CAGAYAN VALLEY'S AMAIZEING CORN PRODUCTS

INCREASING INCOME OF FARMERS THROUGH VALUE ADDING

Cagayan Valley's Amaizeing Corn Products:
Increasing Income of Farmers Through Value Adding

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INCREASING INCOME OF FARMERS THROUGH VALUE ADDING

Introduction

For many years, the government has been focused in raising the income of farmers through increasing their production using improved varieties, technologies, among others. However, the ASEAN integration poses a great challenge to the government most especially to the Department of Agriculture (DA) on how to make the products of farmers competitive in the market.

The Department of Agriculture-Regional Field Office No. 02 (DA-RFO 02) has recognized the power of product development undertakings in transforming raw materials of famers into innovative products that may compete in the market. This is in consonance with its vision in making "Cagayan Valley towards Agri-preneurship". Agri-preneurship is a term coined from the words "agriculture" and "entrepreneurship" which envisions to make agriculture an enterprising endeavor.

Corn is one of the primary commodities in Region 02 particularly in Isabela province. In fact, the City of Ilagan was declared as the "Corn Capital of the Philippines". Through the Cagayan Valley Research Center (CVRC) located in the province, a number of Open Pollinated Varieties (OPVs) were developed with the aim of improving the yield and income of corn farmers most especially those using said varieties. The department's vision in making every farmer agri-preneurs greatly influenced the initiative of CVRC in its product development undertakings. Also, to develop innovative products as identity of the province being the no. 1 producer in the Philippines.

Furthermore, product development entails rigorous research and development activities from idea generation up to packaging of the finished product while ensuring its safety and nutrition benefits. The marketability of developed products is also considered in the process thereby making sure its business value in the market. These developed corn-based products are made from the varieties bred by CVRC over the past years. This is to provide an additional income generation activities for the corn growers. Likewise creating a market for the raw materials.

The product development of corn-based products is just the beginning of bigger opportunities for corn farmers and other stakeholders. With the concerted efforts of the Research Division, Research Centers/Experiment Stations, Integrated Laboratories Division, Food Technology Center and Agribusiness and Marketing Division, greater number of products will be developed from the raw materials found in the region be it rice, vegetables including livestock among others that will make Cagayan Valley farmers be all agri-preneurs in the near future.

Table of Contents

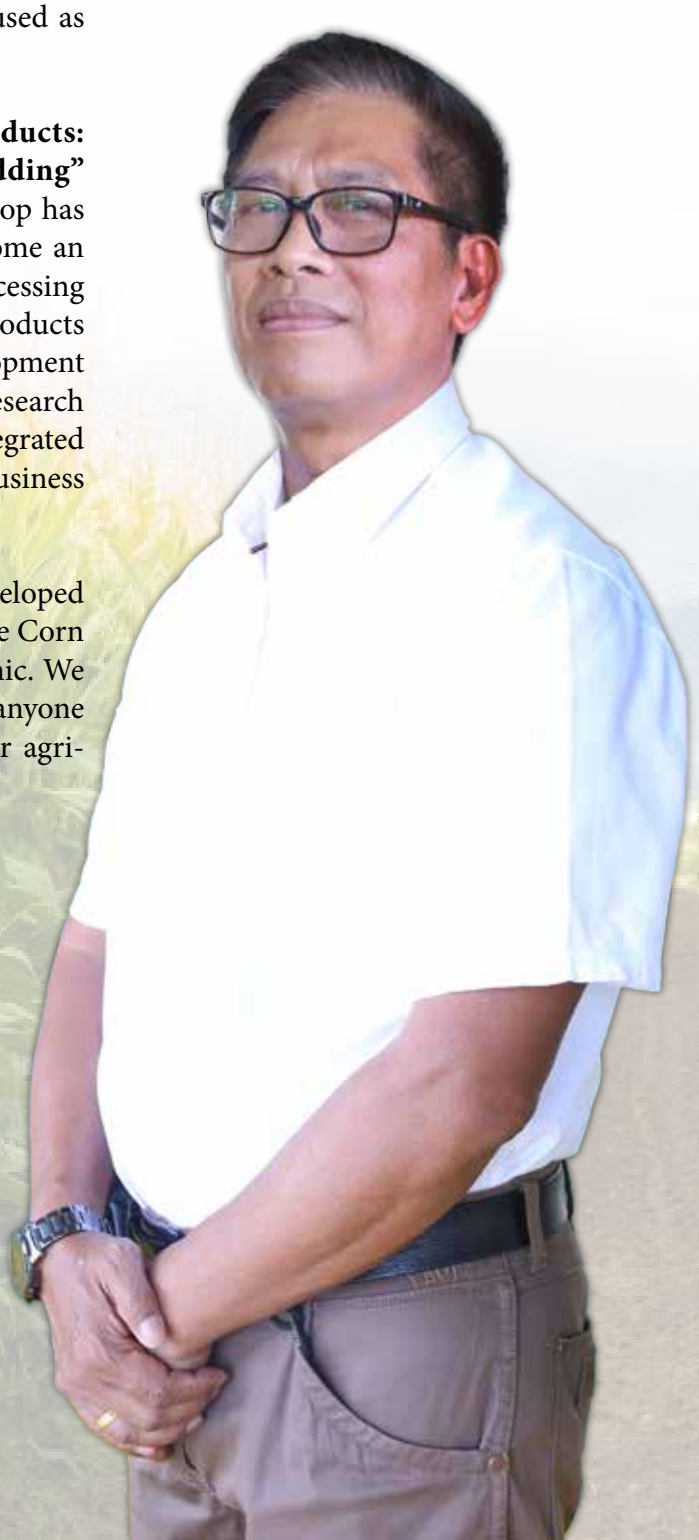
Foreword

The agriculture sector has been focused on the production of our priority commodities over the past decades. Majority of the government's programs and projects were towards increasing productivity and income of farmers. But now, it has come to a time when regional competition in the ASEAN market has driven us to innovate and add more value to our fresh products.

Therefore, the new endeavour of the department is anchored on our vision, that is, "Cagayan Valley towards Agri-preneurship". We believe that this initiative will contribute to the agriculture sector growth in Region 02 for the period 2016-2022. We wanted to develop further our farmers to be more competitive and increase the demand for fresh products that will be used as raw materials for processing, thus, increasing their income.

This book "**Cagayan Valley's Amaizeing Corn Products: Increasing Income of Farmers Through Value Adding"** showcases value adding on white and purple corn. This crop has been given lesser importance before, but now, it has become an emerging commodity that is very appropriate for food processing and an alternate staple food for Filipinos. These products developed by DA-RFO 02 are results of research and development and are market-oriented. It is a collective effort of our Research Division, Research Centers/Experiment Stations, Integrated Laboratories Division, Food Technology Center and Agribusiness and Marketing Assistance Division.

So I enjoin everyone to read and learn how we developed our Mangi Products such as Pinoy Gourmix, Kornbi, White Corn Mix, Mangi Pansi, Café Bagga, Maize Silky Sip and Cracknic. We are happy to award these products and technologies to anyone who wishes to become a business partner in building our agri-based industries.



LORENZO M. CARANGUIAN, DPA
OIC - Regional Executive Director

Message

Through the collective effort of our Research Division, Research Centers/Experiment Stations, the Integrated Laboratories Division, Food Technology Center and Agribusiness and Marketing Assistance Division, the DA-RFO 02 has established its Product Development Services to benefit our stakeholders. We now offer our free services in research and development which focuses on product conceptualization and enhancement, laboratory analyses, packaging and labelling and marketing.

This endeavour was conceptualized by DA-RFO 02 because we understand the hardships of our creative and innovative agri-preneurs in product development. We claim that we have the best tasting products, yet, it have not undergone analysis of its nutritional value and other characteristics. It lacks appropriate packaging and labelling. Likewise, some of our products have not been registered to the Intellectual Property Office and/or Food and Drug Administration.

Having our products undergo laboratory analysis, registration and dressing it for its target market is costly to our agri-processors. That is why, the DA-RFO 02 has enhanced its capability and capacity in R&D through our Research Centers/Experiment Stations regionwide. We already have a state-of-the-art laboratory, the Cagayan Valley Integrated Agricultural Laboratory (CVIAL), located at the Regional Government Center, Carig Sur, Tuguegarao City. We also have licensed food technologists that will provide technical assistance to our food processors. Lastly, we also have our Agribusiness & Marketing Assistance Division who will assist our stakeholders in linking their products to our target market.

Through DA-RFO 02's initiatives, we have also taken steps to develop products from white and purple corn, which in turn, will be awarded to food processors/investors. It is a great honor for me to introduce the "**Cagayan Valley's Amaizeing Corn Products: Increasing Income of Farmers Through Value Adding**" as it showcases our IPO-registered products.

I commend the men and women behind this endeavour for re-awakening our interest in product development. I also would like to thank the Department of Agriculture - Bureau of Agricultural Research (DA-BAR) with their support in the Technology Commercialization of all these products featured in this book.

ROSE MARY G. AQUINO
OIC - Regional Technical Director
for Research and Regulatory


Our Products,
YourProducts!
MANGI MAXI
CRACKNIC
CRUNCHY GLUTINOUS CORN SNACKS
CHEESE
CRACKNIC
150 g
CORN COFFEE CEREAL DRINK
Cafe
BAGGA
PANSI
Purple Corn Noodles
Must Try!
Net Wt 50grams


EXPORT QUALITY
Pinoy GOURmix
Vege & Protein Rich
Smart Food!
Corn-Rice Mix
1 KG
Maize Silky Soy
Net Content: 350 ml

REGION 02's PRIDE

Pinoy GOURmix

Your Complete and Smart Food!

"Lugaw" or porridge or plain congee has established its own name in the Filipino diet making it a cheap substitute for a regular meal within the day. Porridge only requires rice, water, and salt. It may also be topped with egg, chicken meat and the like depending on one's choice. However, this "lugaw" underwent transformation to make it more nutritious for all ages. Thanks to the researchers of Cagayan Valley Research Center (CVRC) who transformed 'lugaw' into what we call "Pinoy GOURmix"!

Birth of Pinoy GOURmix

It is in CY 2014 when the City of Tacloban experienced the devastating effect of Typhoon Yolanda. Casualties were recorded not to mention the damaged it caused in the agriculture sector of the city. During this time, the former Center Chief of CVRC now the Regional Technical Director for Research and Regulatory, Ms. Rose Mary G. Aquino volunteered in the relief operations in the city led by a group of clergy. She first saw here the US Manna Pack Rice which was distributed as relief food to all the survivors. With this, Aquino pushed for the development of a healthier and Filipino version of said relief food using available crops in Region 02.

Further, the region is known for its abundant supply of corn, mungbean and rice. It is the home of the Corn and Mungbean Capitals of the Philippines and the 2nd largest producer of rice. Apart from this, Region 02 is also the major soybean and adlay seed supplier in Luzon and the upland vegetable basket of the North. Considering this, product development and processing is one key to improve market value of these raw materials for increased income of farmers. This is also to provide a market opportunity for the growers of these crops to not just only focus on production.

Pinoy Gourmix is composed of rice, Open Pollinated Variety (OPV) White Corn grits, adllay and mungbean. It is also added with the goodness of soybean Texturized Vegetable Protein (TVP), malunggay powder, and yellow ginger or turmeric. The technology commercialization of Pinoy Gourmix is supported by the DA-Bureau of Agricultural Research (DA - BAR).

Searching for the right mix

Inspired and challenged with the Yolanda story, researchers of CVRC started to explore on the right mix of crops abundantly grown in Region 02. Through the center's research and development activity, Pinoy Gourmix was developed not just to provide Filipinos with highly nutritious and affordable foods but also to create local and competitive market for OPV white corn and Adlay food staples (low in glycemic index and rich in anti-oxidants), protein-rich mungbean and soybeans, the medicinal malunggay and yellow ginger turmeric. Several trials on the right mix of these crops were conducted to achieve the best combination of the ingredients. Its first formulation used the whole grain of rice and corn grits. Sensory evaluation was also conducted to test its suitability to consumer's palate. But this was further improved through the adjustment of the milling operation of cereals to achieve uniform and finer grits size. The ratio and proportion of other vegetables and protein ingredients was also adjusted based on the consumer's preference.

Generally, its ingredients contain vitamins such as Vitamin B or Thiamine and Vitamin C. It also has proteins, antioxidant, iron and the anti-cancer properties of malunggay and yellow ginger or turmeric. Aside from this, nutritional analysis of Department of Science and Technology (DOST) showed that in every pack of Pinoy Gourmix contains 53.8% carbohydrates, 5.62% total fat, 10.32% moisture content, 7.69% ash and a low calories of 120 making it a complete and smart food high in protein and anti-oxidant. These health benefits can be experienced by spending a meager amount of Php 35.00 per 250 gram pack which can feed eight (8) to ten (10) persons.

Improving the packaging

Secondary to taste, attractive product packaging always influences the preference of buyers. Through the product development initiative of CVRC, they also looked into the best product packaging for Pinoy Gourmix. Its product packaging way back in 2014 is a simple unattractive one.

With the series of consultation conducted with partner-experts, the final packaging used was a food-grade packaging with vacuum sealed. Labeling of Food and Drug Administration (FDA) registration number and the expiration date of the product were also included in the new product packaging.

Support to Nutrition and Farmers

Regarded as complete and smart food, the Regional Nutrition Committee (RNC) thru the National Nutrition Council Region 02 (NNC R02) issued Resolution No. 4 Series of 2015 which endorses and supports Pinoy Gourmix as supplementary, complementary and food relief during emergencies. Since CY 2014 until CY 2016, the product has been used in various feeding programs of both government and private organizations including Local Government Units (LGUs) and Non-Government Organizations (NGOs). The ABS-CBN, one of the largest TV networks in the country also used Pinoy Gourmix in its PROGRAMA GENIO Kapamilya Foundation as part of its feeding/ nutrition program advocacy.

From CY 2014-2016, the total Pinoy Gourmix sold and used in product promotion, exhibits, and feeding programs is at 82,867 packs. This CY 2018, the Pinoy Gourmix requirements for six (6) months is at 28, 920 packs in the province of Isabela alone. This translates to an assured market for OPV White Corn, Adlay, Mungbean, among others. For instance, CVRC is buying OPV White Corn Grits at Php 27.00 per kilo compared to Php 12.00 per kilo when sold as corn grains.

Most of the OPV White Corn came from white corn producing municipalities of Enrile, Peñablanca, Piat, Tuguegarao City, and Amulung in Cagayan including Sta. Maria, Sto. Tomas, San Pablo, and City of Ilagan in Isabela. For adlay, supplies came from Maddela in Quirino, Lasam, Cagayan and Bayombong, Dupax Del Sur in Nueva Vizcaya. While most of mungbean produce came from San Mateo and Cabatuan, Isabela.

With the growing demand of Pinoy Gourmix, CVRC ensures the safe supply for Pinoy Gourmix. This is through the provision of trainings on Good Agricultural Practices (GAP) and Organic Farming Practices for growers of the product's main ingredients.

Market Partners

Further, the product is also displayed in nine (9) branches of LCC Supermarket in Bicol Region. Thru the Market & Trademark Licensing Agreement (Technology Transfer Act), the Jevita Sales and Marketing is currently the sole distributor of Pinoy Gourmix in the Philippines and outside the country. In addition, the Department of Health-Food and Drug Administration (DOH-FDA) awarded CVRC a License to Operate as Food Manufacturer to support its Market and Licensing Agreement with its partner-distributors and manufacturers.

Intellectual Property Rights

In 2015, the Department of Trade and Industry- Intellectual Property Office (DTI-IPO) issued the Trademark Registration Certificate of Pinoy GOURmix. The trademark registration gives CVRC the exclusive right in the product name to avoid the usage of the same product name without permission from the center.

Future Plans

With the success of the product development undertaking, CVRC intends to develop another variant of Pinoy Gourmix with saluyot and brown rice. They also wanted to create an instant food version of the product as per partner-market demand.

Steps on How to Cook

Here is a bonus treat for you when preparing Pinoy Gourmix! Just follow the following simple steps and viola! Sauté garlic, add two liters of water, bring to boil, then add contents of the package. Stir, cover, and cook over low fire for 10-15 minutes. You may also add your favorite toppings of your choice.

CORN UPRiceING!

HEALTHY ALTERNATIVES TO WHITE RICE

Rice is central to Filipinos diet as it has been a part of our culture. However, with the issue on rice insufficiency mainly due to the growing population of the Philippines and other economic and environmental factors, the search for alternatives to rice has begun. Corn, banana, and root crops like cassava, sweet potato, taro, and yam among others are currently the focus as rice substitutes. These options are becoming popular with the aid of the social media. Filipinos, especially those who are health and weight conscious, were frantically looking for rice alternatives that are more nutritious and are open to shift into these staple foods.

Having this thought and the goal of improving the lives of the white corn farmers in Region 02 thru increased income, Cagayan Valley Research Center (CVRC) conducted a research on product development using white corn as an alternative staple food. This technology can be adopted by farmers or food processors/investors and make it their income generating business. There were three (3) products developed, namely, Corn-Rice Mix, White Corn Grits and Kornbi. These three (3) IPO-registered products under the Mangi Maxi brand are great sources of protein and carbohydrates backed up with nutritional analyses from the Regional Standards and Testing Laboratory of the Department of Science and Technology Regional Office No. 02 (DOST RO 02).

Corn-Rice Mix

Shifting to corn is not easy for someone who is used to eating rice. Thus, the research team thought of combining corn with rice which they called "Corn-Rice Mix". This product is suited to consumers who are used to eating rice and cannot totally leave it out on their diet right away.

Researchers used Open Pollinated Varieties (OPVs) of glutinous and flint corn which are milled using the Adlay Milling Machine developed by CVRC in 2015. Flint corn is distinguished to have a hard outer shell and kernels with a range of colors from white to red. Glutinous corn otherwise known as waxy corn has a softer white shell which becomes sticky or waxy when cooked. Researchers explored on the right combination of rice and corn as well as its cooking time. They were also challenged to determine the right size for corn grits since these are bigger in size compared to rice. It serves as vital information which ensures that all grains will be cooked at the same time.

Further, it was found out that the best combination is 50% Rice + 25% Flint Corn + 25% Glut Corn. It only requires 30 minutes of cooking which cooked all three (3) grains at the same time giving the right texture, softness and moisture. It is also important to note that 1 kg of corn-rice mix was added with 1 liter of water. As to the grit size, Grade 8 was used for flint and glut corn grits since the existing consumers of corn grits as staple food preferred such. This was also confirmed by the suppliers of corn grits in the market. To date, Corn-Rice Mix can be bought for only Php 45.00 per 1kg pack.

Table 1. Tests on the different ratios of rice, flint and glutinous corn

Rice + Flint + Glut Ratio	Cooking Time (thru Rice Cooker)	Results
50% Rice + 50% Flint corn	40 minutes	The output was half-cooked even after 40 minutes.
50% Rice + 40% Flint corn + 10% Glut corn	35 minutes	The rice and glut corn was already overcooked but the flint corn was still half-cooked after 35 minutes.
50% Rice + 30% Flint corn + 20% Glut corn	35 minutes	The flint was cooked right but the rice and glut corn were overcooked after 35 minutes.
50% Rice + 20% Flint corn + 30% Glut corn	30 minutes	All three grains were already cooked after 30 minutes but the mixture was too moist.
50% Rice + 25% Flint corn + 25% Glut corn	30 minutes	All three grains were cooked well, with the right texture, softness and moisture.

Note: 1kg corn-rice mix = 1 liter of water

Kornbi

Another product developed using OPV glutinous and flint corn was the Kornbi. Kornbi got its name from the combination of its ingredients of flint and glutinous corn. Like Corn-Rice Mix, it also underwent several explorations on the right combination or ratio of flint and corn as well as its cooking time.

The ratio of ingredients was also subjected to sensory evaluation. It was found out that 70% Flint + 30% Glutinous was the most preferred mix of the sensory panel based on the sensory evaluation of the product. This is the current ratio used in mass producing the Kornbi. At 20 minutes of cooking (using rice cooker), flint and glut were cooked at the same time which resulted to a soft texture similar to rice. Kornbi comes in two (2) variants namely Kornbi purple and Kornbi White. Kornbi purple is made with 70% Purple flint and 30% Glutinous Corn while Kornbi White is a combination of 70% White Corn Flint and 30% Glutinous Corn. Kornbi is sold at Php 45.00 per 1 kg pack for both variants.

Table 2: Different combinations between flint and glutinous corn (corn grits)

Experiments	Ratio between Flint and Glutinous (Glut) Corn	Water Level	Cooking Time (minutes)	Results
Baseline	100% Flint	300 mL	30	Normal cooking time of flint corn
Treament 1	90% Flint + 10% Glut	270 mL	25	The flint and glut were both cooked but the result is not soft enough like rice.
Treatment 2	80% Flint + 20% Glut	240 mL	20	The flint and glut were both cooked but the result was not soft enough like rice.
Treatment 3	70% Flint + 30% Glut	240 mL	20	The flint and glut were both cooked and the result was soft for chewing like rice.
Treatment 4	60% Flint + 40% Glut	240 mL	20	The flint and glut were both cooked and the result was softer than Treatment 3.
Treatment 5	50% Flint + 50% Glut	240 mL	20	The flint and glut were both cooked but it was very sticky.

White Corn Grits

There are also consumers out there who prefer to consume native corn grits as their staple food. Ilocanos sometimes jokingly call this "pegpeg" since it is usually fed to chicken. One (1) cup of this is usually cooked within 40 minutes using stove with continuous stirring.

Good thing, CVRC researchers thought of improving the quality of "pegpeg" turning it into an excellent rice substitute for diabetics using different OPV White Flint varieties developed by the research center. This usual "pegpeg" was transformed into what we call White Corn Grits. One good feature of this is it is softer than native corn grits and easier to cook at 30 minutes on either stove or rice cooker without stirring it when boiling. Currently, it is sold at Php 45.00 at 1 kg per pack.

Ready for adoption

Corn-Rice Mix, Kornbi and White Corn Grits under the Mangi Maxi brand are ready to be awarded free to any food processor/distributor/investor who wants to make it as income generating business. CVRC provides technical assistance to any adopter of this product. They also conducted several trainings on Good Agricultural Practices (GAP) for corn farmers in Region 02 and established corn farmer producers to ensure safe and sufficient supply of raw materials required for Kornbi, Corn-Rice Mix and White Corn Grits.

White corn grits mixed with rice

White corn grits

Glutinous and White flint mix

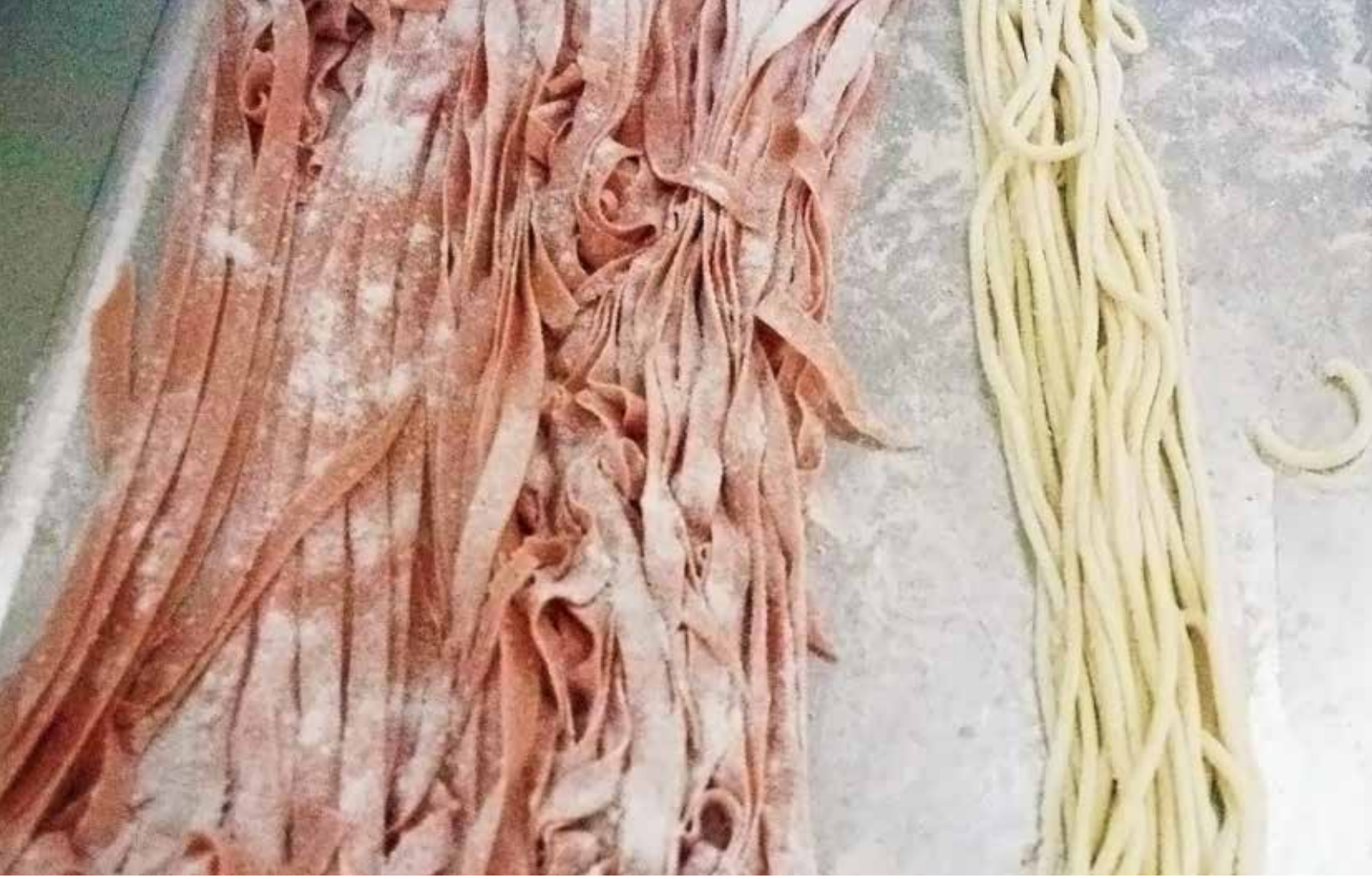
Glutinous and Purple flint mix

MANGI Pansi

Turning Corn into a Luscious Comfort Food

Pancit is the common name for noodles in the Filipino Cuisine introduced by Chinese-Filipino settlers' centuries ago. The term was derived from the Chinese which literally means "comfort food". It is one of the common staple foods in many Asian countries.

Here in the Philippines, provinces take pride in their own version of pancit. For instance, Bicol is known for its Pancit Bato, Quezon for its Pancit Luglog while Batangas boasts its Lomi. In Isabela, Cagayan Valley Research Center (CVRC) spearheaded the product development of noodles made from corn which the province is known for. Corn noodles are made from the OPV White Corn varieties developed by CVRC namely IES Glutinous 4, IES Glutinous 8, and IES Glutinous 10. The product line of corn noodles is named Mangi Pansi, an ibanag term for "Corn Noodles". It is a product under the Mangi Maxi IPO registered brand in 2017.



Kneading the right mix

Just any other cooks in China, researchers from CVRC prepared the noodles themselves in search for the right mix of raw materials to be used for the noodles. IES Glutinous 4, IES Glutinous 8, and IES Glutinous 10 including purple varieties were used as raw materials. Glutinous corn is initially dried and further processed into corn flour. Corn flour is added with all-purpose flour to find out the right elasticity and softness of noodles appropriate for any kind of pancit-based recipes. The challenge begins in the kneading since the texture of noodles commonly depends on it.

From the different combinations (Table 1), the ratio of 30% Glutinous Corn Flour + 70% All-Purpose Flour turned out to be the best for making the dough. Glutinous corn flour and all-purpose flour mixed with water and egg is kneaded for 10 minutes. Once the dough is ready, it can now be flattened and cut using noodle maker. Its size and thickness can be adjusted using the machine depending on one's preference. Fresh noodles can last for three (3) days under room temperature while dehydrated noodles can extend its shelf life up to four (4) months. Mangi pansi has two (2) variants, the White Corn Noodles and Purple Corn Noodles. Both variants come in 50 and 100 gram pack.

Table 1. Different Treatments of Corn and All-purpose Flour Ratios:

100% Glutinous Corn Flour	• The dough was not compact enough when kneading. • When put into the noodle maker, it cannot hold its form.
50% Glutinous Corn Flour + 50% All-purpose Flour	• The dough was compact when kneading. • When put into the noodle maker, it was able to take form but not elastic enough that it breaks. • When cooked, the noodles were smooth but very firm and hard that is not suitable characteristic for a noodle.
30% Glutinous Corn Flour + 70% All-purpose Flour	• The dough was compact and elastic when kneading. • When put into the noodle maker, the noodles glided out smoothly and did not break. • When cooked, the noodles were soft that it glides in your mouth.

White Corn noodles feature a long rounded shape similar to the regular shape noodles sold in the market. It is enriched with powdered Malunggay (*Moringa oleifera*) which is a great source of vitamins and minerals. This type of noodles is best for Pancit Guisado and the like. Meanwhile, Purple Mangi Pansi is the colorful version of white corn noodles added with amaranthus collectively known as amaranth. Amaranth is a great source of protein and antioxidant. Its leaves were used as natural plant-based coloring added to the corn flour to achieve its distinct purple color. Purple Mangi Pansi is a flat and thin type noodle similar to Pappardelle, a type of pasta. It is great for making carbonara which makes it more appealing due to its purple color.

On the other hand, Mangi Pansi is also subjected to laboratory analysis to ensure that it is clean, safe and healthy to eat. On May 8, 2017, its nutritional analysis for white and purple corn noodles was released by the DOST-Food and Nutrition Research Institute Service Laboratory. Every 50 gram pack of Mangi Pansi contains dietary fiber, iron, calcium, and beta carotene.

To date, Mangi Pansi is sold at Php 15.00/ 50g pack. A one (1) year production of Mangi Pansi can produce an estimate of 105,600 packs with a Net Income of Php 354,734.58 giving a Return on Investment (ROI) of 66.17%. This estimated ROI can be used as basis of future food processor or business personalities who are interested in venturing this product. In fact, CVRC will also extend technical assistance for those who will express their interest to adopt this product.

The DA-CVRC Mangi Food Hauz and Pasalubong Center is an adopter of Mangi Pansi. It is a cooperative managed food establishment located at CVRC-Annex in Brgy. Baligatan, City of Ilagan, Isabela. According to Ms. Elizabeth Allam, the manager of Mangi Food Hauz, she thought of using Mangi Pansi in recreating the famous Pancit Batil Patong, Pancit Guisado, Lomi, Carbonara and Pinataro. Surprisingly, these dishes were always the customers' favorite for snacks or quick meals. Customers say that they did not know the noodles are made of corn and were amazed that it tasted as good as the other noodles they have tried.


SILKY
SIP
HEALTHY & REFRESHING

Sipping the goodness of Corn Silk

Corn is one of the most versatile crops in the field of agriculture. Almost all of its parts can be turned into something useful. For instance, whole corn is used in making corn meal thru grinding. Corn flour is the finest grade of ground corn which is used for pancakes, donuts, breading, and baby food. Corn husk is used in the production of mushroom as substrate and whole corn plant can be made as silage for feeding cattle and carabao. However, corn silk are commonly discarded by farmers not knowing that it can be transformed into something valuable.

Cagayan Valley is known as the home of the Corn Capital of the Philippines making it the top producer of corn. Given the bulk of corn production in the region, the volume of corn silk discarded is almost equivalent to the amount of corn harvested. Imagine the amount of corn silk discarded every harvest is just an enormous waste! But don't worry, corn silk are now being transformed into something valuable which can generate additional income for corn growers.

The Cagayan Valley Research Center (CVRC) located in San Felipe, City of Ilagan, Isabela pioneered in the development of new product using corn silk which is called "Maize Silky Sip". The name Maize Silky Sip is derived from the terms "maize" which means corn and "silky" refers to the corn silk while "sip" defines that it is a juice. Maize Silky Sip contains boiled corn silk enhanced with lemongrass, honey, and other plant-based flavourings.

Before the development or improvement of new corn silk products, it is traditionally consumed as a tea and the Native Americans use it as an herbal remedy since 500 B.C. It is believed to have diuretic properties helping in the stimulation of urination which can be useful in treating Urinary Tract Infection (UTI).

In Search for the right formula

Sometime in 2017, researchers from CVRC started brainstorming on what value adding activity could be done in corn aside from cornick or the crunchy corn commonly munched for merienda or pulutan. Apart from this, the research aims to help farmers in increasing yield through the use of corn silk which are commonly regarded as agricultural waste and address problems such as UTI in a safer way.

Through the initiative of the CVRC, they successfully formulated the right formula for transforming corn silk into Maize Silky Sip. In the formulation of the product, corn silk of Open Pollinated Varieties (OPVs) were used to maximize its whole utilization since these are commonly harvested for green corn. Green corn is the tender ears of young corn suitable for cooking and eating. The researchers followed the green corn technology production which include the use of certified seeds, soil testing for determining the specific fertilizer, land preparation, preparation of furrows, application of basal fertilizer, planting (3 seeds per hill, 5 cm apart), cultivation, weed control and thinning of seedlings (done at 12 days after planting (DAP)), side dressing (Nitrogen fertilizer at 25 DAP), pest management, and harvest (70-72 DAP).

In searching for the right formula, the researchers experimented on different corn varieties and time of harvesting. They tried commercial hybrid and OPV corn types. It was found out that silk from commercial hybrid corn had a bitter after taste making it unpleasant to the taste buds. Hence, they focused only on using OPV corn types. The time of harvesting corn silk was also looked into. Corn silk harvested at an early stage (50-55 DAP) produces a lighter brown tea or juice. Its sweetness is on the average. If corn silk is harvested at a later stage (60-75 DAP), the tea or juice it produces is much sweeter and darker in color. Naturally, corn silk has a subtle, pleasant taste with a sweet aroma. To balance its sweetness and enhance its flavour, they used natural sweeteners such as honey added with a twist of lemongrass.

Corn Silk Harvesting

Corn silk can be harvested in two (2) ways. First, silk from green corn can be collected after harvesting or at 70-72 DAP. It can be directly pulled out from the corn when removing the corn husk. Second, corn silk from OPV Sweet Corn and OPV Glutinous can be harvested through cutting the protruding silk from the corn. Once the corn silk are collected, these can immediately be processed to make Maize Silky or can be stored in the freezer.

Processing the Corn Silk

Freshly harvested corn silk are carefully checked for impurities and washed thoroughly to assure its quality. Corn silk processing is just an easy task. You need to have a 100 gram of corn silk mix with 1 liter of purified water. Let it boil for 30 minutes with other natural flavour enhancers. It can produce three (3) 220 ml pouches. The concoction is cooled down to about 60 degrees Celsius before packaging into glass bottles or retortable pouches.

cleaning and boiling

Further, glass bottles used in the processing are sealed and pasteurized to eliminate bacteria and other harmful microorganism as it may help in prolonging shelf life. For retortable pouches, these are sealed and cooked in a retort machine for the same reasons. Although the shelf life of this product is still a research on progress, Maize Silky Sip can be stored three (3) to four (4) months under room temperature.

Why Corn Silk?

Health Benefits - Corn Silk has diuretic properties, treats Urinary Tract Infection (UTI) and keeps kidney stone at bay

Added Benefits - Its ingredients like honey and plant-based flavorings provide for additional antioxidants in the body

Additional Income for Farmers - Processing corn silk provides additional income for farmers because more parts of the corn is utilized

Corn Waste No More

After the successful product development, corn silk can be tagged as one of the corn parts giving additional income for corn growers. Researchers of CVRC were able to establish the cost of producing Maize Silky Sip which comes in three (3) different packaging. These include a 350 ml and 500 ml clear bottle and a handy 220 ml pouch. The production of 350 ml bottle will cost you Php 24.17 while 500 ml is at Php 33.50. The production of 220 ml pouch costs Php 18.75. Further, these production costs can be lowered when producing a bigger volume of product.

With the uniqueness of the product, it garnered the 3rd Best Innovative Product in the 13th National Technology Forum on August 8-11, 2017. This was held at the DA-Bureau of Agricultural Research(DA-BAR) in Quezon City. Aside from this, Maize Silky Sip also grabbed the attention of stakeholders during the 2017 National Corn Congress held at PICC, Manila.

. . .a little bit of history

Filipinos are fond of drinking coffee in between meals, after siesta hours, to keep them awake during graveyard shifts or a drink that spices up a little chitchat with friends. The aroma and the bittersweet taste of coffee seems to relax ones system while enjoying the company of others or savouring the solitude. Whatever the reason is, coffee plays a vital role in our day to day life.

Oftentimes, too much drinking of coffee would lead to irregular heartbeat of the heart or palpitation which gives an uneasy feeling. But don't worry, the researchers of Cagayan Valley Research Center (CVRC) successfully developed a corn-based coffee cereal drink through its research on the "Enhancement of Developed Food Products

"a taste of warmth with a story that goes way back" . . .

Cafe BAGGA

from CVRC Open Pollinated Varieties (OPVs) White and Pigmented Corn in Region 02". Through the assistance of DA-Bureau of Agricultural Research (DA-BAR), Cafe' Bagga is one of the OPV Corn-based products that was developed and enhanced through product development.

Basically, Café Bagga is an Ibanag coffee drink inspired traditionally consumed in the northern part of Isabela and Cagayan. Its name is derived from the Ibanag word "bagga" which means rice or "bigas" and café because it is a coffee. Don't get confused with the usage of the term "bigas" or rice since during the early times, people in Isabela regarded corn as their first rice due to its abundance in the province, hence the term. This drink is made from pan roasted purple and glutinous corn rich in protein, anthocyanin, and low in glycemic index. Its protein content is used by our bodies in building and repairing tissues. Anthocyanin according to researches, help reduce the risk of heart disease in women. Currently, the product is registered under the trademark name Maxi which was registered in the Intellectual Property Office (IPO)of the Philippines.

. . .warm & full

Furthermore, Café bagga underwent several adjustments to achieve its taste today. Researchers tried various preparation such as the time of roasting process and the combination of grits used. First, the combination of grits used include 100% flint corn but is hard to roast due to its hard covering.In using 100% glutinous corn, they observed that it is easier to cook compared to flint corn but most of the grits used puffed in the process of roasting. They also tried the combination of 50% flint and 50% glutinous corn and same result was observed in terms of the number of puffed grits during roasting. The experiment does not end here since they also tried the last combination which is 70% flint and 30% glutinous corn. Its result is promising since they achieved a lesser number of grits puffing during roasting.

On the other hand, they also tried different length of roasting time. Roasting of corn grits at 30 minutes resulted to a very strong taste while 25 minutes had a mild and bitter taste. The last length of time tested was 20 minutes which is not bitter neither has a strong taste. After these trials, the best combination was 70% flint and 30% glutinous roasted for 20 minutes.

Researchers wanted to ensure the safety of Café Bagga for human consumption. Samples of the product were subjected to microbial and shelf life analysis including its nutrition facts. These were tested by the Department of Science and Technology (DOST). Sources of raw materials are being sourced out to white corn growers of Enrile, Peñablanca, Amulung, Piat and Tuguegarao City in Cagayan including San Pablo, Sta. Maria, City of Ilagan and Sto. Tomas in Isabela. Most of these farmers were trained to practice Good Agricultural Practices (GAP) in their white corn production. Aside from this farmers, CVRC also identified two (2) processing partners such as Cabisera 18 Farmers Credit Cooperative in City of Ilagan, Isabela and Sta. Maria Green Ladies Organization in Isabela. They will be engaged in the adoption of technology and product commercialization.

. . .easy & affordable

In order to experience the reinvented traditional drink of Ibanags, you will be spending minimal amount of Php 75.00 per 100 gram pack which is good for 20 cups. Café Bagga is prepared through boiling of the contents of 100 gram pack in 3 liters of water for 30 minutes. This is best enjoyed with a dash of condensed milk which makes it creamier and tastier. If you are not a condensed milk lover, you might as well use the sugar and creamer combo depending on your preference.

Indeed, the traditional foods and drinks need not to be forgotten as we progress. What we can actually do is to improve, reinvent and enhance these traditional products through research and development activities, just like what the researchers of CVRC did to Café Bagga. Through this, we are not only saving our tradition but we are also helping our farmers to increase their income through value adding undertakings.


MANGI MAXI
Good food, Good health
CRACKNIC
CRUNCHY GLUTINOUS CORN BINATOT
CHEESE
Net Wt. 150g
Produced and Manufactured by:
DA-CAGAYAN VALLEY
RESEARCH CENTER (DA-CVRC)
City of Ilagan, Isabela
(CORN CAPITAL OF THE PHILIPPINES)
Assisted by:
DA-Bureau of Agricultural Research
Quezon City

CRACKNIC

Popping up the traditional Cornick

A popular snack food among Filipinos is cornick which has been existing since we were kids. In the United States and Peru, it is usually called corn nuts. This food snack is made from roasting or deep frying glutinous corn. In the Philippines, the famous cornick brand known as Chichacorn started as a family-business in Paoay, Ilocos Norte. It has become an "agri-tourism product" of the province and positioned in the market as a healthy snack food for tourists and locals. "Boy Bawang" is another successful brand of cornick which is manufactured by KSK Food Products and popularized different flavours such as garlic, cheese, chili and barbecue. These are just the only few successful food processors of cornick in the Philippines which is a proof that it is a lucrative business for anyone who would want to venture in processing cornick.

A lot of innovations have been incorporated to cornick since 1950's. When this was first introduced by Halloway, the most popular brand of CornNuts in the US, the nuts were as big as a quarter coin and hard to the teeth when cracking it in your mouth especially to kids and elders. This has inspired the company to try several corn varieties overseas to conform into their ideal corn nuts which is smaller and crunchier.

This is also the same premise of our agricultural researchers at Cagayan Valley Research Center (CVRC) spearheaded by Mr. Roynic Aquino and Ms. Vanessa Calderon thru the Food Processing Center of CVRC managed by Ms. Sheryl de Guzman. With this thought in mind, Cracknic was conceptualized by using a special variety of glutinous corn, the IES Glut 4 developed by CVRC. IES Glut 4 is known for its waxy characteristic that it pops when fried, easier to cook and retains its original sweet taste even after deep frying as compared to other white corn varieties tested for Cracknic. This variety is usually sold as green corn too in the market because of its sweet taste.

Cracknic is uniquely processed compared to the traditional way of processing cornick. Instead of using lime to remove the outer skin of the corn, milling was done instead to partially remove the pericarp or the corn's hard outer skin. The milled corn when cooked produces a cracked cornick, thus, the origin of the name Cracknic.

The milled corn (IES Glut 4) was then boiled for two (2) hours until the outer skin has obviously separated itself in its endosperm. Next, it was washed to remove the skin and then boiled for 4-6 hours until the corn kernels turn soft. After that, it was put in a dehydrator for two (2) hours and then air dried for 12-24 hours. Sun drying was also a method used in the trial, however, it produced a darker color of the corn kernels when cooked compared to using the dehydrator.

Finally, it is ready for cooking. Cracknic is then deep fried for 15-20 seconds only. Prior to doing this, the oil must be really hot. An indicator that the oil is already good for frying the Cracknic is when you see a faint smoke from the oil. Researchers have had a sensory evaluation of Cracknic and it was concluded that it was flavourful and more favored by the panellists compared to the control (cornick) at a t-test value of 16.70 at 5% level of significance.

This IPO-registered food product is under the Mangi Maxi brand. Cracknic is packed in a polyethylene pouch at 100 grams to keep it fresh and sold at Php 25.00/100 grams. Nutritional analysis of Cracknic and shelf-life on its current packaging is ongoing. If a food processor / investor is interested in making Cracknic as their business, CVRC will award this product and train them for free. A one year production of Cracknic will produce 142, 560 packs with a net income of Php 673, 404.38 and a rate of return on the initial investment at 93.33%.

Acknowledgement

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- Office of the Regional Agriculture and Fisheries Information Section Chief

Department of Agriculture - Bureau of Agricultural Research

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"Masaganang Agrikultura, Masaganang Bansa"

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