



Hyping the “Blackgold”: Assessing the Market Potential of Mungbean-Based Products in Cagayan Valley

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RESEARCH ARTICLE INFORMATION	ABSTRACT
<p>Received: June 08, 2023 Reviewed: November 20, 2024 Accepted: December 19, 2024 Published: December 31, 2024</p>	<p>DA-RFO-02-CVRC initiated the development of mungbean-based food products in 2018 as a value-adding intervention to support farmers in Cagayan Valley. The primary aim of this study was to conduct market research that would serve as a foundation for improving the product's processing technology, assessing its financial viability, and transferring the developed Package of Technology (POT). Additionally, the study included capability-building and enterprise development activities for potential technology takers. The products include instant ginisang munggo, instant mungbean noodles, and vacuum-fried sprouts. To assess the market potential of these products, focus group discussions (FGDs) with three age cohorts. Pre-consumption data revealed positive responses, particularly in areas such as packaging. Post-consumption data showed that, across all three developed products, the aroma, texture, and flavor were liked a lot by the respondents. The payback period for the various established enterprises is as follows: (1) Ginisang Munggo + Mungbean Noodles and Vacuum-Fried Sprouts (1.87 years); (2) Ginisang Munggo + Mungbean Noodles (2.05 years); and (3) Vacuum-Fried Sprouts and Fresh Mungbean Sprouts (2.97 years). Currently, the FLOW of Pariir Agriculture Cooperative is the technology taker for these products. The cooperative is now responsible for the commercialization and production of 68,593 pieces of mungbean food products, generating a total gross income of PHP 1,412,496 in just one year of operation.</p>

Keywords: *mungbean-based food products, market research, market potential, value-adding, blackgold*

Introduction

Cagayan Valley still ranks as one of the top mungbean-producing regions, contributing about 24.3% to the country's total output from 2012 to 2016 (PSA, 2018). Mungbean (*Vigna radiata* L.) is an important pulse consumed all over the world, especially in Asian countries, and has a long history of usage as traditional medicine. It has been known to be an excellent source of protein dietary fiber, minerals, vitamins, and significant amounts of bioactive compounds,

including polyphenols, polysaccharides, and peptides, therefore, becoming a popular functional food in promoting good health (Hou, 2019).

The increase of the production output in Region 02 leads to the continuous campaign of the Department of Agriculture in promoting proven technologies in mungbean production. In order to add value to the said commodity and be utilized other than in the seed production business, processors in the region produced and sold processed developed food products in the form of chips, instant drinks, and noodles. However, these processors often face losses due to inappropriate packaging materials, the absence of labels including nutritional facts, and improper costing.

The Department of Agriculture – Cagayan Valley Research Center (DA-CVRC) through its Food Product Research and Development Center initiated the development of a value chain and research-oriented mungbean-based food product in 2018, dubbed the Mang Bean Brand, starting with the assessment of its market potential.

The three developed food products of DA-CVRC include the instant mungbean soup, instant mungbean noodles, and the vacuum fried mungbean sprouts. The instant mungbean soup only requires five-minute boiling and it contains a small packet of dried malunggay, mushroom, amaranth, and squash blossom mirroring the traditional Filipino viand “ginisang munggo”.

Meanwhile, the mungbean noodles were concocted for people who are always on the go but seek healthier food options. The vacuum-fried mungbean sprouts is an innovative twist given to the traditional “togue”. Vacuum frying is a reasonably new technology that uses low pressure and temperature rather than atmospheric deep-fat frying to improve the quality attributes of food products (Diamante, 2015).



Figure 1. DA-CVRC Mungbean-Based Developed Product with Potential for Commercialization

Conceptualizing market orientation at the level of the product development process is relevant because market orientation is a highly critical factor for new product success and this conceptualization can be used as a starting point to transform the whole organization into a more market-oriented one. Market-oriented product development appears to be more than carrying out a number of marketing activities in a product development process (Kok at al., 2002).

The conduct of a market assessment for the DA–CVRC-developed mungbean-based food products would determine the viability of the processed products. Moreover, this would help in assessing potential farming organizations that would serve as the technology adapters of the product line.

It is essential that the developed products be enhanced through a science-based research and development approach, incorporating focus group discussions and market surveys. This approach ensures that the products meet consumer needs, align with market trends, and benefit from valuable feedback for continuous improvement. By leveraging both qualitative insights from focus groups and quantitative data from market surveys, the development process can be more targeted and effective, leading to better product performance and greater customer satisfaction.

Moreover, past studies on mungbean at the local level have primarily focused on its production, with little attention given to the development of mungbean-based food products, which now highlights the importance of this study.

Methods

The qualitative approach through focus group discussion and quantitative approach through market survey were conducted at DA-CVRC, San Felipe, City of Ilagan, Isabela, and Santiago City, Isabela, respectively.

The focus group discussion was conducted at DA-CVRC in order to have a conducive environment for the participants. Meanwhile, the market survey was conducted at Santiago City, Isabela since it is considered as a highly urbanized city (HUC), which is considered as the target market for the products. Due to COVID-19 restrictions, only a limited number of participants could be invited to join the study, both for the focus group discussion and the market survey.

Focus Group Discussion

The focus group discussion was participated by three groups, namely, Group A (Generation X and Baby Boomers), Group B (Millennial Group), and Group C (Generation Z), which served as replications needed in the gathering of the qualitative data for the improvement of the processing technology of the products. A questionnaire guide was also utilized by the researchers during the discussion in order to have a comprehensive discussion of the three products.

Market Survey

Results from the focus group discussion were then incorporated with the product. After this, the improved products were subjected to a market survey of 60 respondents per product.

Computation of Financial and Profitability Analysis

To attract potential "big brothers" or clients, such as private businesses and agribusiness firms that can invest in the mass production of Mang Bean Food Products not only in Cagayan Valley but also nationwide, a financial viability and profitability analysis for the Mang Bean Food Products was conducted for potential technology takers.

Ethical Considerations

Ethical procedures were observed in the conduct of this study. Respondents and key informants voluntarily agreed to participate in the study and no harm was inflicted on them. They were fully informed about the objectives of the study before it was executed.

Results and Discussion

Participants' Feedback Based on the Results of Focus Group Discussion

Instant Mungbean Soup

Generally, the three generation groups had good responses to instant mungbean soup, they liked the idea of the "instantness" of the product as well as its post-consumption qualities evaluated such as aroma, texture, and flavor.

For the product label and packaging, the millennial generation has the most comments for the instant ginisang munggo, such as that, the label should indicate serving suggestions, nutritional facts, and a tagline to introduce the product.

The packaging material was the next topic discussed in the FGD. One participant described the packaging material as "safe and sealed". Furthermore, one participant in the activity also suggested that the product should indicate the "best before" date on the label so that the consumers will be aware of the expiration date of the product. They also suggested adding the nutritional facts for the label. Mode of weight should also be indicated (e.g., grams, pieces) to show the volume of the developed processed product.

Instant Mungbean Noodles

The participants think that green is a good color choice and it is suitable for the product line and that graphic illustrations particularly product pictures should portray an honest representation of the food product. All necessary product information should be included in the label content.

Vacuum-Fried Mungbean Sprouts

FGD participants thought that the product aroma was lacking and that the general mouthfeel was gritty and dry. Flavor is acceptable, but needs further improvement, and the price is appropriate and acceptable for the product quality, but not with quantity. The majority of the respondents are willing to buy the product.

Instant Mungbean Soup Pre-Consumption Data Results During Market Survey

Sixty respondents were involved in the conduct of market survey and the age of the respondents ranged from 44 to 51 years old, which are considered to be older adults. This age range displays good market segmentation for this particular concept, since according to a study conducted by Doma (2019), the majority of older adults considered beans as a healthy food and thought consuming them could improve their health; however, only 51.2% of them were bean consumers.

As the majority (83.6%) of older adults were aware that a serving of beans is high in dietary fiber, bean consumers were significantly more likely to think that consuming beans could improve health areas related to dietary fiber including body weight management and constipation. Furthermore, most (84.8%) older adults thought consuming beans could improve heart health.

The would-be flavor of the product captures the attention of the majority of the respondents (Table 1). This can be attributed to the product label since all the fresh ingredients of the product can be seen on the said label.

Table 1. Feature of the Instant Mungbean Soup Capturing Respondents' Attention

Features	Frequency	Proportion	SE	95% Confidence Interval	
				LL	UL
Content/ Ingredients	9	15.00	4.65	7.84	26.80
Would-be Flavor	12	20.00	5.21	11.53	32.41
Logo	6	10.00	3.91	4.45	20.93
Brand Name	13	21.67	5.36	12.81	34.23
Packaging	20	33.33	6.14	22.34	46.49

This aligns with the results presented in Table 2, where respondents were asked about the primary factor influencing their decision-making in selecting the product's best feature. They indicated that the attractive packaging material played a significant role, as it highlighted the freshness of the ingredients on the label. With just one glance, they could readily understand the product's content and ingredients.

Table 2. Factors Affecting the Respondents' Perception of the Best Feature of Ginisang Munggo

Features	Frequency	Proportion	SE	95% Confidence Interval	
				LL	UL
Attractive	14	30.43	6.86	18.55	45.66
Innovation	8	17.39	5.65	8.70	31.73
All-in-One	5	10.87	4.64	4.44	26.24
Easy to Cook	5	10.87	4.64	4.44	24.24
Nutritious	10	21.74	6.15	11.83	36.52

The respondents were asked the first thing that comes to their mind when they look/hear the name of the product which is "Instant Ginisang Munggo". The majority of the respondents think that the product is easy to cook because of the word "instant". With this, the researchers would see to it that the mass manufacturer of the product should ensure that the processing technology is followed thoroughly so that five minutes of marketed cooking time for the product will be experienced by the consumers.

Moreover, incongruent suggestive brand names can distort product evaluations and alter perceptions of product performance in joint product judgments involving contradictory credence attributes; they can misdirect product

evaluations even if the search attributes conflict with competitor brands. Furthermore, they are more likely to backfire if contradictory experience attributes are readily available to consumers (Gunasti, 2020).

In addition, the respondents were asked to compare the difference between the product to other existing brand names. According to the respondents, the said brand name is extremely different from other existing brand names in the market, and the overall packaging of the product was also appreciated by the respondents, who rated it as "Very High Quality." This aligns with their feedback, expressing a strong liking for the overall packaging.

Essentially, the focus group discussion (FGD) about the product as the survey commenced was also made. With this, it was found out that the participants have a misconception about the name "Instant Mungbean Soup" as their perceived quality of the product is a clear, broth-like soup. They suggested that it would be better if the name "Instant Ginisang Munggo" or "Instant Munggo Ulam" will be utilized as it will allow the stimuli of the individual to perceive that the product is Ginisang Munggo.

According to the participants, the said product is innovative because of the less time it took to be prepared which is very convenient for all kinds of consumers and this product is something they need and will be buying if the availability of this product in the market will be permitted. Furthermore, the product, if displayed in stores and other commercial establishments, should be visible because of its name and packaging materials. When asked about the information indicated on the label of the packaging material, the respondents conveyed that too much information was indicated in the product.

Instant Mungbean Soup Post-Consumption Data Results During Market Survey

The post-consumption data results show the respondents' response to stimuli after tasting the product in terms of texture, aroma, and flavor/taste.

Table 3. Computation for the Range of Results for the Texture, Aroma, and Flavor of Instant Mungbean Soup

Variables	Frequency	Mean	SE	95% Confidence Interval	
				LL	UL
Texture	60	4.51	0.09	4.33	4.69
Aroma	60	4.68	0.06	4.56	4.90
Flavor	60	4.53	0.08	4.37	4.68

Data results show that participants overall liked a lot the texture, aroma, and flavor of the product. Follow-up questions such as their favorite aspect of the product were also asked by researchers including things that they would like to improve in the product.

The respondents stated that the taste or the product being delicious is their favorite aspect of the product. On the other hand, they also suggested room for improvement such as the addition of ingredients such as bitter melon, leaves, and shrimp. Other suggestions include improving the flavor, improving the packaging (big portion sizes), including the price tag, and improvement of the texture of the product.

Instant Mungbean Noodles Pre-Consumption Data Results During Market Survey

The age of the respondents ranged from 47 to 53 years old, which signifies that the age population of the study was quite high. The reason behind this is that during the conduct of the research, Enhanced Community Quarantine (ECQ) was imposed in the City of Santiago, Isabela. Moreover, 34 out of 60 respondents were male, which is slightly higher than the 26 female respondents, equivalent to 43%.

In terms of their satisfaction with buying the instant noodles now being commercialized in the market, the respondents said that they are very satisfied in terms of the overall quality of the product. However, it was duly noted that they are also aware that the current products prevailing in the market have high sodium content.

In a study conducted by Farrand (2017), he had undertaken an analysis of 765 instant noodle products from 10 countries using packaged food composition databases of ultra-processed foods compiled by the Global Food Monitoring Group (GFMG) and national shop survey data. Sodium levels were high and variable, within and between

European and Asian countries. The average packet contributed 35% to 95% of the World Health Organization's recommended daily salt intake.

Table 4. Feature of the Instant Mungbean Noodles Capturing the Respondents' Attention

Features	Frequency	Proportion	SE	95% Confidence Interval	
				LL	UL
Content/ Ingredients	7	11.67	4.18	5.54	22.92
Would-be Flavor	5	8.33	3.60	3.42	18.92
Logo	6	10.00	3.91	4.45	20.93
Brand Name	17	28.33	5.87	18.15	41.34
Packaging	25	41.67	6.42	29.63	54.78

In this section of the questionnaire, based on Table 4, which highlights the product feature that captures the respondents' attention, it was found that the majority—41.67% or 25 out of 60 respondents—identified the product's packaging as the most attractive feature. This result supports the study conducted by the International Journal of Retail and Distribution in 2017 that there is a strong association regarding the influence of packaging on the purchase decision, with over 73 percent of interviewed consumers stating that they rely on packaging to aid their decision-making process at the point of purchase.

Moreover, the respondents were asked about their first perception when they heard the product name “Instant Mungbean Noodles”, and almost half of them answered that they immediately thought that it was “New to the Market”. It is uncommon to find noodles that are made from the mungbean. The packaging material for instant mungbean noodles in the Philippines is noteworthy. While sotanghon or cellophane noodles are traditionally made from mungbean starch, instant mungbean noodles, if commercialized, would be the first of their kind in the Cagayan Valley Region.

On the consumers' demand for the product, the participants' response dictates that the product is something they “probably need” to try because it is their first time hearing and tasting the product. In terms of the product competition for visibility in the market, they said that the product will be very visible not only in terms of the physical appearance (label and packaging) but especially because of its product name and innovativeness.

Instant Mungbean Noodles Post-Consumption Data Results During Market Survey

Table 5. Computation for the Range of Results for the Texture, Aroma, and Flavor of the Product

Features	Frequency	Proportion	SE	95% Confidence Interval	
				LL	UL
Texture	60	4.51	0.09	4.33	4.69
Aroma	60	4.68	0.06	4.56	4.90
Flavor	60	4.53	0.08	4.37	4.68

Post-consumption data results show that participants overall liked a lot the texture, aroma, and flavor of the product, follow-up questions such as their favorite aspect of the product were also asked by the researchers including things that they would like to improve in the product.

The respondents stated that the taste or the product being delicious is their favorite aspect of the product. On the other hand, they also suggested room for improvement for the product taste which includes improving the flavor of the Instant Mungbean Noodles, since the respondents or participants of the study are used to the savory flavor of commercialized instant noodles in the market.

Vacuum-Fried Mungbean Sprouts Pre-Consumption Data Results During Market Survey

Supposedly the target participants of the market research for this concept were children with age ranging from 8 to 13 years old but due to ECQ restrictions imposed on the period, the age of the participants was from 49 to 52 years old and 58% of them are male and the remaining respondents are female.

Table 6. Feature of the Instant Mungbean Noodles Capturing the Respondents' Attention

Features	Frequency	Proportion	SE	95% Confidence Interval	
				LL	UL
Content/ Ingredients	9	15.00	4.65	7.84	26.80
Would-be Flavor	7	11.67	4.18	5.54	22.92
Logo	2	3.33	2.34	0.80	12.83
Brand Name	17	28.33	5.87	18.15	41.34
Packaging	25	41.67	6.42	29.63	54.87

The feature of the product that captured the respondents' attention was the packaging, with 41% (25 out of 60 respondents) selecting it as their favorite feature. This was followed by the brand name and the product's content/ingredients.

Moreover, the respondents were asked the first thing that comes to their mind when they look/hear the name of the product which is "Vacuum-Fried Mungbean Sprouts". The majority of respondents considered the product a new innovation in the market. Additionally, they believed the product is nutritious because it is made from mungbean. According to a study conducted by Wanyama (2019), new nutritionally enhanced foods and innovations have good potential in markets if they build on local consumption habits and are not associated with significant price increases.

Vacuum-Fried Mungbean Sprouts Post-Consumption Data Results During Market Survey

Table 7. Computation for the Range of Results for the Texture, Aroma, and Flavor of the Product

Variables	Frequency	Mean	SE	95% Confidence Interval	
				LL	UL
Texture	60	4.36	0.10	4.16	4.56
Aroma	60	4.39	0.08	4.23	4.56
Flavor	60	4.38	0.10	4.17	4.58

The computation for the range of results for the texture, aroma, and flavor of the product post-consumption data results shows that participants overall liked a lot the texture, aroma, and flavor of the product.

Financial Viability and Profitability Analysis

Establishing financial viability and profitability analysis to attract other potential investors for the product is essential. The analysis was divided into three enterprises to provide potential takers with options for ventures. All three enterprises demonstrated a benefit-cost ratio greater than 1, indicating that the production of the product line is both viable and profitable. Furthermore, the payback period of the investments lies between 20 to 32 months.

Table 8. Computed Profitability Analysis for the Three Enterprises of the Mang Bean Food Product Line

Particulars	Net Present Value (PHP)	Benefit-Cost Ratio	Return on Investment (for the first year of operation)	Payback Period
Enterprise 1	15,634.5	1.48	53.52%	1.87
Enterprise 2	10,196.7	1.41	48.89%	2.05
Enterprise 3	6,773.9	1.42	33.62%	2.97

Enterprise 1 (Instant Ginisang Munggo, Instant Mungbean Noodles, and Vacuum-Fried Mungbean Sprouts)

Enterprise 2 (Instant Ginisang Munggo + Instant Mungbean Noodles)

Enterprise 3 (Instant Ginisang Munggo+Instant Mungbean Noodles)

Conclusion and Future Works

Based on the Focus Group Discussion (FGD) conducted to improve the processing technology of the three developed food products, the participants suggested improvements on the labels and packaging materials. The respondents were particularly focused on the inclusion of nutritional facts and serving suggestions, reflecting the growing consumer demand for healthier food options.

This feedback provides a solid foundation for the researchers to enhance the products and develop variations based on these results. The positive post-consumption feedback indicates that, in terms of aroma, texture, and flavor, the products are of good quality, with only minor improvements needed.

Furthermore, the post-consumption results show that participants favor the instant Ginisang Munggo due to its innovation and the convenience of its "instant" cooking marketing strategy, compared to traditional Ginisang Munggo.

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Conflict of Interest

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