PHILIPPINE CARABAO CENTER | 9th Issue, December 2018

R4D Highlights

Annual PCC R4D In-House Review showcases 41 researches

By Charlene Joanino

The PCC has demonstrated its research for development (R4D) efforts, as completed and on-going papers were presented and evaluated during the R4D In-House Review last July 4-6 at the PCC National Headquarters and Gene Pool in the Science City of Muñoz, Nueva Ecija.

R4D Division chief Dr. Annabelle Sarabia said the review provides a venue for researchers and scientists to engage in a meaningful discourse. Expectedly, she added, this should lead to opportunities for learning and sharing of scientific knowledge.

Meanwhile, Dr. Arnel del Barrio, PCC executive director, noted the significance of the review specially to first time presentors and budding researchers who can acquire learnings in the process. He deemed that to be able to write, have it evaluated and to present is already a success on the part of a researcher.

(Continued on page 2)

CONTENTS

Annual PCC... (From page 1)

The studies were assessed based on the merits of technical integrity and relevance. Three external evaluators were invited namely Dr. Jose Arceo N. Bautista, Associate Professor IV at the University of the Philippines Los Baños; Dr. Fe Porciuncula, Central Luzon State University Vice President for Research, Extension and Training; and Peter James Icalia, Instructor III at the Mariano Marcos State University.

Six awards were given.

The study on the "Development of Loop Mediated Isothermal Amplification (LAMP) Assay-Based Test Kit for the Detection/Screening for Caprine Arthritis Encephalitis Virus (CAEV)" was awarded "Best Paper" for completed research. It was conducted by Dr. Daryl Dela Cruz, Dr. Joram Gautane, Dr. Michelle Balbin and Dr. Claro Mingala.

Dr. Jesus Rommel Herrera bagged the "Best Paper for Completed Research-Student Thesis" for his dissertation titled "Genome-wide association study for milk traits in Philippine dairy buffaloes".

Dr. Daniel Aquino was named "Best Presenter" for the study on the "Nutritive Value, Digestibility and Performance of Buffaloes using Banana By-Products and Water Lily as Alternative Feed Sources".

Special recognitions were accorded to the Animal Breeding and Genomics Section for "Most Number of Presentations" (9 studies) and "Most Number of On-going Researches Presented" (7 studies). On the other hand, PCC at Ubay Stock Farm was recognized for "Most Number of Approved Research Proposals for the Year 2017".

The researches reviewed were categorized according to the R4D Agenda's Thematic Fields namely Product Development, Socio-Economic Dimensions of Carabao Development Program Implementation, Production Management System, Genetic Improvement-Animal Genomics or Genetic Diversity and Cryopreservation, Genetic Improvement-Reproductive and Cryopreservation Techniques, and Biosafety.

Dr. Annabelle Sarabia, PCC RDD chief, inspires participants in the In-House Review to embark on research undertakings that create impact in the communities.

Dr. Daryl Dela Cruz and Dr. Claro Mingala with PCC Exceutive Director Arnel del Barrio, RDD Chief Annabelle Sarabia and two of the external evaluators, receives the "Best Paper" award for the study "LAMP Assay-Based Test Kit for the Detection/Screening for CAEV", during the R4D In-House Review.

EDITORIAL STAFF

Editor-in-Chief Eric P. Palacpac
Managing Editor Rowena Galang- Bumanlag
Issue Managing Editor Charlene S. Joanino

Writers Annabelle S. Sarabia • Mina P. Abella • Edwin C. Atabay • Ma. Wynne A. Pagaduan • Ma. Cecilia C. Irang • Teresita M. Baltazar • Daryl G. Dela Cruz • Charlene S. Joanino • Charlene P. Corpuz • Chrissalyn L.Marcelo • Jennifer F. Maramba • Patrizia O. Saturno • Ma. Cristina D. Gragasin

Layout Khrizie Evert Marcelo-Padre
Circulation Manager Chrissalyn L. Marcelo
Editorial Consultant Anselmo S. Roque
Editorial Adviser Arnel N. Del Barrio

Proper buffalo feed management, practices prevent accumulation of AFM1

By Ma. Wynne Pagaduan and Charlene Joanino

Dr. Ma. Wynne Pagaduan, PCC Training Specialist III and staff at the Biosafety and Environment Section extracts milk samples to be injected to the UPLC.

Aflatoxin M1 or AFM1 is a toxic substance produced by molds (fungus) found in contaminated feedstuff which when ingested by dairy animals can be passed unto humans through milk consumption. However, there is limited literature relating to AFM1 in local milk products in the Philippines.

Republic Act No. 10611 of the Philippines or previously known as the Food Safety Act of 2013 rendered concern on the production, processing, distribution and sale of safe pasteurized liquid milk products from dairy animals. Coinciding with the said act is PCC's initiative in the development of technologies related to promotion and marketing of buffalo dairy products.

With the aim to detect AFM1, a research entitled "Monitoring of Aflatoxin M1 (AFM1) and Dairy Farm Management of Water Buffalo" was conducted by Dr. Ma. Wynne Pagaduan, Dr. Claro Mingala, and Dr. Marvin Villanueva of PCC in collaboration with Dr. Gemerlyn Garcia of Central Luzon State University.

Previous studies stated that the contamination of feed with fungus allows conversion of Aflatoxin B1 (AFB1) by hydroxylation to AFM1 that can be found in the milk of lactating cows. If not detected, the ingestion of AFB1 can cause liver damage and cancer and subdues immune system and nutrient absorption of humans.

Two components comprise the research namely Detection of AFM1 through Ultra Performance Liquid Chromatography (UPLC) and Monitoring for Dairy Management Programs. Milk samples were collected from the PCC institutional herd and four PCC-assisted cooperative farms in Nueva Ecija. Apart from laboratory utilization, questionnaire for the evaluation of feed system and skill of dairy handlers from cooperating farms was designed.

As per the optimization of UPLC conditions, the calibration curve comprises AFM1 standard and retention peaks, composition of mobile solvents such as water, acetonitrile and methanol at the flow rate of 1 ml/minute, manipulation of column temperature and wavelength at 350 nm. Precision testing was done for the validation of AFM1 UV absorbance values between the retention time 0.8 and 1.0 minute.

The result shows that there is no trace of AFM1 amongst the 32 raw unpasteurized milk and five pasteurized milk from PCC institutional herd, Catalanacan Primary Multi-Purpose Cooperative (CPMPC) in Science City of Muñoz, Bagong Pag-asa sa Bagong Talavera Cooperative (BPBTC) in Talavera, Eastern Primary Multi-Purpose Cooperative (EPMPC) and Simula ng Panibagong Bukas Multi-Purpose Cooperative (SIPBUMPC) in San Jose City.

Moreover, good dairy management principles and practices were employed by the dairy buffalo farmers. The following were observed.

1. Effective implementation of proper forage production and conservation and feeding management on pre, during and post-harvest, which included the use of well dried forages, removal of discolored and unhealthy feeds, and removal of pests and insects from the storage.

2. Usage of toxin binders to dairy feed concentrates prevent aflatoxin contamination.

3. The monitored adoption of skills derived from training contributed to the aflatoxin risk-free milk for public consumption.

While there are still other elements that affect milk, the detection of AFM1 that can cause cancer is a must to further ensure safety of consumers. Also, it helps rally good feed management and practices amongst dairy buffalo farmers that is needed in preventing Aflatoxin.

Apart from UPLC, other technologies that can be used to determine AFM1 are radioimmunoassay, enzyme-linked immunoassay and mass spectrometer.

About the researcher

Dr. Ma. Wynne A. Pagaduan finished her Master of Veterinary Studies degree at Central Luzon State University. Dr. Pagaduan currently works at PCC as Training Specialist III and staff at the Biosafety and Environment Section.

Increased efficiency of AI in dairy buffaloes sought in research

By Edwin Atabay and Charlene Corpuz

Reproductive inefficiency and low fertility rate among dairy buffaloes as a major concern limiting the productivity of the species need to be addressed and it requires further research and thorough studies.

Understanding and knowing the decreased rate of progesterone level in animals treated with luteolytic agents under synchronizing ovulation protocol are very important in order to achieve more synchronous estrus, ovulation and proper timing of insemination to increase pregnancy rate and overall AI efficiency in dairy buffaloes.

The study says that the most extensive and effective Fixed-time Artificial Insemination (FTAI) protocol is the use of Controlled Internal Drug Release (CIDR) to minimize the growth of follicle and occurrence of estrus before artificial insemination.

Other protocols used include gonadotropin and prostaglandin for the synchronizing ovulation and FTAI to improve the production of good quality oocytes at the time of ovulation and subsequently optimal uterine environment for embryo development leading to a pregnancy.

Thus, the study entitled "Effect of Different Prostaglandin Analogues during Synchronization in Dairy Buffaloes" was conducted to determine the effect of different prostaglandin analogues during estrus synchronization in dairy buffaloes. Specifically, it looks over the ovarian response following prostaglandin administration and determines the pregnancy rate.

The study involves two major areas to consider; the Ovarian Response Following Prostaglandin Administration (study 1) and the Pregnancy Rate of Dairy Buffaloes Treated with Different Prostaglandin Analogues (study2).

The research team was composed of Ms. Rebecca Ruby G. Gabriel, Dr. Eufrocina P. Atabay, Dr. Edwin C. Atabay, Dr. Jessica Gay M. Ortiz, Mr. Jhon Paul R. Apolinario, Dr. Ramesh C. Tilwani and Dr. Edgar A. Orden.

Findings and significance

For study 1, a total of twenty-four (24) post-partum buffalo cows with BCS of no less than 3 were used to determine ovarian response. These buffalo cows were randomly allocated into three treatment groups having eight buffalo cows each that underwent CIDR Synch protocol with 5ml dinoprost thromethamine (Treatment1), 2ml chloprostenol (Treatment 2), and 2ml d-chloprostenol (Treatment 3). Upon evaluation on the level of progesterone concentration of the blood samples collected, which served as bases to test the effectivity of the prostaglandin, no significance difference was seen among treatment groups.

On the other hand, the study 2 used a total of 150 animals with fifty animals per treatment to determine pregnancy rate. The main objective of synchronizing ovulation for FTAI protocol is to improve productivity of the animal by increasing the pregnancy rate per animal inseminated.

It shows that 40% is for treatment 2 and 36% both for treatments 1 and 3 but has no significant difference. As the researchers tried the treatments on a small size of herd, their observation says that the 40% pregnancy rate on the chloprostenol group tended to be higher than the two other treatments, which implies that it can also be of great impact on a larger scale.

Moreover, the size of the follicle after the treatment is known to influence pregnancy outcome following Artificial Insemination (AI). However, the researchers found out that, these generally, cannot directly suggest that increase in pregnancy rate is due to the treatment alone; other factors influencing pregnancy outcome could be the health status of the animals, the quality of semen used, the time of insemination done in relation to the estrus period, and the competence of the AI technicians.

Studies are continuously conducted in this specialization to achieve higher productivity in the livestock industry as AI program really has the potential to contribute more calf drop, increase the supply or production of local milk in the industry, as well as meat and hide.

The work indicates the effectiveness of these analogues in inducing luteolysis, follicular growth, ovulation and pregnancy and therefore, chloprostenol can be an alternative synchronizing agent in conventional or an enhanced AI program to improve reproductive efficiency of dairy buffaloes in the country.

The information gained from this study could serve as valuable inputs towards development of an effective reproductive management system to improve AI efficiency in buffaloes and other livestock species.

The study was jointly funded by Department of Science and Technology - PCAARRD and Department of Agriculture - PCC under the project "Development of Reproductive Management Program for Increased Efficiency of AI in Dairy Buffaloes" which is implemented by Reproduction and Physiology Section of PCC.

About the researcher

Dr. Edwin C. Atabay works as Scientist I at PCC. He took his PhD in Veterinary Medicine at the Hokkaido University in Sapporo, Japan.

Growth curve and weight estimates of PCs are significantly valued when determining market price, study says

By Jennifer Maramba and Charlene Joanino

The selection of buffaloes for breeding and fattening utilizes data on body weights, average daily gain (ADG) and body conformation of the same age group. However, alteration in the estimation of genetic parameters for animal evaluation may occur based on the preliminary analysis of growth trait.

In relation to this, PCC researchers Jennifer Maramba, Jose Arceo Bautista, Josefina Dizon, Ester Flores and Agapita Salces, studied the "Growth Curve and Weight Estimates of the Philippine Swamp Buffalo (Bubalusbubalis Linn.) in Piat, Cagayan". It aimed to determine weights and heights for the different age groups of Philippine swamp buffalo or PC in PCC at Cagayan State University (CSU) and identify a growth model that best fit the curve.

A total of 10,801 records from 272 animals in the PC nucleus herd of PCC at CSU for growth curve and 352 records from 252 animals for weight prediction were analyzed using JMP version 8 software. Wherein, monthly growth was described in terms of the animal's body weight (kg), wither height (cm), heart girth (cm) and body length (cm) using animal weighing scale, meter stick as well as tape measure.

Four non-linear models (Logistic, Gomperts, Von Bertalanffy and Brody) were used to determine the growth curve of PC using weight and height with different age categories. It was found that Brody model best fit the curve with an average percent difference of 2.4% or 97.6% accuracy. The Brody model rendered the lowest Aikaike Information Criterion (AIC) and Root Mean Square Error (RMSE) values, which serves as determinants in choosing amongst the said models.

Among different body measurements in PC, significantly higher correlation of body weight (BW) was found with heart girth followed by body length when analyzed using linear regression. Higher degree of predicting weight was observed in 22 to 33 months of age (1.1% to 2.4%) derived in the model equation. Using the validation data, the percent difference of predicted weight from actual weight ranged from 0.1% to 6.7% or 93.3% to almost 100% accuracy. Thus, it indicated a very good prediction of body weight.

Overall, Brody growth curve model best fit the data set of weight and height for all male and female PC using different age category. Prediction of body weight using linear regression can be helpful for the farmer or farm supervisor to monitor the growth for breeding, knowledge on the dosage required in administering medicine, determine the feed requirement when fattening and value of animals when sold to market without the availability of animal weighing scale in the farm or in the field. This can help farmers render better management of rearing buffaloes.

About the researcher

Jennifer Maramba finished MS in Animal Science at the University of the Philippines Los Baños. She is a Laboratory Aide II at PCC's Animal Breeding and Genomics Section.

HSP70 expression can indicate heat stress, fertility rate in livestock

By Excel Rio Maylem and Chrissalyn Marcelo

Researchers from PCC have found out the cellular response of livestock toward heat and environmental condition in the Philippines.

In a study titled "The Role of Heat Shock Protein (HSP70) Gene Expression in Blood Lymphocytes of Water Buffaloes" done by Excel Rio Maylem, Shanemae Rivera, Gerald Ramos, Eufrocina Atabay, Edwin Atabay, and Emma Venturina, HSP70 expression was detected in the blood lymphocytes of water buffaloes.

HSP70 was noted as a potential indicator of heat stress in livestock. As a member of the family of HSP, a gene responsible for counteracting the effect of the continuously changing climate, HSP70 is deemed as the most inducible and highly sensitive form in its family.

A total of 20 Bulgarian Murrah buffaloes and two native carabaos were used in the study. Ten from these animals were donor bulls from the PCC National Bull Farm in Digdig, Carranglan, Nueva Ecija while the remaining 12 were buffalo cows from the institutional herd of the PCC National Headquarters and Gene Pool in Science City of Munoz, Nueva Ecija.

The study was conducted last January 2016 to June 2018 with a budget of PhP5,305,200.00 from the Department of Agriculture-Biotechology Program.

Methodology

The researchers performed blood collection and isolation of peripheral blood mononuclear cells (PBMCs), RNA extraction, and quantitative RT-PCR analysis.

Cows were grouped according to their age and lactation period. All of them were fed with a mixture of grasses, silage and concentrates and given water ad libitum. House pens were opened to allow continuous flow of air.

Blood samples, meanwhile, were also collected for the analysis of HSP70 gene expression during the hot dry (May-July), hot wet (August-October), cool wet (November-January) and cool dry (February-April) seasons for the determination of its response to elevated temperatures. For physiological responses; respiration rate (RR), pulse rate (PR) and rectal temperature (RT) data were recorded on the same date before blood collection. Cows were grouped into three: low calving interval (300-400), mid calving interval (401-599)

and high calving interval (600-700).

These were then followed by the isolation of PBMCs, RNA extraction and quantitative RT-PCR analysis using technical protocols.

Results

Observations were made on the different levels of HSP70 expression of individual bulls and cows.

Highly significant ($P<0.05$) expression of HSP70 was recorded during hot-dry months (May to July) which is approximately 2.6 to 2.7-fold change higher than the cold-dry months (February to April). This shows that the animals are more stressed during the former months compared to other months such as cold-dry months, hot-wet months (August to October) and cool-wet months (November to January) of the year.

Furthermore, moderately positive correlation was also observed between HSP70 and minimum temperature ($\beta=0.38$), maximum temperature ($\beta=0.44$), rainfall ($\beta=0.37$) and strong negative correlation for relative humidity (RH) ($\beta=-0.42$). This inferred that temperature, rainfall and unabated fluctuation of relative humidity brought by climate change greatly affects the expression of HSP70 in the blood lymphocyte of water buffaloes and imposed a deleterious effect on animal reproduction and production. Therefore, any change in this environmental condition leads to escalation of HSP70 relative expression level.

Physiological parameters, meanwhile, like rectal temperature (RT) ($\beta=0.42$) and pulse rate (PR) ($\beta=0.33$) had a moderate correlation to HSP70 while respiratory rate (RR) ($\beta=0.17$) and semen quality traits including semen volume, sperm motility and concentration had no significant correlation. This means that an increase in PR and RT could also signify animals experiencing heat stress.

In terms of fertility, a two-fold higher gene expression of HSP70 on high calving-interval cows ($P<0.05$) was recorded compared to low-interval cows (1.30) and mid-interval cows (1.21). This showed that cows with more HSP70 expression are more heat-stressed which is considered to be a contributory reason to why the animals have a high calving interval, or lower fertility rate.

Shanemae Rivera, PCC Reproduction and Physiology Section Research Assistant, fills a test tube with blood samples.

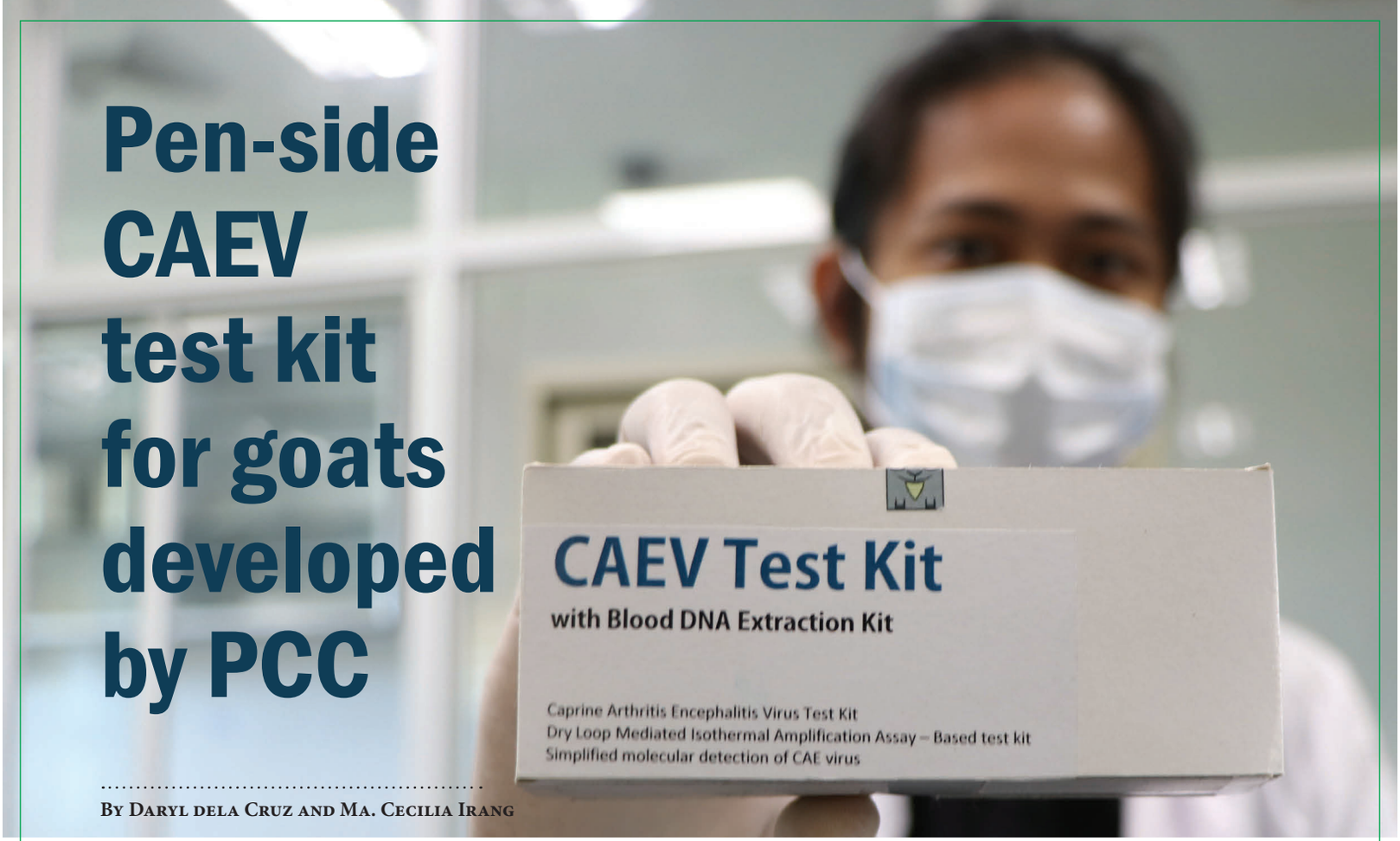
Based on the overall results, the researchers concluded that understanding the cellular response of livestock animals to heat stress will allow the identification of the animal's intrinsic thermotolerance to heat and the changing climate in the Philippines. This can serve as a lead in providing interventions to address the detrimental effect of heat stress in the livestock sector.

On the side, the HSP70 in blood lymphocytes can be a potential indicator of heat stress in water buffaloes and its varying expression levels can be used as a valuable reason for the differences on its length of calving interval leading to fertility rate. This then leads to the utilization of HSP70 for the management of heat stress and its effect on reproduction in water buffaloes.

About the researcher

Excel Rio S. Maylem is a Science Research Specialist II at PCC's Research for Development Division. She currently studies PhD in Animal Science at Oklahoma State University.

Pen-side CAEV test kit for goats developed by PCC



By Daryl dela Cruz and Ma. Cecilia Irang

A rapid and cost-effective molecular-based test kit which detects Caprine Arthritis Encephalitis Virus (CAEV) in goats even at the farm level has been developed by researchers of Philippine Carabao Center.

It was referred to as CAEV dry – LAMP (Loop Mediated Isothermal Amplification) Test Kit.

The goat industry in the country is considered as one of the fastest growing agricultural-based industries but emergence of CAE virus is threatening its sustainable growth.

CAE is a multi-organ disease of goats characterized by long incubation period and persistent infection. It has common clinical signs of polyarthritis and mastitis in adult goats and leukoencephalitis among kids. The virus can be transmitted mainly via ingestion of infected colostrum or milk and horizontally via direct contact with the infected animal.

The success in controlling the spread of CAE virus infection depends largely on regular monitoring, early detection and removal of infected animals from the herd. Thus, the development and application of rapid test kit in the detection of CAE virus is significant in the sensitive screening and control of the pathogen/disease.

Detection of CAE virus infection is mainly done through serological and molecular methods such as Enzyme-Linked Immunosorbent Assay (ELISA) and Polymerase Chain Reaction (PCR). However, these techniques are laborious and require expensive equipment that may not be present in some laboratories.

Thus, the PCC conducted a study entitled "Development of LAMP Assay-Based Test Kit for the Detection/Screening of CAEV" engaging researchers namely Dr. Michelle M. Balbin, Dr. Daryl G. Dela Cruz, Dr. Joram J. Gautane and Dr. Claro N. Mingala.

Amplification and detection of the target gene in LAMP can be completed in a single step by subjecting the mixture of sample, primers, buffers and DNA polymerase at a constant temperature between 60ºC and 65ºC. A protocol using LAMP technique in the detection of CAE virus was optimized in the Philippines by Dr. Michelle M. Balbin and other PCC researchers in 2014. Using the optimized protocol, CAE virus can be detected within 30 minutes.

Recent developments in LAMP technique includes preparation of reagents in different formats that is more accessible and applicable in both laboratory and field condition and one of which is the preparation and storing of reagents in dry format.

The result of the study revealed that the developed CAEV dry-LAMP test kit could detect CAE virus in clinical sample. There is also no need for sophisticated instrument and it is simply carried out in a heat block or simple thermos. After incubation, positive samples will turn green while negative samples will be orange.

Applying dry-LAMP technique in the detection of CAE virus is a simple method that does not require expensive equipment. It is an effective way to motivate farmers or producers to screen their goats for the presence of the virus and eventually lead to better farm management, disease control, and reduced case or possible eradication of the virus in the herd.

The test kits were evaluated by different research institutions and animal diagnostic laboratories in the country and proven to be effective and efficient.

Currently, the kit is submitted for patenting and will be commercialized soon.

About the researcher

Dr. Daryl Dela G. Cruz earned the degrees BS in Animal Husbandry and Doctor of Veterinary Medicine at Central Luzon State University. He is a Science Research Specialist I at PCC.

Mango peel pectin prevent syneresis, sedimentation of acidified buffalo milk products

By Teresita Baltazar, Mina Abella, Patrizia Camille Saturno, Ma. Cristina Gragasin, and Charlene Joanino

Various problems in the quality of acidified milk products surface when pH is lowered. It leads to protein coagulation and agglomeration, protein sedimentation and whey separation that causes low or high viscosity.

In response to such circumstances, local mango peel pectin (MPP) is a recommended stabilizer for whey milk drink and fermented milk products. As a polysaccharide with negative charge, MPP can bind to positively charged protein surfaces, that, therefore, makes it a good stabilizer. Its usage is explored in the research entitled "Quality Improvement of Acidified Buffalo Milk Products Through Stabilization with Locally Produced Mango Peel Pectin".

Conducted by researchers Teresita Baltazar, Patrizia Camille Saturno, and Mina Abella, PCC partnered with Philippine Center for Postharvest Development and Mechanization (PhilMech), represented by Dr. Ma. Cristina Gragasin, which provided funds and served as the source of MPP used in the samples. The research was comprised of three component studies that delved on MPP usage in whey drink, fermented whey beverage and yogurt products.

Whey Drink

Both commercial pectin and local MPP were able to prevent protein coagulation and sedimentation in acidified whey drink. Study showed that sedimentation decreases while viscosity increases as the level of pectin increases. Viscosity behavior depends on pectin concentration and also influences the sensory assessment of the product.

Based on the microbial count, the whey drink samples conformed with the FDA Microbiological Standards for non-alcoholic beverages. It was found that acidified whey drink can last 4 weeks at ambient temperature.

Fermented Whey Beverage

It was found that lactic acid fermentation decreases lactose content in whey. The pH level was also reduced. Moreover, the longer the alcoholic fermentation, the

(Continued on page 10)

Teresita Baltazar, PCC Carabao Enterprise Development Section Food Technologist, showing acidified whey drink and fermented whey beverage with mango peel pectin.

Mango peel...

(From page 9)

higher the increase in alcohol (ethanol) content and an evident decrease in total soluble solids. Mango peel pectin was found to be effective in preventing sedimentation in fermented whey beverage.

Compared to natural flavoring, it was found that artificial flavoring has a higher score in purchase intent and general accessibility despite having no differences between the samples. The cost of fermented whey beverage is Php34.03 per 350mL.

Yogurt Products

In this study, MPP was used to prevent syneresis or wheying-off in set and yogurt drink samples since it gives an undesirable effect on quality. It was found that treatments in set and yogurt drink with no pectin experienced syneresis on the 15th day while samples with MPP were whey-free. By using MPP, which has a great water-holding capacity, it creates a three-dimensional network in milk while it holds maximum water which leads to the prevention of syneresis and also results in an increase in viscosity in yogurt products. However, specific high levels of MPP have an effect on the color of set and yogurt drink.

Overall, using MPP to improve the quality of acidified buffalo milk products through stabilization was found to be effective in this study. Aside from the prevention of sedimentation and syneresis, it also improves the quality in terms of appearance, viscosity and mouthfeel of acidified milk products.

The transferring of mixture subjected to heat treatment.

Some of the final products with Mango Peel Pectin alongside powdered Mango Peel Pectin.

About the researcher

Teresita M. Baltazar works as a Food Technologist at PCC. She finished BS Food Technology at Central Luzon State University.

Mina P. Abella is the head of PCC's Carabao Enterprise Development Section. She earned a degree in BS Chemistry at the University of Santo Thomas and pursued MS in Animal Science at Central Luzon State University.

Patrizia Camille Saturno is a Science Research Specialist II at PCC. She finished BS Food Technology at the University of Santo Thomas.

Dr. Ma. Cristina D. Gragasin earned a PhD degree in Pesticide Toxicology at Chiba University in Japan. She currently works as a Supervising Science Research Specialist at PHILMECH.

Roster of various scientific recognitions, 2018

"PSAS Outstanding Professional in Animal Science Extension"

Dr. Eric P. Palacpac
Chief of PCC's Knowledge Management Division

2018 PSAS-UNAHCO, Inc. Outstanding Young Professional in Animal Science"

Dr. Marvin A. Villanueva
PCC's Senior Science Research Specialist

Best Paper, Applied Research Category, PSAS
"Monitoring of Aflatoxin M1 and Dairy Farm Management of Water Buffalo"

Dr. Ma. Wynne A. Pagaduan, Dr. Marvin A. Villanueva and Gemerlyn G. Garcia

Best Paper, Biotechnology Category, PSAS
"Effect of Different Prostaglandin (PGF2) Analogues during Synchronization in Dairy Buffaloes (Bubalus bubalis)"

Dr. Eufrocina P. Atabay, Dr. Edwin C. Atabay, Dr. Jessica Gay M. Ortiz, Dr. Edgar A. Orden, and Jhon Paul R. Apolinario

Best Paper, Disease and Diagnostics Category
"Identification of Bacterial Community in Mastitic Milk Water from Buffalo in Selected Cooperatives of the National Impact Zone Using PCR and DGGE Method"

Paula Blanca V. Gaban, Dr. Claro N. Mingala, Niña Rica A. Pagaduan, and Jervin R. Undan

Agriculture and Fisheries Modernization Act (AFMA) Best R&D Paper Gold Award, Applied Research (Technology Generation/ Information Generation) – Agriculture Animal Science category -"Bronze Award", AFMA Best R&D Poster category
"Development of LAMP Assay-Based Test Kit for the Detection/Screening of CAEV"

Dr. Michelle M. Balbin, Dr. Daryl G. Dela Cruz, Dr. Joram J. Gautane and Dr. Claro N. Mingala

OPINION

Cascading technologies, knowledge from research

ANNABELLE S. SARABIA, PhD
PCC RDD Chief and National R4D Coordinator

Since the creation of PCC's Research and Development Division (RDD) five years ago and its optimization in mid-2016, we shifted to a broader approach by addressing certain ruminant industry issues through application. We started pursuing our efforts in packaging technology options that are accessible and can be adopted by the farmers.

The focus was on specific thematic areas and paved the way in the functionality of the established Reproduction and Physiology Section, Animal Breeding and Genomics Section, Biosafety and Environment Section, Production Systems and Nutrition, Socio Economic and Policy Section, Carabao Enterprise Development Section. This is in consideration that you cannot create an efficient industry without research where you utilize scientific method to render solutions on problems that can be social, economic, among others.

Over the years, RDD facilitated production of technologies that had helped a lot in furthering PCC's mandate "towards better nutrition, higher levels of income and improved general well-being of the overwhelming sector, the rural farming families, through the conservation, propagation and promotion of water buffalo as important source of milk and meat, in addition to draft power and hide."

Under the PCC's Carabao Development Program (CDP), the research for development component encompasses supports to other components like genetic improvement and enterprise development.

For example, before you can reap benefits in dairy enterprise, you need to make your animal capable as your source of milk. It is through research initiatives in genetics and breeding that we were able to develop a dairy buffalo that can produce more milk. In fact, it has become possible for a farmer nowadays to collect 10 liters of milk a day in one dairy buffalo and acquire added value in terms of dairy product processing.

At the same time, we are able to transcend the traditional use of native carabao as a draft animal by stewarding the dairy industry by way of propagating dairy buffaloes in the Philippines through technologies like Fixed-Time Artificial Insemination.

However, in the nitty gritty world of research, it is not only the animal that one should delve on but people as well. Whereas, if we want the animal to perform, there should be a symbiotic relationship between the caretaker and the animal. In research, we do not only delve more than how the farmer handles the animal or the animal biology but we also explore the human side. This is dubbed as social intervention, which we address in one of the thematic areas.

Overall, there is a need to determine the issues to be able to render solutions through technologies crafted by researchers that do rigorous efforts on analysis, proposal and execution.

Challenging. Hardwork. Great Satisfaction. This is how I would describe the life of a researcher. The road towards your goal is not even. You will experience hurdles but when you contribute something to science you feel a sense of fulfillment.

To the researchers, scientist or anyone aspiring to do research, you should be motivated and have patience to see through the end. It is a vocation where you have to persevere to get where you want to be because I'm sure somewhere along the way you will realize what to do. You'd be surprised that some of the most amazing discoveries happen incidentally.

R4D *Highlights*©

R4D Highlights, an annual publication of the Philippine Carabao Center, publishes in popularized form the agency's completed researches presented in its annual R&D Review. This publication reaches out to a wide scope of readers both in the science and non-science profession as well as the interested public.

For comments and suggestions, please write to the Editor-in-Chief in this mailing address:

Philippine Carabao Center
National Headquarters and Gene Pool
Science City of Muñoz, Nueva Ecija, Philippines
or email at ilivestockbiotech@gmail.com.

Department of Agriculture
PHILIPPINE CARABAO CENTER
CERTIFIED: ISO 9001 | ISO 14001 | OHSAS 18001