

Fruits of the Future: Characterization of Indigenous Fruits of Cagayan Valley

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Asia Pacific Journal of
Multidisciplinary Research

Vol. 6 No.4, 52-59

November 2018 Part II

P-ISSN 2350-7756

E-ISSN 2350-8442

www.apjmr.com

CHED Recognized Journal

ASEAN Citation Index

Date Received: March 2, 2018; Date Revised: November 12, 2018

Abstract - To characterize indigenous and wild fruits in the region, fruits specimens and samples were collected from different areas of the region. These samples were subjected to laboratory analysis at the DOST laboratory for the nutrient composition, phytochemical and pharmacological characteristics of the fruits. The characteristics of the plants, their fruits and their seeds were determined using the Characterization Guide of the Fruits Technical Working Group of the National Seed Industry Council, Bureau of Plant Industry.

The fruits included in the study are, in their local names,,: pulit(*Microcos stylocarpa* (Warb.) Burret), bagobo (*Diplodiscus paniculatus*), limuran(*Calamus ornatus* Blume var. *philippinensis*.Becc.), litoko(*Calamus manilensis* Wendl.), palali(*Dillenia philippinensis*), bayoyo(*Antidesma ghaesembilla* Gaertn), dagwey(*Saurauia subglabra* Merr.). The nutrient composition included moisture, ash, total fat, crude protein, carbohydrates, iron, calcium and sodium. The phytochemical composition of the fruit samples were in four parameters: flavonoids, antraquinones, tannins and saponins. The palali fruit is positive in flavonoids and antraquinones while negative in tannins and saponins. The bagobo seeds are positive only in saponins while negative in flavonoids, antraquinones and tannins. The pulit fruit is positive in flavonoids, antraquinones and saponins while negative in tannins. The litoko fruit is positive in flavonoids and antraquinones while negative in tannins and saponins.

The pharmacological characteristics consisted of measures of zones of inhibition for *Staphylococcus aureus* and *Staphylococcus epidermidis*. The data show that the two species of bacteria tested were more susceptible to Palali fruit extract than to the Pulit fruit extract.

Keywords: indigenous fruits, wild fruits, nutrient composition, phytochemical, pharmacological

INTRODUCTION

With the increasing needs of the increasing population, there is a need to explore alternative food sources and raw materials for commercial products. The nutrient contents and other characteristics have to be determined as basis for exploring ways by which they can be processed into products.

The rural areas of Cagayan Valley especially along the Sierra Madre range are rich with a diversity of indigenous fruit-bearing plants growing in the wild. The rural folks have been gathering and using these local fruits in the traditional use as they learned from their parents. Some of these fruits in their local names are: *pulit* (*Microcos stylocarpa* (Warb.) Burret), *bagobo* (*Diplodiscus paniculatus*), *limuran* (*Calamus ornatus* Blume var. *philippinensis* Becc.), *litoko* (*Calamus manilensis* Wendl.), *palali* (*Dillenia philippinensis*), *bayoyo* (*Antidesma ghaesembilla* Gaertn), *dagwey* (*Saurauia subglabra* Merr.), and

many others These fruits are gathered by rural folks from the wild during the fruiting season. They are commonly gathered for family consumption while some of them are sold in the local market. However, the potentials of these fruits for other commercial uses have not been fully explored.

There is a need to explore ways by which the fruits gathered from the wild can be processed into commercial products so they can be available not only during their fruiting season.

The planting of these indigenous fruit-bearing plants can help in the conservation of biodiversity and address the problem of mitigating climate change. It is therefore important to study the botanical characteristics of the fruit-bearing plants as basis for growing and domestication of the said plant species from the wild. Characterization of these plants can help address the need to grow crops that are resilient to

climate change. These plants will be saved from being lost in the future generations.

Furthermore, determining the phytochemical and pharmacological characteristics of the wild fruits will be basis for exploration and development of products from them.

OBJECTIVES OF THE STUDY

Generally, the study aimed to help in biodiversity conservation and to explore and utilize alternative food sources from indigenous fruits within the Cagayan Valley Region.

Specifically, the study aimed to find out the botanical and agronomic characteristics of the indigenous fruit-bearing plants in the region, and determine the nutritive, phytochemical and pharmacological characteristics of the indigenous fruits

On the Phytochemical Properties of Fruits.

Some of the important phytochemical contents of fruits are flavonoids, anthraquinones and saponins.

On the health benefits of Flavonoids, they have antioxidant activity, anti-allergic, anti-cancer, antioxidant, anti-inflammatory and anti-viral. The flavonoids quercetin is known for its ability to relieve hay fever, eczema, sinusitis and asthma. Epidemiological studies have illustrated that heart diseases are inversely related to flavonoid intake, meaning more flavonoid intake, less heart diseases. Studies have shown that flavonoids prevent the oxidation of low-density lipoprotein thereby reducing the risk for the development of atherosclerosis.

Red wine contains high levels of flavonoids, mainly quercetin and rutin. The high intake of red wine (and flavonoids) by the French might explain why they suffer less from coronary heart disease than other Europeans, although their consumption of cholesterol rich foods is higher. Many studies have confirmed that one or two glasses of red wine daily can protect against heart disease.

Soy flavonoids (isoflavones) can also reduce blood cholesterol and can help to prevent osteoporosis. Soy flavonoids are also used to ease menopausal symptoms.

For use as biopesticide, in a study by Suganthi and Sakthivel [1], flavonoids was found most effective compared to the other tested agents against tobacco caterpillar, *Spodoptera litura* Fab. Infesting *Gloriosa superba* (Linn.)

Singh and Kumar [2] tested the flavonoids extract from three plants, namely *Withania somnifera*,

Euphorbia hirta and *Terminalia chebula* for their antifungal potential against plant pathogenic fungi *Fusarium oxysporum*. Results revealed that the bound flavonoid of root of *W. somnifera* and free flavonoids of stem bark and fruits of *T. chebula* totally inhibited spore germination of the fungi (100%). The study suggests that both alkaloids and flavonoids extracts of selected plants have potential antifungal properties for the control of diseases of various crops.

Since anthraquinone contributes to the coloring pigment of plants, fungi and insects, the compound is used commercially to manufacture dyes. In powdered form, anthraquinone exhibits a color that ranges from gray to yellow and green.

Other commercial applications for anthraquinone is its use as a catalyst in the production of wood pulp and paper. A derivative called 2-ethylanthraquinone is used to manufacture hydrogen peroxide. Anthraquinone has a long history of use as a bird repellent and is used to deter the presence of geese in particular. This action may be due to the laxative properties that the compound possesses when introduced as treated birdseed or grass.

For use as a biopesticide, isolated anthraquinones were found highly lethal to larvae of *Culex pipiens pallens*. The results suggest that anthraquinones can be useful as biopesticides for the biological control of mosquitoes [1].

For its medicinal uses, Anthraquinone is used as a laxative. It has been shown effective at speeding up bowel movements in those with constipation. Anthraquinone also reduce inflammation in arthritis patients, inhibit the growth of cancer cells. It is also used in the treatment of arthritis [2].

Uses of Saponins. On the medicinal uses of saponin, it is being promoted commercially as dietary supplements and nutraceuticals. It reduces blood cholesterol levels and reduces the risk of cancer. It can be found in around 100 different plant families, including food sources such as beans and legumes. In medical experiments, it was also found to possess antispasmodic activity in guinea pigs.

Saponins extract from neem plants (*Azadirachta indica*) was effective as feeding repellent against red flour beetle (*Tribolium castaneum*) [2]. Another study revealed that saponic extract from *Cestrum parqui* (Solanaceae) has pesticide potential against insects *Schistocerca gregaria*, *Spodoptera littoralis*, *Tribolium confusum*, and *Culex pipiens* [3].

METHODS

The study started with a survey to identify and list indigenous fruits used in rural communities. Respondents were old folks/rural folks from highland barangays and communities of Gonzaga, Cagayan, Sta. Teresita, Cagayan and Sta. Fe, Nueva Vizcaya, Philippines. Local names of the fruits, their uses and other characteristics of the fruits and the plants were asked from the respondents.

Seeds were gathered and propagated at the CSU Gonzaga campus. Seedlings were also gathered and grown in the campus.

Fruits were gathered during their fruiting season and analyzed through the DOST laboratory.

The characteristics of the plants, their fruits and their seeds were determined using the Characterization Guide of the Fruits Technical Working Group of the National Seed Industry Council, Bureau of Plant Industry.

The method of laboratory analysis (by the DOST Laboratory) on the fruits are as follows:

1. Moisture. The accurately weighed sample was placed in aluminum dish and dried at 105 degrees Centigrade in an oven for 1 hour. The dish with residue was weighed to determine weight loss as moisture following Official method of Analysis (OMA-AOAC 925.23)
2. Crude Protein. A suitable amount of sample was digested at 410 degrees Centigrade with sulphuric acid using copper sulphate-potassium sulphate as catalyst. The digested sample was diluted with water. Forty percent sodium hydroxide was added to liberate ammonia and subsequently steam distilled using Kjeltac Distilling apparatus. The liberated ammonia was collected in Boric acid receiver solution then titrated with standard acid.
3. Ash. Suitable amount of sample was charred on a hotplate and burned to ash in a muffle furnace at 550 degrees Centigrade until the residue is white or nearly white
4. Total Fat. Suitable amount of dried sample was extracted with solvent using soxhlet for 4 hours at solvent condensation rate of 5-6 drops. Solvent used was evaporated and fat residue was dried at 100 degrees Centigrade for 30 minutes, cooled and weighed following Official method of Analysis.
5. Carbohydrates. Carbohydrate was computed from 100 minus the sum of total fat, crude protein, ash and moisture.
6. Sodium, Iron, Calcium. Suitable amount of sample was charred on a hotplate and burned to ash in a

muffle furnace at 550 degrees Centigrade until the residue is white or nearly white. Ash is dissolved in diluted acid and sodium/iron/calcium were determined through atomic absorption spectrophotometer.

On the Method of Analysis of the Phytochemical Composition of the Fruit Samples(DOST Laboratory), the fruit sample was soaked in 80% ethanol and the solution was concentrated. The extract was evaporated to incipient dryness and tested for the presence of the stated phytochemicals.

RESULTS AND DISCUSSION

Some Indigenous and Wild Fruits in the Region

The survey resulted in the identification of some indigenous and wild fruits found in the Cagayan Valley Region (Table 1).

Table 1. Some Identified Indigenous Fruits

Local Name	Common Name	Scientific Name	Location/Habitat
1.Palali(Iloco)	Catmon	<i>Dillenia philippinensis</i>	Cagayan and throughout the country
2.Bagobo	Bagobo	<i>Diplodiscus paniculatus</i> Turz.	Gonzaga and Sta. Teresita, Cagayan
3.Pulit, Kamuling, Aporong (Filipino) Damak-damak (Brunei and Malaysia)	Pulit	<i>Microcos stylocarpa</i> (Warb.) Burret	Forests along Sierra Madre, Sta. Clara, Gonzaga, Cagayan
4.Litoco	Rattan Bayabong	<i>Calamus manillensis</i> Wendl.)	Sta. Fe and Kayapa, Nueva Vizcaya
5.Limuran	Rattan Kalapi	<i>Calamus ornatus</i> Blume	Gonzaga, Cagayan and along Sierra Madre range
6.Dagwey	Weed tree	<i>Saurauia subglabra</i> Merl.	Imugan, Sta. Fe and Kayapa, Nueva Vizcaya
7.Bayuyu	Black currant tree	<i>Antidesma ghaesembilia</i>	Caroan, Gonzaga, Cagayan and other coastal towns of Cagayan

On Plant Characteristics

1. Bagobo (*Diplodiscus paniculatus*) is not selective in its growing area. Bagobo trees are found in mountain slopes and along river banks, among thick forests and in open areas. The leaves are elongated, with pinnate venation,
2. Pulit (*Microcos stylocarpa* (Warb.) Burret) grows in forest areas at low and medium altitudes. It grows up to 15 m tall and 30 cm in diameter. Its leaves have pinnate venation, lanceolate to oblong, 12-18(-25) cm × 5 cm. Its fruits are obovoid drupe, 2-3 cm long, green when young, yellow when ripe [4]
 - a. The fruit pulp is edible and of good flavor. The wood is used for the manufacture of household utensils and agricultural implements.
3. Palali or Catmon (*Dillenia philippinensis*) thrives on well drained soil. Its leaves are broad and abundant, pinnately venated, 15 centimeters long and 12 centimeters wide. Palali trees are good shades during hot weather.
4. Litoco (*Calamus manilensis* Wendl.) is a species of rattan, is a climbing palm of the genus *Calamus* of tropical Asia, having long, tough, slender stems. It is known by its scientific name *Calamus manilensis*.

The name Rattan is derived from the Malay term *rotan*. It has about roughly 600 species of palms in the tribe Calameae (from the Greek '*kálamos*' which means reed), native to tropical regions of Africa and Asia [5] and [6].

Litoco belongs to the rattan family. It starts bearing fruits when it reaches seven years of age. It is found in the forests of Nueva Vizcaya, but it has been grown commercially in different parts of the country [5].
5. Dagwey is found in the highlands of Nueva Vizcaya. It is known by its common name weed tree [7] and scientific name *Saurauia subglabra* Merl.. Dagwey trees can grow to a height of 15 meters when mature. Its leaves are long with pinnate venation [8] and [9]. Its fruits are round and gathered for food by the people of the province [9]. The fruits are eaten raw but can be processed into jam and vinegar [10].
6. Bayuyu or Binayuyu (*Antidesma ghaesembilla* Gaertn) is a semi-deciduous tree or shrub that belongs to the family Phyllanthaceae and known by its common name Black currant tree. It is found

along seashore communities of Cagayan. Its fruits are used as food. It is also used by B'laan tribes in the southern part of the Philippines, not only as food but also as cure for stomach ache and to help lower blood sugar. It has anti-oxidant property and hypoglycemic effect.

Nutrient Composition of Fruit Samples (Table 3)

Palali (*Dillenia philippinensis*) fruits are commonly eaten raw with some salt or bagoong. Because of its sour taste, it is also used as ingredient for cooking dishes/recipes like sinigang.

Because Palali is a juicy fruit, it has a moisture content of 90.69 g/100g. It is notable that although it is has a generally sour taste, it has high Carbohydrates content of 7.17 g/100g. It has total fat content of 1.00 g/100g, crude protein of .64 g/100g, and ash content of .50 g/100g. It has a calcium content of 92.20 ug/g, sodium content of 42.90 ug/g, and iron content of 1.95 ug/g.

Bagobo (*Diplodiscus paniculatus*) trees grow in the wild. Its fruits are commonly gathered by people near forest areas. The seeds are commonly cooked by boiling. A boiled Bagobo seed has a starchy sweet taste, like the taste of boiled peanut.

When boiled, bagobo seed has a carbohydrates content of 59.86 g/100g, ash content of 12.91 g/100g, crude protein content of 11.91 g/100g, total fat content of 7.99 g/100g and moisture content of 7.33 g/100g.

A bagobo seed is high in calcium content with 3,721.79 ug/g. It has a sodium content of 329.40 ug/g and iron content of 120.97 ug/g.

Pulit fruits are gathered and eaten raw with some salt. The fruit is juicy and has a generally sour taste. It has a moisture content of 78.56 g/100g, with carbohydrates content of 15.41 g/100g, crude protein of 2.19 g/100g, total fat content of 2.18 g/100g and ash content of 1.66 g/100g.

The pulit fruit also has high calcium content of 295.42 ug/g, sodium content of 118.34 ug/g and iron content of 8.71 ug/g (Table 2).

Litoco (*Calamus manilensis*) belongs to the rattan family. Litoco fruits are commonly eaten raw, some people eat it with a pinch of salt.

Litoco fruit has a moisture content of 78.47g/100g, Carbohydrates content of 19.55 g/100g, sodium content of 8.48 mg/100g, ash content of 1.44 g/100g, crude protein content of 0.35 g/100g, total fat content of 0.19 g/100g, and iron content of 0.17 mg/100g.

Table 2. Characterization of the Indigenous Fruits

PARAMETERS	BAGOBO (<i>Diplodiscus paniculatus</i>)	PULIT (<i>Microcos stylocarpa</i> (Warb.))	CATMON (<i>Dillenia philippinensis</i>)	LITOCO (<i>Calamus manilensis</i> Wendl.)	DAGWEY (<i>Saurauia subglabra</i> Merl.)
1.Plant/Tree Characters					
Height	5 m or taller	4 m or taller	3 m or taller	10 m or longer, a climbing palm	Up to 15 m tall
Canopy Spread	Erect	Erect	Spreading	Spreading	Spreading
Harvest season	May-July	April-June	May-August	August- September	October- December
Regularity of bearing	Annual	Annual	Annual	Annual	Annual
Yield	25 kg or more of fruits depending on tree size	10 kg or more of fruits depending on tree size	50 kg or more of fruits depending on tree size	50 kg or more	50 kg or more depending on tree size
2. Fruit					
2.1 Whole fruit					
2.1.1 Size					
Weight	10-20 grams	12 grams	50 grams	15-20 grams	
Length	16-20 mm	16-20 mm	40 mm	20-25 mm	
Width	16-20 mm	12 mm	40 mm	20-25 mm	
Thickness	16-20 mm	12 mm	40 mm	20-25 mm	¾ to 1”
2.1.2 Shape	Round	Avocado shape	Round	Round	Round
2.2 Peel					
Color	Brown	Green when young, yellow when ripe	Green	Yellow	yellowish when ripe; Green when unripe
Texture	Rough	Smooth	Smooth	Rough	Smooth
Thickness	1 mm	.5 mm	3 mm	2 mm	
2.3 Flesh					
Thickness	16-20 mm	12 mm	35 mm	20-25 mm	
Color	Cream	White	Light green	Cream	Cream
Texture	Firm	Firm	Smooth	Soft	
Juiciness	Dry	Juicy	Juicy	Juicy	Juicy
Fibers	Scanty	Plenty	Plenty	Scanty	Scanty
Aroma	None	None	None	Mild	Mild
Flavor	Somewhat sweet	Sour	Sour	Sweet Sour	Sweet sour
Edible portion	99%	99%	90%	85%	80%
2.4 Seed					
Number	1	1	5 or more	3	hundreds
Size	16-20 mm	12 mm			Tiny
Weight	25 grams	12 grams		5 grams	
Total weight	25 grams	12 grams		5 grams	
Individual weight	25 grams	12 grams		5 grams	
Length	16-20 mm	16-20 mm	5 mm	7-10 mm	
Width	16-20 mm	12 mm	3 mm	5-7 mm	
Thickness	16-20 mm	12 mm	1 mm	3-5 mm	
Shape	Round	Avocado shape	Oblong	Oblong	

Table 3. Result of Laboratory Analysis on the Nutrient Composition of Fruit and Seed Samples

Name of Fruit	Parameter	Result	Method Used
1. Palali Fruit (<i>Dillenia philippinensis</i>)	Moisture (g/100g)	90.69	Gravimetric
	Ash (g/100g)	.50	Gravimetric
	Crude Protein (g/100g)	.64	Steam Distillation
	Total Fat (g/100g)	1.00	Soxhlet Extraction
	Carbohydrates (g/100g)	7.17	By computation
	Iron (ug/g)	1.95	FAAS
	Calcium (ug/g)	92.20	FAAS
	Sodium (ug/g)	42.90	FAAS
2. Bagobo Seeds (<i>Diplodiscus paniculatus</i>)	Moisture (g/100g)	7.33	Gravimetric
	Ash (g/100g)	12.91	Gravimetric
	Crude Protein (g/100g)	11.91	Steam Distillation
	Total Fat (g/100g)	7.99	Soxhlet Extraction
	Carbohydrates (g/100g)	59.86	By computation
	Iron (ug/g)	120.97	FAAS
	Calcium (ug/g)	3,721.79	FAAS
	Sodium (ug/g)	329.40	FAAS
3. Pulit Fruit (<i>Microcos stylocarpa</i> (Warb.) Burret)	Moisture (g/100g)	78.56	Gravimetric
	Ash (g/100g)	1.66	Gravimetric
	Crude Protein (g/100g)	2.19	Steam Distillation
	Total Fat (g/100g)	2.18	Soxhlet Extraction
	Carbohydrates (g/100g)	15.41	By computation
	Iron (ug/g)	8.71	FAAS
	Calcium (ug/g)	295.42	FAAS
	Sodium (ug/g)	118.34	FAAS
4. Litoco Fruit (<i>Calamus manilensis</i> Wendl.)	Moisture (g/100g)	78.47	Gravimetric
	Ash (g/100g)	1.44	Gravimetric
	Crude Protein (g/100g)	.35	Steam Distillation
	Total Fat (g/100g)	.19	Soxhlet Extraction
	Carbohydrates (g/100g)	19.55	By computation
	Iron (ug/g)	.17	FAAS
	Sodium (ug/g)	8.48	FAAS

Note: 1 microgram/gram = 1 milligram/kilogram

Phytochemical Characteristics of the Fruits

On the phytochemical composition of the fruit samples (Table 4), the three samples were subjected to four parameters: flavonoids, antraquinones, tannins and saponins.

The palali (*Dillenia philippinensis*) fruit is positive in flavonoids and antraquinones while negative in tannins and saponins. The bagobo seeds are positive only in saponins while negative in flavonoids, antraquinones and tannins. The pulit fruit is positive in flavonoids, antraquinones and saponins while negative in tannins. The litoco fruit is positive in flavonoids and antraquinones while negative in tannins and saponins.

Basing on results of related literature, it can be said that palali, pulit and litoko fruits are useful for their health benefits as antioxidant, anti-allergic, anti-cancer, antioxidant, anti-inflammatory and anti-viral [9]. They are good for the heart, as they reduce the risk of atherosclerosis. The flavonoid content also reduces blood cholesterol and helps prevent osteoporosis, and ease menopausal symptoms.

Flavonoid extract from these fruits can also be used as biopesticide against insects *Spodoptera litura* and against pathogenic fungi *Fusarium oxysporum*.

Since these three fruits, palali (*Dillenia philippinensis*), pulit (*Microcos stylocarpa* (Warb.) Burret) and litoko (*Calamus manilensis* Wendl.) also

contain anthraquinone, they can be used as a laxative, to speed up bowel movements in those with constipation, for treatment of arthritis, and inhibit growth of cancer cells. Aside from their health benefits, the anthraquinone extract from them can be used as biopesticide for the biological control of mosquitoes

The findings reveal that Bagobo seeds and Pulit fruits contain saponins. With this saponin content, they are good as dietary supplements and nutraceuticals. They reduce blood cholesterol levels and reduce the risk of cancer.

The other uses of saponins extract are biopesticide as feeding repellent against mosquitoes and other insects red flour beetle (*Tribolium castaneum*), *Schistocerca gregaria*, *Spodoptera littoralis*, and *Tribolium confusum*.

Table 4. Result of Phytochemical Analysis on Fruit and Seed Samples

Name of Fruit	Parameter	Result
1. Palali Fruit (<i>Dillenia philippinensis</i>)	Flavonoids	+
	Antraquinones	+
	Tannins	-
	Saponins	-
2. Bagobo Seeds(<i>Diplodiscus paniculatus</i>)	Flavonoids	-
	Antraquinones	-
	Tannins	-
	Saponins	+
3.Pulit Fruit (<i>Microcos stylocarpa</i> (Warb.) Burret)	Flavonoids	+
	Antraquinones	+
	Tannins	-
	Saponins	+
4.Litoco Fruit (<i>Calamus manilensis</i> Wendl.)	Flavonoids	+
	Antraquinones	+
	Tannins	-
	Saponins	-

Pharmacological Properties of the Fruit samples

On the pharmacological analysis on two fruit samples (Table 5), there were two zones of inhibition included for the bacteria *Staphylococcus aureus* and *Staphylococcus epidermidis*. The Palali fruit extract has 15 mm in both *S. aureus* and *S. epidermidis*, while the Pulit fruit extract has 12 mm in both *S. aureus* and *S. epidermidis*.

The data show that the two species of bacteria tested were more susceptible to Palali fruit extract than to the Pulit fruit extract.

Table 5. Result of Pharmacological Analysis on Two Fruit Samples

Name of Fruit	ZONE OF INHIBITION		Method Used
	<i>S. aureus</i>	<i>S. epidermidis</i>	
1. Palali Fruit Extract	15	15	Paper disk diffusion method
2.Pulit Fruit Extract	12	12	Paper disk diffusion method

CONCLUSION AND RECOMMENDATION

Of the four fruits; palali (*Dillenia philippinensis*), bagobo (*Diplodiscus paniculatus*), pulit(*Microcos stylocarpa* (Warb.) Burret) and litoco(*Calamus manilensis* Wendl.) subjected for phytochemical analysis, boiled bagobo fruits is the best because it has the highest content in seven out of the eight parameters. It has the highest content of ash (12.91 g/100g), crude protein (11.91 g/100g), total fat(7.99 g/100g), carbohydrates (59.86 g/100g), iron(120.97 ug/g), calcium(3,721.79 ug/g) and sodium (329.40 ug/g). Meanwhile, palali fruit has the highest moisture content with 90.69 g/100g.

On medicinal uses, the fruits of catmon and pulit contain flavonoids which are beneficial for the health as antioxidant, anti-allergenic, anti-cancer, anti-inflammatory and anti-viral. They can also be useful for lowering blood cholesterol levels and ease menopausal symptoms. These two fruits also contain anthraquinones that are helpful as laxative, help in digestion and speed up bowel movements in constipated persons and reduce inflammation of arthritis.

Pulit and bagobo fruits also contain saponins that are good dietary supplements that reduce blood cholesterol level, reduce risk of cancer and is an anti-spasmodic.

With the rich nutrient contents of the indigenous fruits listed herein, their phytochemical contents of flavonoids, anthraquinones and saponins, and their pharmacological properties, ways by which they can be processed into food products or wines, and be used for their characteristics can be explored.

On the pharmacological analysis on catmon and pulit fruit samples through two zones of inhibition for bacteria *Staphylococcus aureus* and *Staphylococcus epidermidis*, it was found out that the two species of bacteria tested were more susceptible to Palali fruit extract than to the Pulit fruit extract.

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