

SILAG (*CoryphaelataRoxb*) FRUIT NUTRICEUTICALS AND PRODUCT DEVELOPMENT

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ABSTRACT: This study determined the impact of *CoryphaelataRoxb* fiber industry and its fruit nutraceuticals. Results of the survey and focus group discussion showed that majority (62%) of those involved in the industry in San Juan, Ilocos Sur are women, and that income generated from it is barely enough for their family. Almost all of them (97.63%) have P5,000.00 and below as an average monthly income. Profits derived from products of a bundle of buntal fiber are PhP175 (fans), PhP100 (mats), PhP25 (hats), and PhP100 (bags). Sales from fresh fruits unpeeled is PhP100, and PhP600 from peeled ones. Analysis of the fruit nutraceuticals by DOST showed the following: ash, 1.00g/100g; moisture content, 48.64 g/100g; crude protein, 0.22 g/100g; crude fat, 1.37g/ 100g; sodium, 16.25 mg/100g; potassium, 58.39 mg/100g; iron, 0.06 mg/100g. Value adding to the fresh fruits like preserving it in sugar syrup brings more profit, about three times more. Mean evaluation of the products developed from the fruit is very desirable.

Key words: *CoryphaelataRoxb*, fruit nutraceuticals, silag, buntal, buri, Ilocos Sur

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INTRODUCTION

Silag (*Coryphaelata*Roxb.) is a palm from which three kinds of fibers, namely, buri, raffia, and buntal are obtained. Also known as buri palm (English), the tree has large fan-shaped leaves with stout petioles ranging from two to three meters in length. The palm reaches a height of 20 to 40 meters and its trunk attains a diameter of one to 1.5 meters. Of the fibers derived the leaves, buntal is the one with the most impact in the market. The tree is a slow growing palm species that grows in the lands of India, Malaysia, Philippines, New Guinea and Northeastern Australia. In other tropical countries, the silag (in Iloko) or buri plant, *Coryphaelata*, is more commonly known as Gebang Palm, or Cabbage Palm. It is a large imposing fan palm with fronds between 4m and 6 m across that grows along watercourses, floodplains and grasslands. The tree's germination is between 1-3 years and would reach its maturity from 25th to 40th years. Like all *Corypha*, the tree only flowers towards the end of its lifetime but when it does flower it sends up a massive inflorescence up to 5m high, and with up to 1 million flowers. At about 5-7 years, its top leaves can be harvested and made into various finished products such as bags, fan and mats. It is noted by the local residents of San Juan, Ilocos Sur, Philippines that the buri palm tree has been in their locality since time immemorial and became notably as their source of living. The production of buntal fiber in the Philippines started in Sariaya and Tayabas, Quezon while the buntal hat weaving industry began in Baliuag, Bulacan way back during the pre-war years. The introduction of the hat weaving industry turned half of the hat weavers in Baliuag and neighboring barrios to the making of buntal hats instead of bamboo hats. The Philippines was then considered a major exporter of buntal fiber. The growing demand for buntal fiber in the international market resulted to a supply shortage in the domestic market. Local manufacturers faced stiff competition with exporters in sourcing their raw material requirements. They claimed that foreign buntal hat makers were utilizing imported Philippine buntal fiber. To support the then booming local hat weaving industry, the government passed Republic Act No. 4666 known as Buntal Export total Ban Law of 1967. Residents of San Juan, Ilocos Sur, the acclaimed buri capital of the Philippines, have been into the buntal fiber industry as far back in time as they can remember. The processed buntal fibers are made into hats, bags, mats. As to the silag fruit, the San Juan residents recall that they eat and sell the fresh fruits only, and none of them have ventured into value adding the fruits other than making them into "tuba," a fermented drink into other products. This study, therefore, looked into the impact of the buntal fiber industry to the people of San Juan, Ilocos Sur, the fruits' nutraceuticals (fortified food or dietary supplement that provides health benefits in addition to its basic nutritional value) and value added products and their acceptability. This is with the hope of augmenting income of those people that depend on the *Coryphaelata*Roxb fiber industry.

FRAMEWORK OF THE STUDY

Before World War II, buntal fibers were traditionally woven only into hats and bags in a circular strip weaving. However, in the introduction of loom weaving in the late '70s, manufacturers were able to innovate and create new products such as shoes, slippers, coin purses, pen holders, window blinds, attache cases, table accessories, wall papers, desk organizers, screen dividers, decorative pillows and lampshades. Buri, on the other hand, is made into braids and woven into various fibercraft products such as hats, bags and placemats. Raffia

fiber is loom-woven into fabrics for wall coverings and upholstery material. Raffia fiber is also made into hats, bags, placemats, mats, folders, portfolios, shoes, slippers, "hula' skirts, other handicraft items, and as tying, decor and wrapping material. Buri (English) or silag (Iloko) is also a good source of food. The pith or "ubod" is made into salad, pickles and other recipes while young fruits are eaten raw and pounded for starch. In some regions of the Philippines, people extract "tuba," a fermented drink from the fruits and sometimes into vinegar. Farmers, traders, processors and exporters comprise the major sectoral groups of the buri industry. As of December 1999, there are 2,187 farmers engaged in the production of buntal and raffia fibers nationwide. There are now 10 licensed buntal traders, two traders/exporters, one grading and baling establishment and 14 processors nationwide. For raffia, there are 20 licensed traders/exporters and 34 traders while the number of licensed processors totaled to 17. These processors have introduced innovations in various buntal and raffia products and were able to expand their production capacity to meet the demand of the local and foreign markets. The table below shows the land area planted with buri palm trees in some regions in the Philippines:

REGION	NO. OF HECTARES
Ilocos Region	326.4
Southern Tagalog	1,111.5
Bicol Region	40.0
Western Visayas	2,000.0
Central Visayas	70.2

Aside from the buri/buntal fiber industry of the people of San Juan, Ilocos Sur, the fruits of the palms tree there are only eaten or sold raw.

METHODOLOGY

This study made use of the descriptive method of research using the survey and focus group discussion methods. Two hundred eleven respondents were taken from about a thousand involved in the buri industry of *Coryphaelata*Roxb. Fresh peeled fruits were bought from the source and developed into sugar-preserved bottled products. One hundred students chosen using the quota-sampling method were taken as taste testers of the products developed.

RESULTS AND DISCUSSION

Socio-demographic Profile of the Respondents. Majority (62%) of those involved in the industry in San Juan, Ilocos Sur are women, belonging to age range of 45-56; 40.76% of them are elementary graduates; 30.81% are high school graduates; mostly (84.36%) are married with family members of 5-7, and 94.7 % of them have farming as their other source of income; 97.63% of them have P5,000.00 and below as their average income;50% have been in the business for 20 years and the other 50% have been in the business for 10 years;83.87% have 5-8 workers and 23.7% have 20 workers; 94.79% of those in the business said that they personally own the business while only 5.21% said, the business is family owned.

Income Derived from *Coryphaelata*'s Buntal Fiber Industry and Fruit Sales.
 Presented in the following Tables 1a and 1b are the sales and profits derived from the buntal fiber and fruit sales of *Coryphaelata*, respectively:

Table 1a. Sales and Profits from the Buntal Fibers

Fiber Industry	A. Materials/Production Cost	B. Output/ Sales	C. Net Profit (B – A = C)
a. Fans	1 bundle Buntal fiber = P50 1 pck Dye = P25 Firewood = P50 Total = P125	20 fans x P15 @ = P300	P175.00
b. Mats	2 bundles Buntal fiber = =P100 2 pcks Dye = P 50 Firewood = P 50 Total = P125 (Tis data, Total =125 might have been misplaced here?)	1 mat = P300.00	P100.00
c. Hats	1 bundle Buntal fiber = P50 1 pck Dye = P25 Firewood = P50 Total = P125	5 hats x P30 = P150	P25.00
d. Bags	1 bundle Buntal fiber = P50 2 pcks Dye = P50 Firewood = P50 Total = P150	5 bags x P50@ = P250	P100,00

Table 1b. Sales and Profits from Fresh *Coryphaelata* fruits

Fruit Sales	A. Materials/ Production Cost	B. Output/ Sales	C. Net Profit (C= B-A)
Fresh	25 kls fresh fruits =PhP300	A. Unpeeled = PhP400 B. 15 kls of peeled fruit = PhP900	A. PhP100 B. PhP 600

Respondents could have the following profits from the buntal fibers, PhP175 from fans, PhP100 from mats, PhP25 from hats, and PhP100 from bags. Whereas, they could have only the following profits from the fresh fruit sales: PhP100 from 25 kls of unpeeled ones, and PhP600 from 15 kls of the peeled ones.

Impact of the *Coryphaelata* Industry. On the income derived from the buri/buntal fiber industry, some of the respondents could afford services of the private hospitals and medicines needed by their families. Majority further told that the industry helped them send their children to school. Likewise, with the industry, wage jobs are available and out of school youths are employed. Through time, diversified and creative handicraft industries were established, and free standing stores were established. However, almost all of the respondents grieved that what they earn from the fiber industry and fruit sales of *Coryphaelata* is barely enough for their existence.”

Silag Nutriceuticals and Product Development. Table 2 shows the nutriceuticals of the silag fruit:

Table 2. Nutriceuticals of the Silag (*Coryphaelata* Roxb) Fruit

Test Method	Result
Ash	1.00g/100g
Moisture Content	48.64 g/100g
Crude Protein	0.22 g/100g
Crude Fat	1.37g/ 100g

Sodium	16.25 mg/100g
Potassium	58.39 mg/100g
Iron	0.06 mg/100g

Nutriceutical analysis showed that the *Coryphaelata* fruit has 1.00g/100g of ash; 48.64 g/100g of moisture content; 0.22 g/100g of crude protein; 1.37g/ 100g of crude fat; 16.25 mg/100g of sodium; 58.39 mg/100g of potassium; and 0.06 mg/100g of iron. The Regional Standards & Testing Laboratory DOST Region I, San Fernando, La Union gave the following nutritional facts about the silag fruit:

Nutrition Facts	
Serving Size ½ cup. (85 g)	
Serving per Container 6	
Amount Per Serving	
Calories 170	Calories from Fat 10
% Daily Value*	
Total Fat 1 g	2%
Saturated Fat	
Trans Fat	
Cholesterol	
Sodium 10 mg	0%
Total Carbohydrate 41 g	14%
Dietary Fiber	
Sugars	
Protein <1 g	
Vitamin A %	Vitamin C %
Calcium %	Iron 0% • Potassium 2%
*Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs.	
	Calories 2,000 2,500
Total Fat	Less than 65g 80g
Sat Fat	Less than 20g 25g
Cholesterol	Less than 300mg 300mg
Sodium	Less than 2,400 mg 2,400mg
Total Carbohydrate	300g 375g
Dietary fiber	25g 30g
Calories per gram:	
Fat 9 • Carbohydrate 4 • Protein 4	

Value Adding to *Coryphaelata* Fruits and Acceptability of the Products Produced.
Value adding to the fresh fruits of *Coryphaelata* and calculating profits derived from the unpeeled, peeled, and processed fruit sales showed that there is only about PhP100 profit from the unpeeled, PhP600 from the peeled, and PhP1,810 from the processed or preserved in sugar syrup fruits, which almost three times more from that sales of the peeled fruits.

Table 3. Sales and Profit of the *Coryphaelata*Fruits

Quantity Raw Fruit	Marketing Strategy/Options		Profit
25 kg	Unprocessed		(C=B-A)
	A. From Site Price	B. Market Price	
	Unpeeled		PhP 100.00
	PhP 300.00	PhP 400.00	
	Peeled Fruit		PhP 600.00
PhP 300.00	Reduced to 15 kg 15 kg x PhP 60/kg= PhP 900.00		
15 kg	Processed		PhP 1,810.00
	Capital		
	PeeledFruit PhP 900 Refined sugar 30 kg PhP52/kg PhP1560 Firewood PhP 100 LaborPhP 250 Bottles 66 pcs PhP10/pc PhP 660 TOTAL PhP 3,470	Sales Estimated quantity of processed product 45 kg (45000 g) 45000g/680 g per bottle = 66 bots@ PhP 80/bot 66 bots x PhP80= PhP 5,280	

A better look of the profits gained from the sets of sales of the fruit is shown in Figure I.

Figure 1. Sales and Profit of *Coryphaelata*fruits

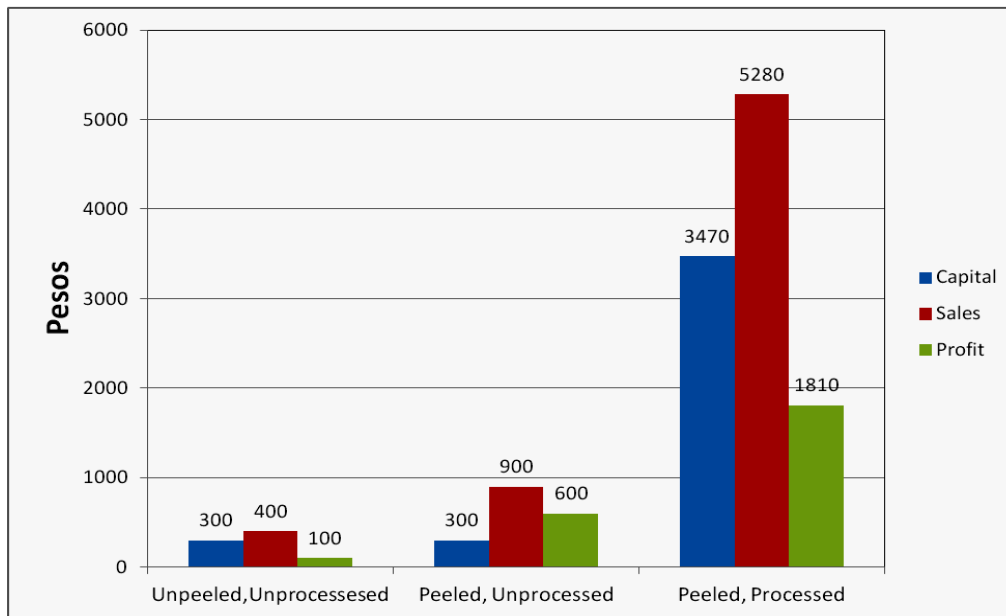


Table 4a shows the summary of the taste tests made on the sugar-preserved fruits. In all the parameters, appearance, taste, texture overall acceptability, the means of the evaluation of the taste testers have qualitative description of very desirable.

Table 4a. Summary Table of the Evaluation of *Coryphaelata* Fruit Product (Prepared in Sugar Syrup)

Parameters	Mean	Qualitative Description
Appearance	4.92	Very Desirable
Taste	4.89	Very Desirable
Texture	4.98	Very Desirable
Overall Acceptability	4.63	Very Desirable

Prepared as a component of a fruit salad (as a substitute of kaong), the means of the evaluation of the taste testers in these parameters, appearance, taste, texture, and overall acceptability are all very desirable (Table 4b, below)

Table 4b. Summary Table of the Evaluation of *Coryphaelata* Fruit Product (Prepared as Fruit Salad)

Parameters	Mean	Qualitative Description
Appearance	4.90	Very Desirable
Taste	4.90	Very Desirable
Texture	4.85	Very Desirable
Overall Acceptability	4.79	Very Desirable

CONCLUSIONS

Majority(62%) of the those involved in the industry in San Juan, Ilocos Sur are women, and that income generated from it is barely enough for their family. Almost all of them (97.63%) have P5,000.00 and below as an average monthly income. Profits derived from products of a bundle of buntal fiber are PhP175 (fans), PhP100 (mats), PhP25 (hats), and PhP100 (bags).Sales from fresh fruits unpeeled is PhP100, and PhP600 from peeled ones. Analysis of the fruit nutraceuticals by DOST showed the following: ash, 1.00g/100g; moisture content, 48.64 g/100g; crude protein, 0.22 g/100g; crude fat, 1.37g/ 100g; sodium, 16.25 mg/100g; potassium, 58.39 mg/100g; iron, 0.06 mg/100g. Value adding to the fresh fruits like preserving it in sugar syrup brings more profit, about three times more. Mean evaluation of the products developed from the fruit is very desirable.

RECOMMENDATIONS

The researchers have recommended that value adding the fresh fruits of *Coryphaelatalike* preserving it in sugar syrup could augment income of those people that depend on the buri/buntal fiber industry. It is further recommended that a follow up study should be conducted on the sustainability of the palm considering that it is a slow growing species, and to find out the viability of the present supply to the demands of the consumers. Furthermore, people involved in the buri industry and in the selling of the fruits and “ubod” should be properly educated on the conservation and preservation of the palm to prevent it from being endangered.

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Food Product Evaluation Form (Based on Measuring Success with Standardized Recipes).