

ACCEPTABILITY AND MARKETABILITY OF MALUNGGAY, AMPALAYA, AND OKRA SEEDS POWDER AS A COFFEE SUBSTITUTE

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ABSTRACT

Coffee is known as a beverage to most people all over the world and is best known for making the drinker active, because of its stimulating effect on the functions of the brain. But drinking coffee also affects human health. Coffee acts as a stimulant through its caffeine. Variants of coffee flavors all over the world were already produced, aiming for the discovery of alternative sources for coffee production. With this premise, the present study attempted to determine the acceptability and marketability of malunggay, ampalaya, and okra seeds powder as a coffee substitute. This study also aimed to find a healthier and cheaper alternative to commercial coffee with less caffeine. The experimental research method was used in this study. The respondents of this study were adults (20-30), (31-40), and 41 years old and above. The study focused only on the acceptability and marketability of making coffee out of powdered malunggay, ampalaya, and okra seeds as coffee substitutes for the main ingredients. Three different proportions 20, grams, 40 grams, and 60 grams were prepared with different seed concentrations where 75% malunggay seed, 20% ampalaya seed, and 5% okra seed were proportioned. Survey questionnaires were administered to the 90 respondents of Batasan Hills National High School and Brgy. Batasan Hills. The five-point Likert scale and nine-point Hedonic scale were used to determine the acceptability of the product. Results further showed that there was no significant difference in the evaluation of the three groups of respondents on the acceptability and marketability of malunggay, ampalaya, and okra seed powder as a coffee substitute in terms of appearance, aroma, taste, and texture. Likewise, there was no significant difference in the evaluation of the three groups of respondents on the acceptability and marketability of coffee with 20 grams, 40 grams, and 60 grams for each proportion of powdered malunggay, ampalaya, and okra seed as a coffee substitute in terms of supply/availability, consumer demand and cost of production. The MAAOKRA Coffee with 40 grams proportion was the most acceptable proportion in terms of appearance, aroma, taste, and texture compared to the 20 grams and 60 grams proportion. The MAAOKRA Coffee with 40 grams has a higher potential in the market in terms of supply and availability compared to the 20 grams and 60 grams proportion. Furthermore, the 40 grams proportion is more affordable and more nutritious. In terms of physicochemical analysis, the 40 grams proportion is more packed with calcium and potassium.

Keywords: Acceptability, Marketability, Maaokra Coffee, Less Caffeine, Experimental

INTRODUCTION

Coffee has been part of Filipino daily meals. It contains caffeine which is a central nervous system and metabolic stimulant that restores one's

alertness. However, too much caffeine can cause insomnia. The researcher chose this study.

MAAOKRA Coffee to find a healthier and cheaper alternative to commercial coffee. The researcher and her husband are both coffee lovers.

It is one of the reasons why the researcher chose coffee for her study. In Addition to being coffee lovers, they are also vegetarians. so, the researcher decided Malunggay, Ampalaya, and okra to be used as her variables in this research study. Also, the researcher's children grew to be vegetarians, so she thought of the other use of ampalaya seeds. As one of the variables, after removing the vegetable, she has chosen coffee and used seeds of her favorite vegetables, malunggay, ampalaya, and okra.

In an article, NANOPDF.com (2018) defines coffee as a dark brewed beverage that has a slightly acidic flavor from the roasted seeds. It has been part of Filipinos' daily meals. It contains caffeine which is a central nervous system and metabolic stimulant that restores one's alertness. Coffee is brewed from the beans of the coffee plant, which are called coffee beans. Green (unroasted) coffee is one of the most traded agricultural commodities in the world. Coffee can have a stimulating effect on humans due to its caffeine content. It is one of the most consumed beverages in the world. Coffee is cultivated in over 70 countries in the world. It is commonly found in tropical and subtropical regions, primarily in Southeast Asia, where the Philippines is located. Coffee is known as a beverage to most people all over the world. It is known for making the drinker active because of its stimulating effect on the functions of the brain.

Few variants of coffee flavors aiming to discover alternative sources in coffee production were already produced. The researchers' goal is to make alternative coffee beans using malunggay, ampalaya, and okra seeds. The researcher also chose MAAOKRA Coffee because it is a healthier beverage and people, whenever at work or at home, drink coffee. This MAAOKRA Coffee is cheaper than the branded coffees available in the market. Coffee is a much-known beverage to the majority with the reference to people, especially adults. Variants of coffee flavor all over the world were already produced, aiming for the discovery of alternative sources for coffee production.

To create this product, the researcher analyzed some factors to produce a healthier and cheaper choice of coffee. Coffee has been part of Filipinos' daily meals. It contains caffeine which is

a central nervous system and metabolic stimulant that restores one's alertness. However, too much caffeine can cause insomnia. The researcher chose this study MAAOKRA COFFEE to find a healthier and cheaper alternative to commercial coffee. The researcher and her husband are both coffee lovers, which prompted her to choose coffee to be her focus of study. They are likewise both vegetarians. With this, the researcher chose malunggay, ampalaya, and okra to be her variables. With this in mind, she thought of using the ampalaya seeds as one of the variables for her coffee. After removing the meat of the vegetable, she added its seeds to the other ingredients such as that of the malunggay and okra. Gutierrez (2015) states that seeds have the potential to produce coffee. There were many researchers who succeeded in utilizing different seeds in making coffee. Beneficial for people who have night shift jobs, and students who are studying and making projects at night.

According to Gopalakrishnanb, Doriyaa, and Kumar (2016), the Moringa tree is one of the most nutrient-rich plants on earth, the leaves, and seeds contain important nutrients that have the potential to significantly improve health and combat malnutrition. The leaves have been referred to as natural multivitamins because they contain a large number of important vitamins and minerals along with all the essential amino acids.

Malunggay (*Moringa oleifera*) seeds are rich in vitamins A and C and the mineral iron. Vitamin A is important for eye health and night vision, healthy skin, hair and nails, and cell growth. Vitamin C is an important antioxidant that protects whoever takes it from the damaging effects of free radicals. It is also important in wound healing, immune function, and collagen synthesis. The pods are fibrous and are valuable to treat digestive problems and thwart colon cancer. Completely caffeine-free and supercharged with nutrients, Moringa is a green leaf that is considered a superfood. It contains a lot of antioxidants and it is an excellent source of iron and magnesium. It is jam-packed with Vitamin A and Vitamin E. Moringa has so many benefits but is especially good for healthy skin and the immune system. It is also supposed to help with stress and fatigue. It can support restful sleep. It has a larger content of

vitamins and minerals that are found in fruits and vegetables. It contains 36 anti-inflammatories, 18 Amino Acids, and 9 Essential Amino Acids (Yonan, 2017).

Ampalaya (*Momordica charantia* Linn.), also known as Bitter Melon, is a crawling vine that grows well in tropical countries, particularly in the Philippines. Known for its bitter taste, ampalaya is at once a staple ingredient in Filipino and Asian cuisines and a reliable home remedy for various illnesses, particularly diabetes. But aside from its role as healthy food, ampalaya is especially valued by diabetics for its known anti-diabetes. Ampalaya is an excellent source of Vitamin B1, B2, and B3, C. Magnesium, folic acid, zinc, phosphorus, manganese, and dietary fiber. It is rich in iron and contains twice the calcium of spinach and twice the potassium of a banana. Drinking Bitter melon can be very helpful for stimulating the immune system (Mon, 2016).

The food center organization stated that okra, the slimy superfood is also known as "lady finger" or gumbo in some regions, grows well in warm climates. Okra has a taste that reminds of soulful, Southern cooking. Okra is a beautiful, edible flowering plant that is part of the mallow family (related to cotton, cocoa, and hibiscus) and originated in Africa. Also known as "ladyfingers" or "gumbo" in some regions this extremely drought- and the heat-tolerant plant grows well in warm climates and offers consumers a wide variety of nutritional benefits. The okra pods are one of the vegetables with very low calories. Just 30 calories per 100 grams with no saturated fats and cholesterol. But rich in dietary fiber, minerals, and vitamins: usually recommended by nutritionists to control and for weight reduction programs. Seeds inside okra are safe to eat. The seeds provide some of the fiber found in okra which helps digestion. Okra is a great compliment to many foods (fruitandveggies.com 2016). Based on the given statements above, the researcher is motivated to provide a way to get the nutrients provided by these plants not just by eating them but in a more frequent way of consuming plants thus considering their seeds as an alternative in coffee making.

Several journal articles, websites, and studies that have some relevance to this study

were reviewed to conduct this research study and these were presented hereunder. Coffee came from the coffee plant called coffee beans, which is dark and slightly acidic in flavor. It grows in cultivated trees in over 70 countries primarily in Latin America. Coffee is one of the most traded agricultural commodities in the world, because of its caffeine content and stimulating effect on humans (Leaf Group, 2015).

Drinking coffee also affects human health. It has been studied to determine the effect of coffee because coffee contains several compounds which are known to affect the human body. The coffee bean contains chemicals that are called mild psychotropics as a defense mechanism of the coffee plant. These are toxic in large doses or intake in humans, or even in their amount when consumed by creatures that may otherwise have threatened the beans in the wild. Coffee act as a stimulant through its caffeine, (Leaf Group, 2015). It is among the most widespread and healthiest beverages in the world. It is known to be a highly rich source of biologically active natural metabolites which possess therapeutic effects and functional properties. Coffee can be considered a drink that has different positive effects on human health. However, heavy coffee consumption may be related to some unpleasant symptoms, mainly anxiety, headache, increased blood pressure, nausea, and restlessness. During the past two decades, several studies have indicated that there is a close correlation between the consumption of coffee and the incidence of depression. In addition, phytochemical studies showed that caffeine is the main responsible constituent for the antidepressant effects of coffee through multiple molecular mechanisms. As the thirteenth century came, it has been believed that Ethiopian ancestors called Oromo people recognized and discovered the energizing effect of the coffee plant, and coffee spread to Egypt and Yemen. The credible evidence of drinking coffee and the knowledge of the coffee tree, in the 16th century, coffee had reached the rest of the Middle East, Persia, Turkey, and Northern Africa. It spread to Italy, the rest of Europe, Indonesia, and to the Americas. (Encyclopedia Americana Vol. 7). A coffee bean is a seed of the coffee plant and the source of coffee. It is a pit inside the red or purple

fruit often referred to as a cherry. Just like ordinary cherries, the coffee fruit is also so-called stone fruit (Attman, 2020).

Factors must be considered in enjoying a cup of coffee. To feel the aroma of the coffee, coffee drinkers first inhale the vapor that rises from the cup. A good coffee drinker inhales the aroma before allowing his lips to touch the coffee. The taste affects most of the quality and flavor of a coffee (Morgan, 2019). There is a good reason to drink coffee. Cups of coffee can cut post-workout muscle pain by up to 48% (University of Georgia, 2007).

Malunggay (*Moringa oleifera*) which is also known as horse-radish tree or Ben oil tree in English is indeed a very useful plant. It is rich in nutrients. The leaves, flowers, and fruits (that are pods) of Malunggay are edible and Filipinos eat them as vegetables. Malunggay is a very nutritious plant and its benefits have been acknowledged by nutritionists, dieticians, and nutrition researchers. Considered a miracle plant, the tea derived from the leaves of this tree has high levels of flavonoids and polyphenols. These are antioxidants that can detoxify your body and strengthen the immune system (Pascual 2016). Zhou (2018) *Moringa oleifera* (Malunggay) also known as horseradish tree. The seeds, fruits, and leaves can be edible food. However, the roots and their extract are not edible to eat. These can be toxic substances. *Moringa* (Malunggay) can easily add to smoothie drinks or tea or coffee when it is powdered.

Ampalaya (*Momordica charantia* Linn.) also known as bitter gourd or bitter melon is a vine with tendrils up to 20 centimeters long that grows well in tropical countries, particularly in the Philippines. The leaves are heart-shaped about 5 to 10 centimeters in diameter and cut into 5 to 7 lobes. The edible fleshy green fruit is oblong with pointed ends, ribbed and wrinkled, bursting when mature to release the seeds. Ampalaya seeds are flat with ruminated margins. It has a bitter taste due to the presence of *Momordica* (Medicalhealthguide, 2015). The result showed that the biosorption process showed higher efficiency when it comes to the content of vitamins and minerals of the *Moringa oleifera* seeds. Ampalaya contains a mixture of flavonoids and alkaloids making the Pancreas produce more

insulin that controls the blood sugar in diabetics. Aside from ampalaya's medicinal value, it is a good source of vitamins A, B, and C, iron, folic acid, phosphorus, and calcium. Ampalaya is also rich in antioxidants that protect the cells of the body from the damage of free radicals (Theaimagent), The feasibility of this plant as a substitute for coffee beans is explained without the comparison between the coffee from ampalaya seeds and commercially available one has more nutritional value (Carreos, 2015).

Okra (*Abelmoschus esculentus*) can grow in tropical and sub-tropical countries and can also grow in that kind of area. Okra (*Abelmoschus esculentus*) is an important vegetable crop. It has various uses like its fresh leaves, buds, flowers, pods, stems, and seeds. Okra seed is rich in high-quality protein regarding its content of essential amino acids relative to other plant protein sources. Okra (*Abelmoschus esculentus*) is a powerhouse of valuable nutrients, with its soluble fiber helping to lower serum cholesterol, reducing the risk of heart disease (Gemedede, 2015). It is also emphasized in steemit.com (2017) that okra seeds when dried can be roasted and ground to make a substitute coffee drink.

Okra (*Abelmoschus esculentus*) is a common vegetable in the market. The immature fruits can be eaten raw, boiled, blanched, or fried. It is also an indispensable component of the Filipino dish "pinakbet" and a common ingredient in soups and sauces. The fruits can be dried or pickled. Okra (*Abelmoschus esculentus*) is a common vegetable in the market. The immature fruits can be eaten raw, boiled, blanched, or fried. It is also an indispensable component of the Filipino dish "pinakbet" and a common ingredient in soups and sauces. The fruits can be dried or pickled. The leaves are sometimes used like spinach and seeds as a substitute for coffee. Okra seeds also contain a considerable amount of good quality oil and protein (Mamaril, 2015). Seeds inside okra are safe to eat. The seeds provide some of the fiber found in okra which helps digestion. Okra is a great compliment to many foods (Mathis, 2016).

Based on the given statements above, the researcher is motivated to provide a way to get the nutrients provided by these plants not just by eating

them but in a more frequent way by consuming plants thus considering their seeds as an alternative in coffee making.

OBJECTIVE OF THE STUDY

This study attempted to determine the acceptability and marketability of the powdered Malunggay, Ampalaya, and Okra Seed as a Coffee Substitute using different proportions during the school year 2018-2019 in Barangay Batasan Hills, Quezon City.

More specifically, this study sought answers to the following questions:

1. To evaluate respondents' perceptions about the acceptability of Malunggay, Ampalaya, and Okra Seed Powder as a Coffee Substitute in terms of appearance, aroma, and tasted texture.
2. To determine the significant difference in the evaluation of the three groups of respondents on the acceptability of Malunggay, Ampalaya, and Okra Seed Powder as a Coffee Substitute.
3. To evaluate the level of marketability of MAAOKRA Coffee in three different proportions as perceived by the respondents.
4. To analyze the significant difference in the evaluation of the three groups of respondents on the level of marketability of MAAOKRA Coffee.
5. To determine the physicochemical analysis of the prepared MAAOKRA Coffee in terms of Calcium, Moisture, Potential for Hydrogen (pH), and d, Potassium.

MATERIAL AND METHODS

An experimental research method was used in this study to determine the acceptability and marketability of produced coffee using Malunggay, Ampalaya, and Okra seeds (MAAOKRA Coffee) to arrive at more precise results. Experimental research has a vital role in society, particularly in

the improvement of human lives. The experimental method of research is defined as systematic and scientific approaches wherein there is an intentional manipulation of one variable while the others are kept constant. The focus of the study is the acceptability and marketability of Malunggay, ampalaya, and okra seed powder as the main ingredients in making nutritious and cheaper coffee, with 20 grams, 40 grams, and 60 grams and with a seed concentration of 70% of malunggay seed, 25% of the ampalaya seed and 5% of okra seed powder.

The data gathering instrument used in this study was the survey questionnaire. This was to determine the evaluation of the three groups of respondents on the finished product in terms of its sensory attributes such as Appearance, Aroma, Taste Texture, and Marketability. The next part of the evaluation of the respondents in the product is on the level of acceptability of Malunggay, Ampalaya, and Okra seed powder as a coffee substitute using nine-point Hedonic rating scales in terms of Appearance, Aroma, Taste, and Texture. A five-point Likert rating scale was used to determine the evaluation of the respondent's Acceptability and Marketability.

The Likert rating scale with range and descriptive values. The researcher secured a written permit from the Division of City Schools in Quezon City to conduct the research. After the approval of the Division Office, the researcher prepared survey questionnaires. To ensure the validity of the survey questionnaires, the researcher asked ten experts to validate the survey questionnaires.

The researcher through the help of her adviser revised the survey questionnaire, as necessary. Having found the survey questionnaires valid and reliable, the researcher secured written permission from the office of the principal at Batasan Hills National High School and the respondents to float the instrument to the respondents of this study. After the approval, the validated survey questionnaires were then administered by the researcher to the consumer respondents who were chosen randomly. After the administration and collection of the survey questionnaires, the researcher gathered,

evaluated, and analyzed all necessary data that are needed in the research data.

In the analysis and interpretation of data, statistical tools were used like MEAN, was used to determine the level of acceptability of and marketability of the Malunggay, Ampalaya, and Okra seed powder as a coffee substitute in terms of the four criteria: Appearance, Aroma, Taste, and Texture. An Analysis of Variance (ANOVA) This was used to determine if there was a significant difference in the evaluation of the three groups on the acceptability of Malunggay, Ampalaya, and okra seed powder as a coffee substitute with 20 grams, 40 grams, and 60 grams in making coffee and (b.) there was no significant difference in the evaluation of the three groups of respondents on the level of marketability of Malunggay, Ampalaya and okra, seed powder as a coffee substitute with 20 grams, 40 grams and 60 grams each proportion of malunggay, ampalaya and okra seed powder as a coffee substitute in terms of the supply/availability, consumer demand, and cost of production.

RESULTS AND DISCUSSION

1. Perceptions of respondents about the acceptability of Malunggay, Ampalaya, and Okra Seed Powder as a Coffee Substitute in terms of appearance, aroma, and tasted texture.

The Adult (20-30) respondents evaluated the acceptability of the Malunggay, Ampalaya, and Okra Seed Powder as a Coffee Substitute with 20 grams' proportion in terms of appearance, aroma, taste, and texture as moderately acceptable with a weighted mean of 7.84 and very acceptable and adult respondents as evidenced by the grand weighted mean ratings of 8.44 and 8.28 respectively.

For the 40 grams proportion, the 20-30 years old respondents rated it 7.72 mean with the verbal interpretation of very acceptable while the 31-40 years old respondents and the 41 years old and above gave it an average of 8.41 and 8.21 respectively which were interpreted as extremely acceptable. The MAAOKRA Coffee with 60 grams' proportion was evaluated by the adults (20-30) with

an overall mean of 7.66, Very Acceptable while the (31-40) and (41- above) respondents gave it the overall mean ratings of 7.60, 8.08, and 7.87, respectively with Extremely Acceptable interpretation.

2. A significant difference in the evaluation of the three groups of respondents on the acceptability of Malunggay, Ampalaya, and Okra Seed Powder as a Coffee Substitute

The Adult (20-30) respondents evaluated the acceptability of the Malunggay, Ampalaya, and Okra Seed Powder as a Coffee Substitute with 20 grams' proportion in terms of appearance, aroma, taste, and texture as Moderately Acceptable with a weighted mean of 7.84 and Very Acceptable and adult respondents as evidenced by the grand weighted mean ratings of 8.44 and 8.28 respectively.

For the 40 grams proportion, the 20-30 years old respondents rated it 7.72 mean with the verbal interpretation of Very Acceptable while the 31-40 years old respondents and the 41 years old and above gave it an average of 8.41 and 8.21 respectively which were interpreted as Extremely Acceptable.

3. Level of marketability of MAAOKRA Coffee in three different proportions as perceived by the respondents

The MAAOKRA Coffee with 60 grams' proportion was evaluated by the adults (20-30) with an overall mean of 7.66, Very Acceptable while the (31-40) and (41- above) respondents gave it the overall mean ratings of 7.60, 8.08, and 7.87, respectively with Extremely Acceptable interpretation adults (20-30) and adult respondents rated the level of marketability of the MAAOKRA Coffee a grand mean rating of 4.35, interpreted as High Potential while the adult (31-40) respondents gave it grand means of 4.60 VHP and those of 40 years old and above, rated it 4.46 grand mean which is High Potential for marketing.

4. A significant difference in the evaluation of the three groups of respondents on the level of marketability of MAAOKRA Coffee

There was a significant difference in the evaluation of the three groups of respondents on the level of marketability of Malunggay, Ampalaya, and Okra Seed Powder as a Coffee Substitute with 20 grams, 40 grams, and 60 grams proportions. It can be observed that the two groups of respondents rated the two proportion (20 grams and 40 grams) with the same overall mean. This means that they have the same evaluation in all the criteria. Another observation is that the young adult respondents gave the MAAOKRA Coffee the highest ratings compared to the other groups. It is evident that this group really likes MAAOKRA Coffee and openly accepts it as a new alternative coffee they can buy in the market. This means that there are significant differences among the evaluations of the three groups of respondents on the level of marketability of Malunggay, Ampalaya and Okra Seed Powder as a Coffee Substitute with 20 grams, 40 grams, and 60 grams' proportions. The data gathered showed that all the three groups of respondents had different evaluations on all the items. It can be observed that the 40 grams proportion has the highest rating among the three proportions. This only indicates that the 40 grams' proportion may be the best option among the three to use. These findings imply that the respondents agreed that marketability of MAAOKRA seed powder as coffee substitute has a very high marketability

5. Physicochemical analysis of the prepared MAAOKRA Coffee in terms of Calcium, Moisture, Potential for Hydrogen (pH), and d, Potassium

The 20 grams proportion has less calcium content, less moisture, and less potassium content but high acidic compared to the other two proportions. On the other hand, the 40 grams proportion has the highest content of calcium, has a moderate content of moisture, is moderately acidic, and has a high protein content compared to the 20 grams and 60 grams proportions. The 60 grams proportion meanwhile has high calcium and high moisture content, is less acidic and has the

highest protein content compared to the other two proportions.

CONCLUSIONS

Based on the findings, the following conclusions were drawn:

1. The MAAOKRA Coffee with 40 grams proportion is the most acceptable proportion in terms of appearance, aroma, taste, and texture compared to the 20 grams and 60 grams proportion.
2. The MAAOKRA Coffee with 40 grams has a higher potential in the market in terms of supply and availability compared to the 20 grams and 60 grams proportion. Furthermore, the 40 grams proportion is more affordable and more nutritious.
3. In terms of physicochemical analysis, the 40 grams proportion is more packed with calcium and potassium.

RECOMMENDATIONS

Based on the conclusions of the study, the following recommendation is hereby endorsed:

1. The college, through the researcher, may craft a project proposal on the production of the MAAOKRA Coffee for a possible research grant from the Department of Science and Technology.
2. The local government may promote MAAOKRA Coffee as one of the healthy coffee products in the local market.
3. Future researchers may undertake similar studies on different seeds that could be a product utilizing other healthy ingredients.

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