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Positioning Herb-Infused Cocoa Drinks for Market Success: A Pre-Market Study

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Abstract – The cacao industry in the Cordillera Administrative Region (CAR) is currently experiencing significant growth, with data indicating a steady increase in cacao production over the past few years. The study aims to introduce innovative approaches to further promote local cacao cultivation and production in the region. One such innovation involves creating cocoa-based drinks infused with locally available herbs, adding value to the cacao produced in the region. Specifically, this study focused on assessing the supply and demand for cacao and cacao-based food products, developing cocoa tablea and cocoa powdered drinks infused with various herbs, and determining the top three most acceptable and preferred formulations. A quantitative descriptive research design was employed for the sensory evaluation, market store checks, and supply and demand analysis. The findings revealed that the supply of cacao in CAR is sufficient to fulfill the requirements of processors producing cacao-based products. Furthermore, it was determined that pandan, guyabano, and turmeric were the most acceptable and preferred herbs for tablea, while thyme, pandan, and guyabano were favored for powdered drinks.

***Keywords*—herb-infused cocoa tablea, herb-infused cocoa powdered drinks, cacao industry, Cordillera Administrative Region**

INTRODUCTION

Cacao (*Theobroma cacao*) is an ancient but still relevant crop and demand is increasing due to its versatility in the food, cosmetics, and other industries. Department of Agriculture (2018) emphasized that the Philippines was the first country in Asia that propagated cacao from around 1670 until the 1950s. Nevertheless, the nation remains an importer of cacao products like chocolate, cocoa powder, and cocoa butter. Davao is the top producer and the most significant contributor of cacao in the country. According to the World Agroforestry (ICRAF, 2022), Davao generates about 78% of the total national production. In the local context, particularly the Cordillera Administrative Region, Apayao is the highest producer (70%), followed by Kalinga with 18%. With the increasing demand for cacao and cacao products, the National Cacao Industry Cluster (NCIC) set a target of a 40% annual increase in cacao production. Department of Agriculture (2017) emphasized that cacao can be grown in many areas in the Cordillera and that the varieties that yield superior qualities include Criollo and Forastero. However, about 90% of the cacao being cultivated in the country is the crossbreed of the two mentioned varieties, known as Trinitario. The Cordillera region holds strong potential to contribute to the said target. The Department of Trade and Industry (2022) likewise reported that more farmers are engaged in cacao and that Philippines can fill the global cacao shortage.

The Department of Agriculture (2018) explained that the value or profitability of cacao is higher when value-adding processes are incorporated. In the country, seven cacao products are being sold to both local and international markets: wet beans, dried beans, dried fermented beans, cacao nibs, tablea, cocoa powder, and cocoa butter. The department reiterated that the demand for cocoa beans to be processed into various products was estimated to increase from 100,000 tons in 2010 to 500,000 tons in 2020. As to financial and profitability analysis, the value of the cacao beans increases four times when processed into tablea and increases eight times when further processed into chocolate. However, while cacao cultivation and processing are evident in the Cordillera Administrative Region, market presence remains limited to a narrow range of items. Initial surveys conducted among informants from Ifugao, Kalinga, and Mt. Province indicate that tablea is the primary locally produced and commercially available cacao-based product. This finding aligns with observations from the Philippine Council for Industry, Energy and Emerging Technology Research and Development.

Product quality is critical for consumer acceptability and market expansion of cacao-based products. However, scientific basis on processing or methods that establish quality cacao products such as selection of quality beans, fermentation, roasting, were not yet explored. Kongor et al. (2016) underscore that the flavor acceptability of cocoa beans and other cocoa products, are influenced by the type of cacao, post-harvest treatments, and roasting. Alasti et al. (2019) similarly highlight that alkalinization and roasting are two of the factors that affect the cocoa powder flavor. Concerning fermentation as a process in cacao products

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production, Schwan and Wheals (2004) emphasize that overfermentation of cacao beans leads to a rise in bacilli and filamentous fungi. The growth spurt of bacilli and fungi causes off flavors to the resulting products. These reviews indicate that despite the wide distribution of cacao and cacao-based products, significant factors need to be addressed, specifically in the Cordillera, where the cacao industry is still at its burgeoning phase.

Given rapid technological advancement, product innovation and development are likewise on the rise. Industries should also keep abreast of these advancements considering time and efficiency (Guiné et al., 2016). With this in mind, technologies developed utilizing cacao as a base in food products were reviewed. Hino et al. (2004) introduced a method for producing a chocolate drink with smooth texture without graininess, producing an excellent and rich flavor. On the other hand, Tuason and McGinley (1990) introduced microcrystalline cellulose-based stabilizer system for dry mix instant chocolate drinks. Another study conducted by Davidsson et al. (1998) presented an iron-fortified chocolate-flavored milk drink for Jamaican children. With this rundown of cocoa products developed, research-based product development strategies to add value to the local products are relevant despite the initial studies reviewed. Though there are protocols or procedures established in the processing of cacao-based products, the interest of the study is to subject the locally cultivated cacao variety in the development of these products. Apart from introducing enhancement in cacao tablea production, utilization of local herbs known to have substantial health benefits is likewise taken into view. Additionally, research-based product development supports the nation's roadmap to conduct research for quality improvement of various cocoa-based products such as tablea, powder, butter, and among others (Department of Agriculture, 2018).

Based on the above, this study addresses the following gaps: first, considering that Cordillera is burgeoning in terms of cacao production, the study supports this effort by introducing innovations to encourage its cultivation and production. Second, the value of processed cacao is four times higher than cacao beans, hence, a need to increase cacao utilization. Finally, though there is a wide assortment of cacao-based food products, there are limited developments in concocting locally available herbs with cacao as a beverage.

Therefore, this study addresses three objectives: (1) to respond to the call of the Department of Agriculture – Bureau of Agricultural Research specifically on cacao to expand cacao crop utilization; (2) to align research efforts with Department of Agriculture initiatives to support the nation's roadmap for quality improvement of cocoa-based products; and (3) to introduce a scientific method to enhance product processing and thereby expand cacao market for local processors and farmers. Aligned with these objectives, the study focused on analyzing the supply and demand for cacao-based food products in CAR, developing cocoa tablea and powdered drinks infused with various herbs, and determining the top three most acceptable and preferred formulations.

MATERIALS AND METHODS

Research Design

In this study, a quantitative descriptive design was employed for the store checks and the analysis of supply and demand for cacao-based food products. The same design was used to determine the most acceptable and preferred herb-infused tablea and powdered drink via a sensory evaluation using a 9-point hedonic scale with untrained panelists.

In developing the cocoa tablea and powdered drink prototypes used in the sensory evaluation, six herbs were infused individually: ashitaba, thyme, guyabano, pandan, ginger, and turmeric. These herbs were selected based on their local availability and reported health benefits.

Production and evaluation of herb-infused cocoa drink prototypes

This phase of the study focused on producing and evaluating prototypes for herb-infused cocoa drinks. Specifically, prototypes were created for six herb-infused tablea and six herb-infused cocoa powdered drinks on a laboratory scale. Numerous trial and error experiments were conducted to determine the optimal ratio of powdered herb to cocoa in each prototype. Following this, a comparison of acceptability between the variants for each product was supported by preference testing to validate the acceptability result.

A total of 150 untrained panelists participated in the evaluation of each product using a convenience sampling technique. Prior to the sensory evaluation, each panelist signed a consent form and an allergy declaration form to ensure their safety and understanding of the study.

In developing the herb-infused cocoa drink prototypes, several production parameters were considered, as detailed in Tables 1 and 2: the source of the cocoa beans and herbs/spices, roasting temperature and duration, the cocoa butter extraction process, and the specific grinding and refining equipment used.

Table 1. Summary of the parameters considered in the development of herb-infused cocoa tablea

Cacao beans	Herb / Spice	Process	Roasting	Grinding	Refining
Ifugao, Apayao and Benguet	Local market	Natural Dutch	100°C 1 hour	Grinder Pulverizer	Melanger

Table 2. Summary of the parameters considered in the development of herb/spice-powdered drinks

Cacao beans	Herb / Spice	Process	Roasting	Cocoa butter extraction	Grinding
Ifugao, Apayao and Benguet	Local market	Natural Dutch	100°C 1 hour	Butter press	Pulverizer

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For the source of fermented and dried cacao beans, three areas were considered, from Ifugao, Mt. Province, and Benguet. The quality of the beans from each location was evaluated using the cutting test method.



Figure 1. Grading of fermented and dried cacao beans from various farmers using the cutting method

The fermented and dried cacao beans from Ifugao (labeled as MIXED VAR – Love Nature above) were evaluated to have the highest percentage of quality beans. However, the farmer from Ifugao was unable to immediately provide the required amount of beans for the experimentation. Similarly, the farm from Mt. Province was unable to meet the study's needs. As a result, negotiations were initiated with one of the largest cacao producers in the Cordillera region, located in Apayao.

The farm in Apayao was able to meet the study's volume requirements. Thus, the fermented and dried beans were sourced from this location. These beans were also subjected to quality testing and successfully passed with a score of 85%. Although this score was lower than that of the Ifugao beans, the beans from Apayao were used throughout the experimentation and production of both the tablea and powdered drink formulations.

Analysis of Data

To determine the top three herb-infused tablea and powdered drink variations, preference and acceptability tests were evaluated using descriptive statistical tools. same tool was used to analyze the cacao supply and demand for cacao-based food products.

RESULTS AND DISCUSSIONS

Cacao production in the Cordillera Administrative Region (CAR)

Cacao-based products available in the local market

Figure 2 presents a comprehensive overview of the various types of products derived from cacao that are readily available. Notably, cocoa bar dominates the market with 42% market share, while tablea accounts for 6%. The remaining 52% is divided between cocoa powder and powder drinks, which is not surprising considering the findings in the Cocoa Products Market Forecast (2022-2027) study by IndustryARC (n.d.) and Palma-Morales et al. (2024) that a demand for cocoa powder is surging and was most preferred.

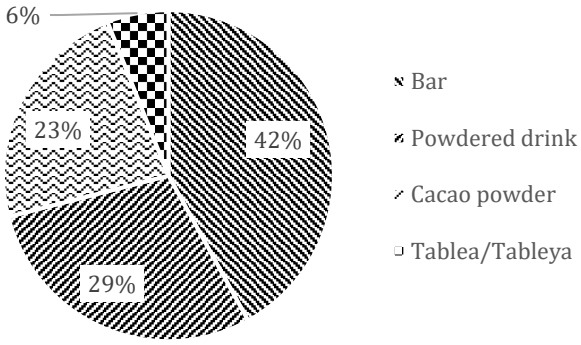


Figure 2. Market share of cacao-based products available in the local market

Market prices of cacao-based products available in the local market

Based on the store checks conducted, the average prices for the various cacao-based products sold in the local market are presented in Table 3.

Table 3. Market price of cacao-based products in the local market

Cacao-based products available on the market	Weight in grams	Average price in PhP
Cocoa powder (100%)	500	343
Cocoa powdered drink	500	700
Bar	500	909.09
Tablea	500	1,630
Other cacao-based products: buttons, syrup, fudge, spread, and chips	500	359.20

Product placement of cacao-based products in the market

Table 4 reveals a significant percentage of products placed at eye level. This strategic placement determines how prominently products are displayed in their surroundings and greatly influences customers' purchasing decisions. According to Pawne et al. (2025), eye-level positioning proved to be an effective strategy to consistently capture the attention and affect the purchasing decisions of consumers across all age groups. Eye placement is considered the buying level, as it is the point where consumers can conveniently access the product. Analyzing the data presented in this table, it becomes evident that cacao products received preferential treatment on the shelves at eye level, resulting in an impressive overall representation of 78%.

Table 4. Product placement of the cacao products in the market

Placement	Placement percentage
Eye level	78%
Below eye level	11%
Top or above eye level	11%
Total	100%

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Market price of cacao and cacao-based food products according to farmers and processors

The cacao farmers in the Cordillera region are not only engaged in cultivating cacao but also in producing a wide range of products derived from this versatile crop. These products include wet beans, which are sold to various cacao by-product manufacturers. The graph in Figure 3 illustrates the pricing trends for cacao and cacao-based products. It is evident from the figure that the wet beans are sourced from assorted varieties at the lowest price. However, as farmers employ further post-harvest processes to enhance the quality of these beans, their value increases leading to higher prices in the market.

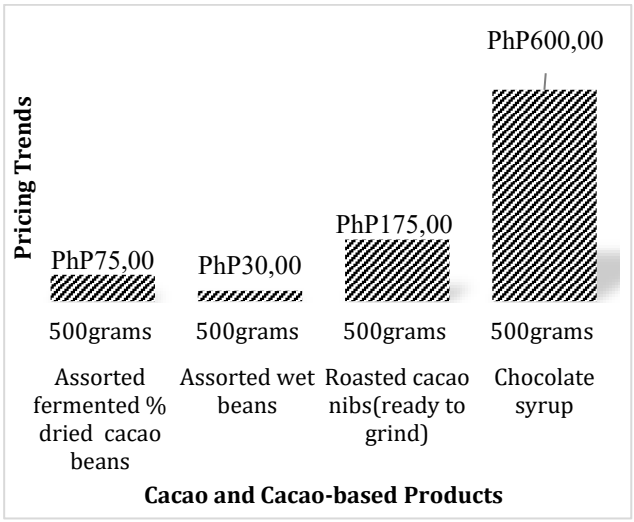


Figure 3. Market price of cacao-based products according to the local farmers and processors

These findings highlight post-harvest processing as a critical driver for increasing product value and farmer income.By investing in advanced processing techniques, farmers can significantly enhance the value of their cacao beans and subsequently command higher prices in the market. In essence, the market price of cacao and cacao-based products is influenced by various factors, with post-harvest processing playing a pivotal role. By recognizing the potential for value commercialization through advanced processing techniques, farmers can optimize their profits and contribute to the growth and sustainability of the cacao industry.

Development of Herb-infused Cocoa Drinks

Six herbs were considered in the development of cocoa-based drinks, these include ashitaba, thyme, guyabano, pandan, ginger, and turmeric. In addition to the numerous health benefits derived from cocoa and herbs, the careful selection of herbs adds depth and complexity to the overall flavor profile of these drinks. The invigorating ashitaba, with its distinct taste, complements the rich cocoa notes. The vibrant turmeric not only adds a pop color but also enhances the drink with its earthy undertones. The aromatic pandan lends a delightful fragrance, while the subtle hints of thyme add a touch of sophistication. Lastly, the refreshing guyabano imparts a tangy twist, balancing out the flavors harmoniously.

Herb-infused cocoa tablea

Table 5. Variables considered in the development of herb-infused cocoa tablea

Variables	Result	Remarks
Cocoa Beans		
Ifugao	92%	Not enough supply
Apayao	85%	Enough supply
Benguet	82%	Not enough supply
Mt. Province	88%	Not enough supply
Process		
Natural	Acceptable	More Nutrients
Dutch	Acceptable	Lesser nutrients
Roasting Duration		
200°C	Unacceptable	Over roasting
100°C	Acceptable	Just right
Roasting Method		
Pan roasting	Acceptable	It may lead to uneven roasting especially when not stirred evenly
Oven roasting	Acceptable	Even roasting
Grinding Equipment		
Grinder	Acceptable	Coarse texture
Pulverizer	Acceptable	Fine texture
Refining Equipment		
Pulverizer	Acceptable	Fine texture
Melanger	Acceptable	Finer texture

Herb-infused cocoa powdered drink

Table 6. Variables considered in the development of herb-infused cocoa powdered drink

Variables	Result	Remarks
Cocoa Beans		
Ifugao	92%	Not enough supply
Apayao	85%	Enough supply
Benguet	82%	Not enough supply
Mt. Province	88%	Not enough supply
Process		
Natural	Acceptable	More nutrients
Dutch	Acceptable	Lesser nutrients
Roasting Duration		
200°C	Unacceptable	Over roasting
100°C	Acceptable	Just right
Roasting Method		
Pan roasting	Acceptable	It may lead to uneven roasting especially when not stirred evenly
Oven roasting	Acceptable	Even roasting

Pre-market Assessment of Herb-infused Cocoa Drinks

A comprehensive pre-market analysis was conducted to evaluate the potential success of herb-infused cocoa drinks. This analysis focused on crucial factors that play a vital role in determining the success of any product. These factors included consumer willingness to purchase the product, the frequency of consumption and purchase, budget allocation, preferred retail channels, and the key factors influencing purchase decisions.

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Herb-infused cocoa tablea

The top three herb-infused cocoa tablea were determined using acceptability testing validated by preference sensory test. Results of the acceptability test based on the mean scores underscore that the top three herb-infused cocoa tablea variants are pandan-infused, guyabano-infused, and turmeric-infused. This outcome perfectly aligns with the preference ranking. However, it is worth noting that while both turmeric and ashitaba made it to the top three, ashitaba had to be excluded due to its limited availability within the area.

Herb-infused cocoa powdered drink

After the conduct of acceptability testing, the top three variants of cocoa powdered drinks were identified. Preference testing further validated the results highlighting the exceptional qualities of thyme, pandan, and guyabano in the preparation of herb-infused cocoa powdered drink.

Willingness to buy the newly introduced food products

To gauge consumer interest, a diverse group of respondents was presented with the newly introduced product concepts. Their feedback proved to be valuable in determining the potential demand for herb-infused cocoa drinks. The survey results were positive, with a majority expressing their willingness to purchase the herb-infused cocoa drinks once they become available in the market

Frequency of consumption and purchase

To enhance an understanding of consumer preferences, this research likewise delves into the determination of frequency of consumption and purchase. By analyzing these factors, valuable insights regarding the potential market size and the expected level of demand were gained. The data in Table 10 show that a majority of the respondents expressed theirinterest in consuming any of the herb-infused cocoa drinks once a week. Similarly, the majority of the respondents share their interest in purchasing any of the products one to two (1-2) times a week.

Table 7. Top three herb-infused cocoa tablea

Formulation	Mean	Description	Acceptability Rank	Preference	Preference Rank
ThICT	5.61	Like Slightly	6	50	5
TuICT	6.3	Like Slightly	3	52	3.5
GuICT	6.6	Like Moderately	2	71	2
GiICT	5.8	Like Slightly	5	43	6
AICT	6.1	Like Slightly	4	52	3.5
PICT	6.7	Like Moderately	1	77	1

***Note: ThICT** (Thyme-infused cocoa tablea); **TuICT** (Turmeric-infused cocoa tablea); **GuICT** (Guyabano-infused cocoa tablea); **GiICT** (Ginger-infused cocoa tablea); **AICT** (Ashitaba-infused cocoa tablea); **PICT** (Pandan-infused cocoa tablea).*

Table 8. Top three herb–infused cocoa powdered drink

Formulation	Mean	Description	Acceptability ranking	Preference	Preference ranking
GuICPD	5.64	Like Slightly	3	323	3
ThICPD	6.21	Like Slightly	1	362	1
AICPD	5.21	Neither Like nor Dislike	5	213	6
PICPD	5.73	Like Slightly	2	332	2
TuICPD	5.19	Neither Like nor Dislike	6	245	5
GiICPD	5.49	Like Slightly	4	308	4

***Note: ThICPD** (Thyme-infused cocoa powdered drink); **TuICPD** (Turmeric-infused cocoa powdered drink); **GuICPD** (Guyabano-infused cocoa powdered drink); **GiICPD** (Ginger-infused cocoa powdered drink); **AICPD** (Ashitaba-infused cocoa powdered drink); **PICPD** (Pandan-infused cocoa powdered drink).*

Table 9. Willingness to buy newly introduced herb-infused cocoa drinks

Newly introduced herb-infused cocoa tablea and powdered drinks	Willing	Not willing
Ashitaba-infused cocoa drink	35	28
Ginger-infused cocoa drink	42	28
Pandan-infused cocoa drink	56	14
Guyabano-infused cocoa drink	37	33
Thyme-infused cocoa drink	46	24
Turmeric-infused cocoa drink	35	34

Table 10. Frequency of consumption and purchase

	Frequency			
	Once a week	Twice a week	Thrice a week	Daily
Frequency of consumption	52	29	12	4
	1-2 times a week	3-4 times a week	5-6 times a week	Daily
Frequency of purchase	81	15	0	3

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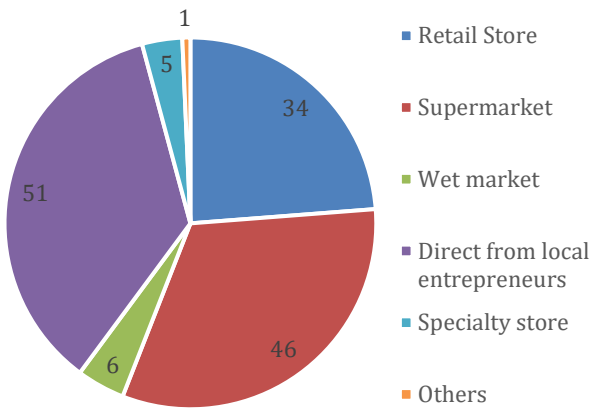


Figure 4. Budget willing to allot for herb-infused cocoa drinks

Budget willing to allot for herb-infused cocoa drinks within a week

Based on the survey findings, a considerable number of respondents are willing to buy any herb-infused cocoa drinks priced below PhP200.00.

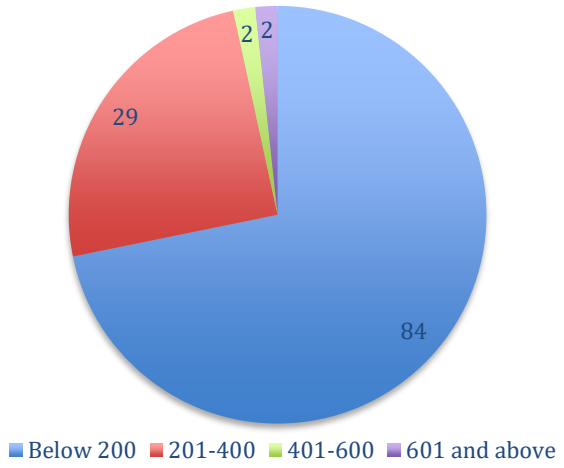


Figure 4. Budget willing to allot for herb-infused cocoa drinks

Preferred retail channels

Identifying the preferred retail channels for herb-infused cocoa drinks is another crucial aspect of the pre-market assessment. By understanding where consumers prefer to purchase such products, producers can strategically position their offerings to maximize accessibility and convenience. Data indicates that the majority of the respondents prefer buying herb-infused cocoa drinks directly from local entrepreneurs. This finding highlights the consumers' assumption that the price of a certain item is lower when purchased without a middleman. However, Ng & Chung (2008) debunked this assumption by explaining that distributors improve efficiency and effectiveness thereby adding strategic value rather than adding cost. Nevertheless, this approach would require the manufacturer to take responsibility of closing all market gaps, resulting in increased business costs.

Key factors influencing purchase decision

The data presented in Table 11 indicates that respondents took into account various factors when making their purchasing decisions. These factors can be categorized into three major groups: sensory qualities, marketing factors, and personal factors.

All three factors were considered by the respondents in the study. By analyzing Table 11, it is observed that consumers consider the combination of sensory qualities, marketing factors, and personal factors in making their purchasing decisions. For product developers, these findings are relevant in understanding the target audience and making informed decisions to meet customer's needs and preferences. Furthermore, by recognizing the importance of sensory qualities, marketing strategies, and personal factors, product developers can tailor the product formulations to better appeal to the customers.

Table 11. Factors influencing purchase decision

Factors influencing purchase decision	Influencing factor	Not a factor
Sensory Qualities		
Color	98	17
Taste	107	8
Texture	90	7
Aroma	107	8
Marketing Factors		
Advertisement/Marketing campaigns	104	11
Accessibility of store locations	108	7
Price	106	9
Quantity per pack	107	8
Personal Factor		
Occupation	101	14
Income	107	8
Lifestyle	105	10
Personality	103	17

CONCLUSIONS

Based on the research findings, the following conclusions have been reached: The Cordillera Administrative Region has a sufficient supply of locally produced cacao beans and a favorable market to sustain the production and further commercialization of herb-infused cocoa drinks. Furthermore, consumer demand for these is evident. Finally, the most acceptable and preferred herbs for tablea formulations are pandan, guyabano, and turmeric, while thyme, pandan, and guyabano are favored for powdered drink variations.

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