



PINOY BIOTEK DIGEST

Updates on biotechnology in the Philippines



NEW RELEASES FROM ISAAA

PINOY BIOTEK MAGAZINE

➤➤➤ bit.ly/PinoyBiotechMagazine2

Pinoy Biotech Magazine aims to raise awareness, understanding, and acceptance of Pinoy biotech products that are derived from conventional and modern biotechnology. The second issue features Bt cotton, reduced browning banana, guava probiotic drink, and many more.



BIOTECH CROP ANNUAL UPDATE: COTTON

➤➤➤ bit.ly/CottonAnnualUpdate

Biotech Crop Annual Updates provides a concise overview of research and development for biotech crops. It highlights potential benefits and offers approval updates on the current status of Bt cotton in the Philippines.

RED MOLD RICE: NATURAL DIETARY SUPPLEMENT FOR A HEALTHIER LIFE

BY LUCILLE GRACE PUNZALAN AND CLEMENT DIONGLAY

White rice is a staple in Filipino cuisine, but some people opt for brown rice due to its ability to lower blood sugar levels and aid in weight management. Have you ever considered trying red yeast rice? Here are some compelling reasons to do so.

➤➤➤ RED MOLD RICE PROJECT

Red mold rice (RMR) is a functional ingredient or dietary supplement that is also commonly used as natural colorant in various East Asian products. In the Philippines, it is utilized as a food colorant in fermented fish (burong isda) and fermented fish paste (bagoong). A survey among 30 local pharmaceutical companies revealed that no existing RMR products are being marketed in the Philippines as a functional ingredient or supplement. Currently, the Philippines imports red mold rice from China or Taiwan.

To address this, a team from the Philippine Rice Research Institute (PhilRice), led by Mr. Henry Mamucod, has worked on establishing the best processing technology for red mold rice within the country. Red mold rice is produced by fermenting non-glutinous rice with *Monascus purpureus*, a species of red mold with known health-promoting properties against lifestyle-related diseases. The researchers have identified that the optimal parameters include a pH of 6.5, a 14-day incubation period, an incubation temperature of 30 to 37°C, and a moisture content of 30 to 40%.

A prototype of the PhilRice-produced RMR-based supplement was developed in May 2021 using the optimized processing technology. The prototype was evaluated and compared with the 10 commercially available RMR-based supplements and was found to be either superior or comparable with the other RMR-based dietary supplements. The RMR technology is now available for commercialization or transfer to interested parties.

IMPACT

Red mold rice offers numerous economic opportunities for entrepreneurs and businesses. It can assist individuals and companies involved in producing or marketing products such as functional food, dietary supplements, and medicine. Its production can be a sustainable source of income for many and can offer a new range of products to consumers. Local and international markets can also leverage red mold rice to benefit their customers. Ultimately, RMR is expected to have a positive impact, particularly in improving the health of consumers, especially those with diabetes and hyperlipidemia.

➤➤➤ FEATURES

Red mold rice has strong antioxidant properties due to its bioactive compounds, including phenolics and flavonoids. It also contains mevinolin, which can lower total cholesterol, triglyceride levels, and LDL or bad cholesterol, while boosting HDL or good cholesterol. Pre-clinical studies on test animals have also shown that red mold rice exhibits anti-diabetic and anticancer properties.

Recognizing the health benefits of red mold rice, PhilRice has developed an RMR supplement with quality comparable to or better than commercially available RMR-based dietary supplements. This supplement is notable for its total phenolic content, antioxidant activity, and mevinolin content.

Additionally, PhilRice has produced food products from red mold rice, such as cookies, sausage, and coffee, which are of superior quality and have better consumer acceptability.



REDUCED BROWNING BANANA: FIRST GENE-EDITED PRODUCT TO GET NON-GMO DETERMINATION IN THE PHILIPPINES

BY CLEMENT DIONGLAY

Bananas are one of the most produced, traded, and consumed fruits globally. They are mostly planted in Asia, Latin America, and Africa, with India and China as the largest producers for domestic consumption. There are more than 1,000 varieties of bananas in the world, and the most traded is the Cavendish banana which accounts for almost half of global production at an estimated annual production volume of 50 million tonnes.



According to the Food and Agriculture Organization of the United Nations, on average, more than 90 percent of bananas exported globally originate from Central and South America and the Philippines. At the same time, the largest importers are the European Union, the United States of America, China, the Russian Federation, and Japan.

➤➤➤ BANANA PRODUCTION IN THE PHILIPPINES

Bananas are one of the most important fruit crops in the Philippines, with the Davao region as the top banana producer, followed by Northern Mindanao and SOCCSKSARGEN. The Philippine Statistics Authority estimates the area planted for bananas in the country was recorded at 443.64 thousand hectares from January to June 2023. Banana production was estimated at 2.269 million metric tons from April to June 2023.

The Banana Industry Profile from PCAARRD's Industry Strategic Science and Technology Programs identifies three major banana varieties produced in the country as cavendish, the primary variety (50% of the total banana production); lakatan, a popularly known dessert (11% of the total banana production); and saba, a major cooking-type banana, comprises 29% of the total banana production.

➤➤➤ PROBLEMS IN BANANA PRODUCTION

Diseases continue to be serious threats to the banana industry. The two serious diseases of bananas are the fungal Panama Disease or Fusarium Tropical Race 4 (TR4), and Black Sigatoka Disease. TR4 threatens 80% of global banana production and has been confirmed in 21 banana-producing countries. This disease has decreased the Philippines' global market share as the top producer and exporter of bananas in Southeast Asia. Other challenges facing the banana industry are prolonging the fruits' shelf life and reducing food waste.

➤➤➤ GENE EDITING TO HELP EXTEND THE SHELF LIFE OF BANANAS AND REDUCE FOOD WASTE

In April 2023, Tropic, a pioneering agricultural biotechnology company in the United Kingdom using CRISPR gene editing to improve traits in bananas, coffee, and rice, announced that their reduced browning gene-edited banana was technically evaluated and determined to be a non-GMO by the Philippines Department of Agriculture-Bureau of Plant Industry (BPI). This banana is the first gene-edited product to go through the Philippines' gene editing regulatory process.

IMPACT

Tropic's gene-edited bananas have the potential to significantly reduce food waste and CO₂ emissions by more than 25%, as over 60% of exported bananas go to waste before reaching the consumer. This innovative product can support a reduction in CO₂ emissions equivalent to removing 2 million passenger vehicles from the road each year. With this determination from BPI, the Tropic gene-edited banana can be freely imported and propagated in the Philippines.