

# PRODUCT AND BY-PRODUCT DEVELOPMENT FOR PANDAN

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**Abstract:** The Bicol Region particularly the 3<sup>rd</sup> District of Albay, Philippines has an abundant supply of raw materials which are potential sources of alternative medicines and culinary condiments. The crop used in this study is Pandan, which is cultivated in all parts of the Philippines. At present, lack of technology to process this crop delimits its use. Knowledge on the use of this herb in the country is very limited, hence, usually neglected.

This research project focused on the characterization of Pandan and developing it into different products by-product such as granulated herbal drinks, food seasoning and flavorings. It also focused on the development of processing technologies that could lead to the maximum utilization of productive lands, create livelihood, provide employment and generate income for the farmers.

The Descriptive-Developmental and Experimental Methods of Research were adopted in the conduct of the study. The finished products were subjected to sensory evaluation to determine its acceptability.

The study revealed that: both the ready-to-drink and granulated herbal drinks from Pandan are highly acceptable in terms of taste, odor/aroma, and texture/consistency. Different recipes which were prepared, seasoned and flavored with Pandan were all found to be highly acceptable in terms of taste and aroma.

The following conclusions were drawn: (1) physico-chemical properties of Pandan could affect the recoveries and processing technologies; (2) Pandan could be processed into acceptable products such as granules, drinks, food seasoning and flavorings; and (3) the cost of the production for Pandan is also acceptable.

The development of these processing technologies could pave way to the utilization of less productive lands, generation of income for the farmers and entrepreneurs, provision of employment, and generation of livelihood for everyone.

It is therefore recommended that: (1) identification of varieties to increase the crop production be conducted; (2) promotion and marketing of the new products be made; (3)

other recipes be prepared using Pandan as seasoning or flavoring; (4) similar studies be conducted using other herbs with medicinal value; and (5) further studies on product process standardization be done.

**Keywords:** Food Seasonings, Herbal Drinks, Indigenous Materials, Livelihood, Processing Technologies.

## INTRODUCTION

The purpose of this research project entitled "Product and By-Product development of Pandan is to innovate technologies to maximize the utilization of this crop and provide additional income to native farmers.

Pandan is an herb usually grown due to the aroma released by its leaves. The crop is characterized by reduced, unisexual flowers borne in tight spikes or heads and by ovules with fleshy or mealy endosperm. The screw pine family comprises three genera. Plants in the family have rigid leaves and small, dioecious flowers. At present, limited importance and use of this crop because has been identified because of insufficient data on the Physico-chemical characteristics and properties of this crop, together with processing technologies.

Pandan is also an herb with medicinal value and is mostly used for culinary purposes. This crop is indigenous and grows in all types of soil and climatic conditions, hence, production could easily be increased many times in years considering the thousands of potential idle lands in the country. Pandan can be a potential for dollar-earning if converted to various marketable products. The need therefore to develop new technologies for this crop is vital in the pursuit of this undertaking.

## MATERIALS AND METHODS

The Descriptive-Developmental and Experimental Methods of Research were adopted in the conduct of the study. The Descriptive-Developmental was used in the discussion and interpretation of the gathered data in the development of the products. The latter was used in the laboratory/experimental phase of the study.

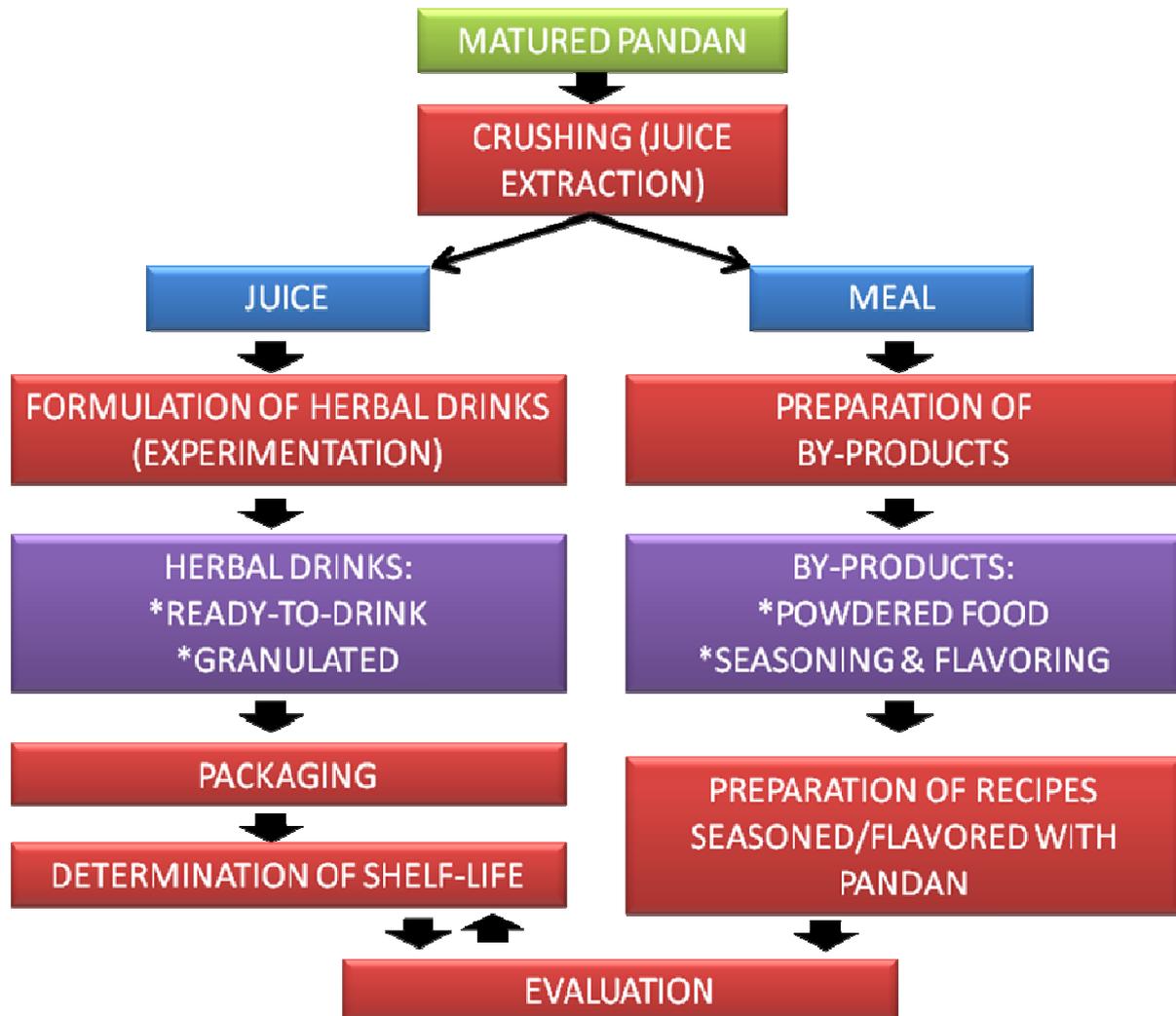


Figure 1: Process Flow in the Development of Product and By-products from Pandan

Matured pandan leaves were utilized as material for characterization where dimension of the samples were determined such as weight, length, width, and thickness. The Angle of Repose, Angle of Friction was also determined using five (5) kg of Pandan leaves as samples. For chemical analysis, secondary data were used in the analysis of parts as to moisture content, proximate analysis and herbal properties.

A juice extractor machine was used in extracting the juice from Pandan. The extracted juices were processed into herbal drinks as main products, while the meal wastes were made into by-products. The finished products were subjected for sensory evaluation to determine the acceptability in terms of

taste, odor/aroma, color and texture/consistency. Shelf-life of the finished products were also determined through everyday observation of the physical appearance as to taste, odor and color which were placed simultaneously under room temperature, under refrigerated condition, and under freezing temperature.

## RESULTS AND DISCUSSION

### Determination of the Physico-Chemical Characteristics of Pandan

Samples of Pandan were obtained at selected sites in the 3<sup>rd</sup> District of Albay, Philippines, particularly at

B.U. Polangui Campus (BUPC) in Polangui, Albay, and B.U. College of Agriculture and Forestry (BUCAF) in Guinobatan, Albay for characterization. Raw materials were readily available in the site for small scale production. With this, BUPC and BUCAF planted this crop to provide additional readily available samples for future needs of the project and to be able to generate and document production data.

On-site observation for pandan grown at BUPC and BUCAF showed that these crops could be harvested ten months after planting. It was noted that harvest for Pandan could reach 5 kg per hill at 50x50cm planting distance in a year.

Results of characterization revealed that Pandan had an average height of 158 cm after 10 months growing period. The 5 kg sample of Pandan has an average length of 667 mm, 1.6 mm thickness and 33.5 mm width. When divided into three equal parts, the top most part consists of 20.25%, middle portion with 31.34% and 48.41% for the bottom part. The obtained MC includes 20.25% for top, 31.34% middle, and 48.41% at the bottom. This indicates that the bottom part is juicier than the top most part which has also high dry matter content. When dried, the leaves reduced in the size by almost 50% when dried to 10-13% MC.

In bulk density determination of Pandan, the sample was divided into three parts --- the top most parts which has an average bulk density of 0.074 g/cm<sup>3</sup> fresh and 0.032 g/cm<sup>3</sup> dried. The middle part had an average bulk density of 0.094 g/cm<sup>3</sup> and 0.046 g/cm<sup>3</sup> for fresh and dried, respectively. The bottom part had an average of 0.116 g/cm<sup>3</sup> fresh and 0.05% g/cm<sup>3</sup> dried.

The angle of friction for Pandan using plain metal sheet and boards is 30 while for screen, it is 35. For dry Pandan samples, the angle of friction is 25 and 30 for metal sheet and boards and screen, respectively.

Data on the vegetative regeneration for leaves and stalks of Pandan resulted to an average of 3-5 kg per hill in 6 months growing period.

For chemical characteristics, secondary data were used due to limited funds.

#### **Development of Pandan Herbal Drinks**

In the development of herbal drinks from Pandan, percentages of juice and meal recovery were determined for economic purposes. These data can be used in determining the volume of raw materials needed in the production of the herbal drinks using Pandan juice extract.

Results revealed that 62% juice and 16.68% meal were recovered from a 2,500 of weight of pandan leaves. Two main products were formulated and developed from the extracted juice of pandan --- the Ready-to-Drink and the Granulated herbal drinks. The most acceptable proportion of ingredients in the formulation of pandan herbal drinks was the third formulation composed of 3 ml juice extract, 10 ml syrup, and 237 ml water with total volume of 250 ml. Meanwhile, 500 ml pandan juice extract, 750 g refined sugar, and 30 ml drops green food coloring was also the most acceptable proportion for the granulated pandan herbal drink.

Results revealed that the Ready-to-Drink and granulated herbal drinks from Pandan are highly acceptable in terms of taste, odor/aroma, texture/consistency. Further, the formulated ready to drink herbal drinks have longer shelf-life when stored in freezing temperature which lasted to thirty one (31) days. The granulated herbal drinks lasted to one and a half years.

#### **Development of By-Products from Pandan**

Pandan powder and juice extracts were made into by-products such as food seasoning and flavorings. Several recipes were prepared, seasoned and flavored with pandan to determine the acceptability of the by-products made. The prepared recipes are as follows: (a) Cookies flavored with pandan juice extract (b) Glazed and coated papaya candies flavored with pandan juice extract (c) Rice puto flavored with pandan juice extract (d) Rice puto flavored with pandan juice extract (e) Italian pork chop and rice chicken liver seasoned with pandan juice extract (f) Hamonadong pata flavored with pandan juice extract.

All the prepared recipes were highly acceptable as to taste and aroma.

#### **CONCLUSIONS**

The following conclusions were drawn from the project:

The physico-chemical properties of pandan could affect the recoveries and processing technologies.

(1) Pandan could be processed into acceptable products such as granules, drinks and food seasoning and flavorings.

(2) The cost of production for pandan products are acceptable

#### **IMPLICATIONS**

The development of products and by-products would lead to the production of new products that could be used as material for different food enterprises. This

would also encourage farmers to venture into the production of Pandan and provide additional income for the family and eventually improve the standard of living.

Simple economics of production showed that at 108,000 kilograms per hectare at 3.00 Philippine Pesos/kg, an annual income of 324,000 pesos could be raised.

The development of processing technologies therefore would pave way to the utilization of less productive lands, generation of income for the farmers and entrepreneurs, provision of employment, and generation of livelihood for everyone.

#### **RECOMMENDATIONS**

The following are the recommendations of the project:

1. Identification of varieties to increase the crop production.
2. Promotion and marketing of the new products be conducted.
3. Other recipes be made using Pandan as seasoning or flavoring.
4. Similar studies be conducted using other herbs with medicinal value
5. Further studies on product process standardization be done.

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