



# PINOY BIOTEK DIGEST

Updates on biotechnology in the Philippines



## NEW RELEASES FROM ISAAA

### BIOTECHNOLOGY IN THE PHILIPPINES

Resource Page



[www.isaaa.org/resources/biotechph/](http://www.isaaa.org/resources/biotechph/)

The resource page titled Biotechnology in the Philippines was launched on the ISAAA website. It contains ISAAA publications, articles from the Biotech Updates (formerly Crop Biotech Update), Pocket Ks, infographics, blog features, and peer-reviewed journal articles highlighting biotechnology applications, regulations, and communication efforts in the Philippines.

[bit.ly/PinoyBiotekMagazine](http://bit.ly/PinoyBiotekMagazine) 

Pinoy Biotek Magazine aims to raise awareness, understanding, and acceptance of Pinoy biotech products that are derived from conventional and modern biotechnology. This magazine will be published in print and distributed for free to selected schools and institutions. It is also available for free download on the ISAAA Inc. website.

## PINOY BIOTEK MAGAZINE

# EMPOWERING FILIPINO FISHERS THROUGH AQUACULTURE INNOVATION

BY ZABRINA J. BUGNOSEN

The fisheries and aquaculture sectors of the Philippines provide livelihood and resources to many Filipinos. In 2019, the Southeast Asia Fisheries Development Center reported that the fisheries sector is comprised of about 1.99 million fishers and 0.35 million farmers. They also stated that each Filipino consumed an average of 34.27 kg of fish and fishery produce every year. During the first quarter of 2023, the Philippine Statistics Authority documented that the Philippines' annual volume of fisheries production increased by 2% from the previous year, having reached 991,140 metric tonnes in total. About half of these, or 545,640 metric tonnes, was attributed to aquaculture production. Sensing the need to improve and promote fisheries and aquaculture activities in the country, DA through the Philippine Agriculture and Fisheries Biotechnology Program (DA Biotech Program) assisted the innovative aquaculture tools and techniques developed by the National Fisheries Research Development Institute (NFRDI) and the Bureau of Fisheries and Aquatic Resources (BFAR).

## INNOVATION FOR MUDFISH

In 2020, Dr. Casiano H. Choresca Jr. led a team of NFRDI researchers from the Fisheries Biotechnology Center to develop techniques that can induce spawning and improve nursery-rearing protocols for dalag (mudfish) and hito (catfish). The goal was to address the decline of fish catch in Philippine waters, the decreasing presence of fingerlings from the wild, and the lack of knowledge in the cultivation of certain fish species. The team chose to focus on dalag because it is palatable, highly nutritional, and has medical value. Its appeal to consumers made the fish economically important to the country.

## IMPACT

Developing aquaculture techniques that can be easily adopted by Filipinos not only aids DA's vision to ensure food security for the Philippines, but also encourages fishers to engage in mudfish farming while increasing awareness about the government's initiatives to foster local innovations that empower both Filipino researchers and fishers. It is through modern techniques like this that DA is proudly able to show tangible results of "Masaganang Ani at Mataas na Kita."

## INDUCED SPAWNING

Induced fish-spawning is meant to bypass the natural biological processes to speed up the spawning process. The new method begins with identifying good quality and mature fish broodstock from fish pens. The selected fish's flesh is exposed to anesthesia for a few minutes, then hormones are injected into its reproductive area. The area is then massaged to evenly distribute the hormone suspension. Afterwards, the fish are placed in pens that are divided into sections using mesh nets as separators, with a 1:1 ratio of male and female per section. The spawning process takes place in these pens and lasts for 24 to 32 hours after injection. Once spawning is completed, fertilized fish eggs start to float. These are collected and incubated in a facility that controls the temperature of the water to stimulate hatching.

The eggs are expected to hatch between 24 and 30 hours after fertilization, and the fry is placed in rearing facilities. They are kept until their desired stage of adulthood.

The technique developed by Dr. Choresca's team is simple and does not require technical knowledge to be successfully implemented. The approach is also proven to remove uncertainties in breeder spawning, produce fry for hatchery and grow-out even outside the spawning season, provide pure spawn or fish under cultivation, and offer a more controlled hatchery or aquaculture operations.





# BIOMEG: THE TOOL FOR CROP SUCCESS

BY LUCILLE GRACE PUNZALAN

If you are given a biotechnology that will boost the yield and nutritional quality of your crops, would you take it? That is what BioMeg is for.

There are soils that cannot be used for agricultural purposes. These soils have immobilized elements that are not utilized by plants. Bacteria can be used to release these micronutrients from the soil, so the plants can absorb them. An example of a bacteria that can help with this process is *Bacillus megaterium*. It is a naturally occurring organism that was isolated from soil in some areas of Leyte and was used to produce BioMeg, a microbial inoculant for crops. BioMeg was innovated by researchers from the Visayas State University led by its project leader, Dr. Edgardo Tulin. The project is currently being funded by the biotechnology office of the Department of Agriculture.

## ➤➤➤ ABOUT THE PROJECT

The researchers chose sweet potato and purple yam as test crops because they are resilient to different types of soils and environmental conditions. These are also high value crops and have high demand locally and abroad. For the micronutrients, the researchers focused on copper, iron, and zinc because they are needed by the human body. Zinc is important for brain growth, while copper and iron are used for human metabolism. *Bacillus megaterium* was chosen for BioMeg because it was suitable for the three criteria that were considered. It is fast-growing and sporulating, so it can be stored in a solid medium for a period of time and revived when it is needed to be used. It can also solubilize copper, iron, and zinc in the soil, so the plants can utilize them. When the micronutrients are absorbed, it will spur growth and development in the plants and will increase the nutritional content, which is translocated into the plants and then stored in the roots.

## ➤➤➤ FEATURES OF BIOMEG

BioMeg only costs about 218 pesos per kilo. It is low-cost because indigenous and locally sourced materials are used in its production. Farmers only need to apply a small amount of BioMeg to the crops a few days after planting, and it will increase the yield and enhance the nutritional quality of the plants. The expected increase in crop yield will produce a corresponding increase in income and offer a sustainable livelihood for the farmers. The net income from crops that used BioMeg is about three to four times higher than the normal yield. This biotechnology is also organic-based and environment-friendly, as no chemicals were used in production. The culture and production of BioMeg are being improved for a more efficient and less costly production system.

## IMPACT

BioMeg is significant in helping farmers face issues, such as food production security and global competitiveness. This biotechnology helps with environmental protection because it does not utilize chemicals, but only organic waste. It also aims to address micronutrient deficiency in infants and growing children. Even though BioMeg was only tested in sweet potato and purple yam, the researchers recommend using it for other types of crops as well. This biotechnology will significantly increase the yield, nutritional content, and income from crops, so people can have a more sustainable livelihood.