

## **Plant Vaccines**

Genetically engineered plants could make getting a vaccine as simple as eating a banana. “As the proverb goes, truth is indeed stranger than fiction”, says Yasmin Thanavala, Roswell Park Cancer Institute, Buffalo, “Effective vaccines may be delivered in genetically engineered fruits and vegetable in the not- so-distant future, and vaccination by injection may be considered as primitive as bloodletting with leeches”. Thanavala from the American Cancer Society science reported that genes can be put successfully into potato plants that will make vaccines against cholera, diarrhea and hepatitis B. Potato plants are used because they can be grown in a few months, and researchers can determine quickly whether the experiments are working. Studies show that mice develop antibodies to the diseases after eating potatoes engineered separately for the various vaccines. The ultimate goal is to get vaccines into bananas that would be grown locally in developing countries, and hepatitis B infection is considered a worldwide epidemic. About 300 million people are carriers of hepatitis B, which can cause liver failure and liver cancer. The next step is to achieve higher doses of vaccines in plants, ensure that the human immune system recognizes the vaccines and develop vaccine- producing banana trees, which take three years to grow. Scientists know the vaccines are effective in raw potatoes, but people do not readily eat the vegetable uncooked; researchers worry that cooking the potato might weaken the medicine..

The rapid progress being made around the world in the race to develop safe new vaccines from plants. These can be either eaten, based upon edible plants or taken nasally based on purified plant virus particles to stimulate mucosal tissues which make up 75% of the body's immune system, hence their immediate and long-term effectiveness. However, the researchers suspect that storing foreign protein in plant cells may be limited if the antigen, a polypeptide, simply builds up anywhere in the cell. They want to develop ‘transformation vectors’ that contain DNA sequences, which will shift polypeptides to specific cellular compartments. The World Health Organization’s Children’s Vaccine Initiative wants vaccines that are orally administered, cheaper and easier to distribute in countries lacking refrigeration and healthcare infrastructure.

*.Source: AGROBIOS*