

Is FSBR eggplant safe to eat?



Before the FSBR eggplant is approved for commercial use, scientists and regulators ensure that it passes through many tests and safety assessments. In the Philippines, biosafety is evaluated in four stages:

- (1) contained research in laboratories and screenhouses;
- (2) small confined trials;
- (3) multilocation field trials; and
- (4) commercial release.

The National Committee on Biosafety of the Philippines (NCBP) is responsible for evaluating the safety of FSBR eggplant under contained and confined conditions. The Bureau of Plant Industry (BPI) and other regulatory agencies under the Department of Agriculture take charge of the safety assessment and monitoring during large field trials, and prior to and after its commercial release. In addition, the reduced use of chemicals on FSBR eggplant will mean that less pesticide residue will remain on the fruit when it is brought to market.

Is FSBR eggplant already available in the market?

In the Philippines, this biotech eggplant is not yet commercially available. The promising varieties are still under the multilocation field trials and tests are continually being done to ensure safety and good performance of the product.

Once it is approved for commercial release, seeds will be made available to farmers. In India, similar FSBR eggplant varieties are near commercialization, and are in the later stages of evaluation and safety assessment.



Project Partners



Institute of Plant Breeding
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Development of Fruit and Shoot Borer-Resistant Eggplant in the Philippines





Eggplant (*Solanum melongena* L.) is a vegetable with worldwide importance. It can have oval, elongated or round fruits that are striped or plain-colored, ranging from dark purple, light purple, green, yellow to white. The fruits are used in many cuisines. They are boiled, stewed, roasted, pickled, fried, or baked. In the Philippines, eggplant is a popular ingredient in dishes such as *pinakbet*, *torta*, *sinigang*, *ensalada*, and *kare-kare*.

Why is eggplant important?

- Eggplant is a good source of vitamins, fibers, and minerals.
- Eggplant is the leading vegetable crop in the Philippines in terms of area and volume of production.
- Small-scale farmers in many provinces grow eggplant and depend on it for their livelihood.

What are the major constraints to eggplant production?



Eggplant production suffers yield losses from pests, diseases and extreme environmental conditions. The most destructive insect pest of eggplant in the Philippines and other Asian

countries is the Fruit and Shoot Borer (FSB). Eggplant yield losses from 51 to 73% because of FSB have been reported in the country.

How does FSB damage eggplant production?



FSB can cause significant yield loss and reduce the number of marketable fruits. Female moths deposit eggs mostly on eggplant leaves. Upon hatching, the young larvae, after an hour or two of probing, feed on the leaf tissues and tunnel inside shoots, resulting in wilting or drying up.

When the fruits are available, the caterpillar bores inside the fruit, producing feeding tunnels. This makes the fruits unfit for market.

How do farmers control and manage FSB?

The majority of farmers still rely on heavy use of insecticide sprays, which are mostly effective only against newly-hatched FSB caterpillars that have not yet tunneled into the plant.

Farmers can also use the following different ways to control the pest:

- follow regular crop rotation, or intercrop the eggplant with other vegetables;
- use nylon net barriers to protect plants from the insects;
- trap male insects using pheromones, to prevent insect mating;
- grow eggplants in a screenhouse before transplanting into the field;
- judicious pesticide use to keep populations of natural enemies of FSB; and
- harvest fruits frequently.

How can biotechnology offer a better alternative to traditional control methods?



Because of time and resource constraints, smallscale farmers desire pest control methods that do not require additional labor and material inputs. Labor intensive control methods such as manual removal of infested shoots, trapping of insects, and application of netting are usually ineffective. Intensive pesticide use often leads to environmental and health issues, and increases the total production costs.

There are no existing commercial varieties of eggplants with high resistance to FSB in the Philippines, and FSB-resistance is difficult to produce using conventional plant breeding. By using biotechnology to introduce FSB-resistance in eggplant,

farmers may benefit from high yields of good quality fruits. They may also save on production and labor costs as less pesticide will be necessary to control the FSB.

What is FSB-resistant eggplant?



FSB-resistant (FSBR) eggplant is an insect resistant eggplant developed with the help of biotechnology.

Also called *Bt* eggplant or *Bt* brinjal, it produces a natural protein that

makes it resistant to FSB. Once the FSB caterpillars feed on plant leaves, shoots and fruits, they stop eating and eventually die. The *Bt* protein in the biotech eggplant only affects FSB and does not affect humans, farm animals, and other non-target organisms.

What institutions are working on the development of FSBR eggplant?

The Indian Maharashtra Hybrid Seeds Company Limited (Mahyco) has developed a highly resistant biotech eggplant. These eggplant lines have been used as source of FSB resistant trait of biotech eggplants in India, Bangladesh, and the Philippines. The Institute of Plant Breeding at the University of the Philippines Los Baños (IPB-UPLB) is currently developing FSBR eggplant for the Philippines, through partnership with Mahyco and Cornell University, and with support from the United States Agency for International Development (USAID) through the Agricultural Biotechnology Support Project II (ABSP II), the International Service for the Acquisition of Agri-biotech Applications (ISAAA) and the Department of Agriculture of the Philippines.

