



# PINOY BIOTEK DIGEST

Updates on biotechnology in the Philippines

## NEW RELEASES FROM ISAAA

### PINOY BIOTEK MAGAZINE

➤➤➤ [bit.ly/PinoyBiotekMagazine3](https://bit.ly/PinoyBiotekMagazine3)

Pinoy Biotek Magazine aims to raise awareness, understanding, and acceptance of Pinoy biotech products that are derived from conventional and modern biotechnology. The third issue features QuickCARE, LOV Kit, Bio N™ Fertilizer, DNA Barcoding of Scallops, and many more.



### VIDEO: PINOY BIOTEK NA TAYO!

➤➤➤ [bit.ly/PinoyBiotekVideo](https://bit.ly/PinoyBiotekVideo)

Pinoy Biotek Na Tayo! (We are for Filipino Biotech) is an engaging video explaining biotechnology in Filipino and features interviews with Filipino experts showcasing groundbreaking innovations.

# QUICKCARE: PEN-SIDE TEST KIT FOR CAPRINE ARTHRITIS ENCEPHALITIS

BY DR. GABRIEL ALEXIS TUBALINAL

Imagine you are a goat farm veterinarian. Your herd is experiencing the poor condition of their coats and hair loss with cases of mastitis, while kids are experiencing paralysis. Samples must be collected and sent to service laboratories to confirm a diagnosis. Kind of tedious, isn't it? What if there is a test kit to screen your herd for caprine arthritis encephalitis (CAE)? The QuickCArE Dry LAMP CAEv Test Kit got you!

Goat farming in the Philippines is a booming industry. The goat population has been steadily increasing since 2016. However, as with every livestock farm in the Philippines, goat farming faces several threats, and CAE is one of these.

CAE is a disease of small ruminants that causes arthritis, mastitis, pneumonia, and central nervous system damage that leads to progressive weight loss and death. CAE endemicity hinders countries from trading live goats to countries free from CAE, considering its grave economic effect. Furthermore, according to the World Organisation for Animal Health (WOAH), the economic relevance of CAE is underestimated. Since 2018, the list of notifiable diseases of goats and sheep in the Philippines includes CAE.

In 2012, a Department of Science and Technology (DOST) research grant from the Outstanding Young Scientist Award of Dr. Claro N. Mingala fueled the initial development of the prototype test kit. Following the completion of this research grant, the Department of Agriculture - Philippine Agriculture and Fisheries Biotechnology Program (DABiotech Program) funded the QuickCArE Dry LAMP CAEv Test Kit with Dr. Mingala and Dr. Michelle M. Balbin as co-project leaders.

## ➤➤➤ CURRENT DETECTION METHODS OF CAE IN THE PHILIPPINES

In the Philippines, the current methods to detect CAE are enzyme-linked immunosorbent assay (ELISA) or nested-polymerase chain reaction (n-PCR). Both tests require samples to be collected in the field, transported and tested in the laboratory. The current detection methods may take up to three to five days before issuance of test results. Aside from the logistical hurdles, the current detection systems are time-consuming, expensive, and require trained personnel. With these difficulties in mind, Dr. Mingala and Dr. Balbin were inspired to develop an easy-to-use and inexpensive pen-side test, leading to the development of the QuickCArE Dry LAMP CAEv Test Kit.

## IMPACT

QuickCArE and pen-side test kits will be significant in helping and augmenting the laboratory test services in the country in screening and detecting livestock diseases and initiating control and prevention strategies. This technology will help unload the current flow of CAEv screening in the country which takes a longer time. Government regulatory organizations like the Food and Drug Administration (FDA) and the Bureau of Animal Industry (BAI) must monitor the use of these test kits in order to fully reap their benefits.



Photo Source: Intellectual Property and Technology Business Management (IPTBM), PCC

## ➤➤➤ FEATURES

QuickCArE Dry LAMP CAEv Test Kit is an easy-to-use CAE detection or screening kit that can be done in four simple steps. First, DNA is extracted from goat blood using the built-in DNA extraction provided. Secondly, as instructed in the kit, the extracted DNA is mixed with the freeze-dried reagents. Then, the mixture is incubated in an insulated vacuum flask (ex. Thermos bottles) at 60°C for 10-60 minutes. Lastly, results are visualized – orange means negative, and green means positive.

With regard to sensitivity and specificity in detecting CAE, the developed test kit is at par with such as ELISA and n-PCR, but is easier to use, cheaper, and has a shorter test time compared to other test kits or services currently available in the market.

SPARE your herd and have it tested in four easy steps. QuickCArE is a Specific, Pen-side, Accurate, Reliable, and Economical CAEv Test for goats.

# A NEW DAWN IN RICE FARMING AS LAMP SHINES IN THE BATTLE AGAINST TUNGRO VIRUS

BY DR. RUBIGILDA PARAGUISON-ALILI

In rice fields across the Philippines, a hidden threat looms over rice, the country's staple crop. Tungro disease, driven by the rice tungro bacilliform virus (RTBV) and rice tungro spherical virus (RTSV), has persistently pestered the country's farmers. These viruses lead to severe symptoms, such as stunting and yellowing of leaves, which can drastically reduce crop yields. They are primarily transmitted by insect vectors like the green leafhopper. A new technology called LoopMediated Isothermal Amplification (LAMP) is making strides in combating this issue. This method is revolutionizing the detection of these viruses, providing a quicker, more affordable, and simpler solution than traditional methods.

Conventional detection of diseases like those caused by RTBV and RTSV in rice involved complex tests, such as polymerase chain reaction (PCR), which require time-consuming procedures and expensive equipment. This complexity often delays researchers and farmers from quickly identifying and addressing the diseases affecting their crops.

## ➤➤➤ ADVANTAGES OF LAMP

LAMP is changing the game. This method identifies DNA at a constant temperature using specific markers. Unlike PCR, which requires sophisticated thermal cyclers, LAMP can be performed with simple tools like a water bath or a heat block, or even at room temperature. This method not only simplifies the process but also accelerates it, providing results that are easily visible through a color change in less than an hour. Additionally, LAMP offers advantages over the gold standard of enzyme-linked immunosorbent assay (ELISA), which, while effective, demands antibodies, can be less sensitive, and takes a longer time in comparison. With LAMP, one gets a quicker, more accessible, and cost-effective way to detect rice viruses, making it a practical alternative for field diagnostics.

Researchers at the Philippine Rice Research Institute (PhilRice) in the Science City of Muñoz, Nueva Ecija, including Rubigilda Paraguison-Alili, Emmanuel R. Tiongco, Xuan Hoai Truong, and Ma. Johna C. Duque showcased the effectiveness of LAMP. Their research shows that LAMP can detect RTBV only one day after rice seedlings are infected by the green leafhopper, which transmits the disease. This detection speed is significantly faster than traditional methods like ELISA, which require more time to confirm the virus' presence.



Photo Sources: Dr. Emmanuel R. Tiongco and Dr. Rubigilda Paraguison-Alili

## IMPLICATIONS

Beyond just finding diseases, LAMP can also help in breeding better rice varieties that are resistant to tungro. This could be a big step forward in managing the disease over the long term, reducing the need for chemical treatments, and supporting more sustainable farming methods. Looking forward, the role of LAMP in agriculture continues to grow. It is not just about fighting the tungro virus per se, but about shaping the future of rice farming. This tool gives farmers a new power to quickly understand and react to threats in their crops, helping ensure that the country's rice bowls are always full.

The quick detection is crucial as it allows farmers to act swiftly to halt the spread of the disease, potentially saving entire fields from destruction. This rapid response is particularly important in areas like Isabela, Negros, and Midsayap in Cotabato, where tungro regularly inflicts significant crop losses.

However, using LAMP is not without its challenges. The method's high sensitivity is generally a benefit, enabling the detection of even small amounts of the virus. Yet, this same sensitivity also means that LAMP can easily pick up contamination, leading to false positives. To avoid this, farmers and researchers must adhere to stringent procedures to ensure everything remains clean and free from contaminants when employing LAMP. This careful handling helps maintain the accuracy of the testing process, ensuring reliable results that can effectively guide disease management decisions.