineered to express antigens against diseases like measles, cholera, hepatitis B, malaria, HIV, and even cancer and diabetes. These plant-based vaccines leverage natural bio-encapsulation for gastrointestinal stability and mucosal immunity, making them a viable strategy for both human and veterinary applications. Despite challenges such as low antigen expression and stability, advances in plant transformation techniques and molecular farming continue to strengthen the feasibility of edible vaccines. This innovative approach holds great potential for global health, particularly in resource-limited regions, by providing a safe, effective, and affordable method of immunization.*

Keywords: Antigen, Edible vaccine, Biotechnology, Immunity, Immunology

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