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The production of Red Ginger and Bitter Gourd as organic tea: Basis for a livelihood program for BSBA

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Abstract

The study aimed to aid the Technology and Livelihood students of Silay Institute to engage in food production and adopt the development of Red Ginger (Zingiber officinale var rubrum) and Bitter Gourd (Momordica Charantia) as organic tea. The study's results will be utilized in developing a livelihood program as a Community Extension Program for the Bachelor of Science in Business Administration (BSBA). Fifteen (15) respondents were chosen to answer the modified questionnaire for acceptability. The study was considered highly acceptable after all the parameters were summarized into one. The modified questionnaire was subjected to validation using Good and Scates (1972) and was reliability tested using the Cronbach alpha reliability test. Microbial and proximate analysis were used to test the mixture at PRAWN Negros Laboratory Test. Findings show that the finished product was germ-free, for there was no indication of bacteria, and contains nutritive value as indicated in the proximate analysis results of Laboratory Testing where carbohydrates were considered the most prevalent, seconded by protein and fiber. Flyers were used to provide information and were disseminated to solicit and gather consumer insight and feedback. A manual of instruction for the production was developed to help in the instructions and utilization of the community extension program.

Keywords: red ginger, bitter gourd, organic tea, community extension, Silay Institute, Philippines

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1. Introduction

Tea dates more than 4,000 years in ancient history, and today it is the most widely consumed hot beverage, according to Halsey, 1974. Next to water, it was the cheapest beverage humans consumed every day (Singhal, 2020). Drinking tea has been considered a health-promoting habit since the old periods and is consistent in the 21st century. Tea consumption has also been shown to help prevent many debilitating human diseases, including maintaining cardiovascular and metabolic health (Montani, 2018). Tea was a popular beverage worldwide, and its ingredients were now considered medicinal benefits as an immune system booster in any health concerns.

The idea of formulating Red Ginger and Bitter Gourd into tea was conceptualized since Red Ginger was best for its spicy taste while the bitter gourd was best for its bitter taste. However, literature on red ginger says it can help improve the spleen and stomach functions and was believed to treat headaches, increase blood circulation, stomach indigestion, etc. (Luigis, 2018). With these two plants combined and serving as part of the family food sources, the researcher feels the reason to develop these plants into tea for the family's health and for public consumption that can be a basis for a livelihood program.

1.1 Background of the study

In Southeast Asia, red ginger is traditionally used as a medicinal ingredient. The rhizomes are tended during the rainy season to help rid the cold, flu, and other sicknesses. It is also believed to warm the body, boosting the immune system, mind, and spirit. In Indonesia, several traditional drinks contain Red ginger, and each beverage may be made with additional ingredients, depending on their preferences. It is also used in bandrek, a drink with ginger, cinnamon, and palm sugar. Other ingredients are occasionally added to the said drink. These are coconut milk, sweetened condensed milk, and spices, and the drink is customarily served at night to let the body relax. In Central Java, sekoteng is a hot beverage made with condensed milk and ginger root syrup, drunk before bed to promote better sleep. (Specialty Produce, 2020).

Bitter gourd is an equatorial wine grown mainly in India, China, and South East Asia. The plant is farmed mainly for its edible fruit part. Bitter gourd is widely unaccepted due to its bitter flavor. However, fruit is a source of several vital nutrients. The plant, as a whole, contains more than 60 phytomedicines that are active against more than 30 diseases, including cancer and diabetes. Comprising the bioactive blends sequestered from bitter gourd into functional foods and beverages finds a fresh horizon. Nanoencapsulation and novel green extraction methods can enhance the yield and quality of extracted compounds and their stability while incorporated into food products. The present study investigates nourishing characteristics, various bioactive compounds, and essential nutraceutical properties of the bitter gourd plant in detail (Gayathry, 2022).

The Philippines is classified as a third-world country, which suggests the nation holds an increased poverty rate and economic instability. With this, numerous Filipinos include restricted admission to needs caused by financial constraints. Similarly, education, a fundamental need and undoubtedly the most practical mechanism for fleeing poverty, is increasingly evolving into a benefit instead than a right for all Filipinos. Counting to the pandemic's ongoing influence on the country's rate of unemployment and deprivation, achieving education is more challenging than ever.

In this case, rather than obtaining a diploma, many Filipinos resort to applying to various jobs that primarily demand human labor or work that does not require high educational attainment. Others go overseas expecting higher wages or better opportunities to satisfy their family's daily necessities. These jobs necessitate training,

which can financially saddle job seekers from low-income grounds. Also, labor is only for some; even when a person is prepared, specific jobs may not fit his total capacity.

This means that livelihood programs are valuable as they nourish Filipinos with opportunities and services when employment is unattainable. They also supply the essential abilities (skills or knowledge) to sustain their experience to fulfill their family's basic needs. In the Philippines, the government and non-government organizations (NGOs) established several livelihood programs that concentrate on supplying the equitable possibility for the marginalized sector to enhance their socio-economic situations via different means, including training and monetary aid in practice for their long-term subsistence.

1.2 Objectives of the study

The study's main objective is to aid the Technology and Livelihood students of Silay Institute to engage in food production and adopt the development of Red Ginger and Bitter Gourd as organic tea. It aims to develop a sustainable livelihood program as a Community Extension Program for the Bachelor of Science in Business Administration.

2. Materials and Methods

The research study used developmental and descriptive research. The study used a modified questionnaire for fifteen (15) respondents subjected to validation using Good and Scates (1972) and was reliability tested using the Cronbach alpha reliability test. Microbial and proximate analysis were used to test the mixture at PRAWN Negros Laboratory Test. Informed consent was made when the evaluation of acceptability was fielded. The SPSS, mean, and standard deviation was used as a treatment for the data gathered.

3. Results and discussion

Upon the completion of the red ginger and bitter gourd into a finished product, a series of tests was done to ensure that it was formulated with a germ-free preparation at PRAWN Negros to test the microbial and proximate analysis of the product.

Table 1

The predetermined formulated proportion of the organic tea from red ginger and bitter gourd

Ingredients	Measurements
Red ginger juice	500 ml
Bitter gourd juice	500 ml
Raw brown sugar	150 ml

Base on table 1 shows the predetermined formulation of red ginger (*Zingiber officinale var rubrum*) and bitter gourd *(Momordica charantia)* as organic tea. It shows an equal amount of measurement to ensure that each main ingredient can contribute to boosting the health of the family and the public in particular if proven worthy for both the plants have beneficial effects as said by Dr. Torres (2010) when taken regularly increase glucose tolerance and potentiates insulin where the Polypeptide-P, insulin is only found in ampalaya plant. At the same time, red ginger was best to treat arthritis, rheumatological conditions, and muscular discomfort, that why it was used as herbal medicine (Bordia, et., 1997). This was the reason why a 50-50 measurement was used.

Table 2

Results of the Proximate Analysis of Organic Tea using red ginger and bitter gourd

Proximate Analysis	Mean Score
% Moisture - Gravimetric Oven Drying at 105°C	4.83 %
% Ash - Oxidation at 550°C	2.11 %
% Fat - Soxhlet Extraction Method	1.81 %
% Fiber - Lepper Modification Method	6.27 %

% Protein - Kjeldahl Method	27 %
% Carbohydrates - Phenol Sulfuric Acid Method	79.36%

Table 2 shows the proximate analysis of the red ginger (Zingiber Officinale var rubrum) and bitter gourd (Momordica Charantia) as organic tea. The proximate analysis of the product was adjudged to have moisture using the gravimetric oven drying at 105°C with a mean score of 4.83%, ash using the Oxidation technique at 550°C with a mean score of 2.11 %, fat using the Soxhlet Extraction Method with a mean score of 1.81 %, fiber using the Lepper Modification Method with a mean score of 6.27 %, protein using the Kjeldahl Method with a means score of 6.27 %, and carbohydrates using the phenol sulfuric acid method with a mean score of 79.36 %. The implication of these laboratory results using the proximate analysis implies that tea has a nutritional content and can be a substitute for rice since it has the highest carbohydrate nutrients with 79. 36 %, followed by Fiber content and Protein at 6.27 % and fat with a minimal content of 1.81%. The proximate analysis only shows that tea can be a supplemental beverage to boost health. This was justified by "*Shang Dynasty* as a medicated drink.

Table 3

Presents the Microbial Analysis of the red ginger and bitter gourd as organic tea

Microbial Analysis	Presence of Microbial Elements
Staphylococcus aureus - (CFU/g)	Not Detected
Salmonella - (3M Petrifilm)	Absent
Listeria - (reveal 2.0 test for listeria)	Negative
Mesophilic Bacteria Count (CFC/g) - (Pour Plate Method)	55
Aerobic Thermophilic Spore Count(CFU/g) - (Pour Plate Method)	Not Detected
E.coli (CFU/g) - (Compact Dry Media)	Not Detected
Total Coliform (MPN/g) - (Multiple Tube Fermentation Technique)	< 3.0
Fecal Coliform (MPN/g) - (Multiple Tube Fermentation Technique)	< 3.0
Yeasts (CFU/g) - (Pour Plate Method), 72 Hours	Not Detected
Molds (CFU/g) - (Pour Plate Method), 72 Hours	Not Detected

Table 3 presents the microbial analysis of the tea in terms of the bacterial mentioned staphylococcus, whose presence was not detected in the laboratory test result; salmonella (3M Petri film) was also absent, listeria bacterium was also negative, Aerobic thermophilic spore count. Coli, yeast, molds, and staphylococcus aureus are not detected, the mesophilic bacteria count is 55, total coliform and fecal coliform are <3.0, and it states that organic tea is safe for drinking. It only implies that the mixture of the finished product was prepared using the HACCP food preparation protocols.

Table 4

Presents the evaluation of acceptability in terms of appearance

Appearance	Mean Score	SD	Verbal Interpretation
1. Transparent white warm color	4.93	.25820	Highly Acceptable
2. Brownish powder color	4.93	.25820	Highly Acceptable
Total	4.93	.26820	Highly Acceptability

Table 4 represents the evaluation of acceptability in terms of appearance. The item transparent white warm color has a mean score of 4.93 and a standard deviation of .25. The item brownish powder color also has a mean score of 4.93, same as item # 1, transparent white warm color. Both were adjudged to be highly acceptable. It only shows that appearance has nothing to do with when tea is consumed as a beverage drink.

Table 5

Presents the evaluation of acceptability in terms of smell

Smell	Mean Score	SD	Verbal Interpretation
1. Delicate strong the smell of red ginger	4.86	.35187	Highly Acceptable
and bitter gourd that rising from the tea.	4.80	.41404	Highly Acceptable
2. Pungent red ginger smell	4.73	.59362	Highly Acceptable
3. Pungent bitter gourd smell.			
Total	4.80	. 37396	Highly Acceptable

Table 5 represents the evaluation of acceptability in terms of smell the delicate, pungent smell of red ginger and bitter gourd that rose from the tea has a mean score of 4.86 and a standard deviation of .35. While the item's pungent red ginger smell also has a mean score of 4.80 has a standard deviation of .41 and items number #3 pungent, bitter gourd smell has a mean score of 4.73 and has a standard deviation of .59. Both were adjudged to be highly acceptable. It only shows that smell has nothing to do with when tea is consumed as a beverage drink.

Table 6

Presents the evaluation of acceptability in terms of taste

Taste	Mean Score	SD	Verbal Interpretation
1. Spicy	4.73	.45774	Highly Acceptable
2. Bitter taste	4.60	.50709	Highly Acceptable
3. Little sweetness after the taste of a red ginger and bitter gourd tea	4.86	.35187	Highly Acceptable
Total	4.73	.36087	Highly Acceptable

Table 6 represents the evaluation of acceptability in terms of taste with the item spicy taste has a mean score of 4.73 and a standard deviation of .45. While the item bitter taste has a mean score of 4.60 and a standard deviation of .50 and item #3 with the bit of sweetness after taste of a red ginger and bitter gourd tea has a mean score of 4.86 and a standard deviation of .35. Both were adjudged to be highly acceptable. It only shows that taste has nothing to do with when tea is consumed as a beverage drink.

Table 7

Presents the evaluation of acceptability in terms of Texture

Texture	Mean Score	SD	Verbal Interpretation
1. Fine powdered red ginger and bitter gourd from the tea.	4.7333	.45774	Highly Acceptable
2. with the granulated presence of both (bitter gourd and red ginger).	4.9333	.25820	Highly Acceptable
Total	4.8333	.30861	Highly Acceptable

Table 7 represents the evaluation of acceptability in terms of texture with the item fine powder red ginger and bitter gourd that rising from the tea has a mean score of 4.73 and a standard deviation of .45. While the item with the granulated presence of both (bitter gourd and red ginger) also has a mean score of 4.93and a standard deviation of .25. Both were adjudged to be highly acceptable. It only shows that texture has nothing to do with when tea is consumed as a beverage drink.

Table 8

Presents the Summary of the Evaluation of Acceptability in terms of Organoleptic Qualities

Organoleptic Qualities	Total Mean Score	Total SD	Verbal Interpretation
Appearance	4.93	.26820	Highly Acceptability
Smell	4.80	.37396	Highly Acceptable
Taste	4.73	.36087	Highly Acceptable
Texture	4.83	.30861	Highly Acceptable
Overall Mean	4.81	.26957	Highly Acceptability

Table 8 represents the summary of the evaluation of acceptability in terms of organoleptic qualities; appearance total mean score of 4.9, interpreted as highly acceptable; smell with a total mean score of 4.8, interpreted as highly acceptable; taste with a total mean score of 4.7 interpreted as highly acceptable and the texture with the total mean score of 4.8 interpreted as highly acceptable. Overall the evaluator evaluates the product as highly acceptable.

After finding out the result, Silay Institute comes up with a module to be cascaded in the adopted barangay. These training modules contain the various steps and procedures in making the said tea. The Technology and Livelihood students of Silay Institute will be the one conducting the said training to the residents of the barangay.

4. Conclusion

Based on the findings of the study, a conclusion was made. The red ginger and bitter gourd mixture was formulated using the predetermined proportion. A germ-free preparation of the formulated predetermine proportion of the red ginger (Zingiber Officinale var rubrum) and bitter gourd (Momordica Charantia) indicates careful observance of the preparation protocol based on the guidelines of HACCP and the result of the microbial and proximate analysis. The formulated predetermined proportion of red ginger and bitter gourd; can be utilized as an alternative supplement to boost health. The development of the flyer for the tea can be made as the basis of information.

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