PURESA BUTTER: A FOOD ACCEPTABILITY ON THE UTILIZATION OF *MUNTINGIA CALABURA* (SARESA) AND *CLITORIA TERNATEA* (PUKI-PUKI) INTO A SPREAD

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Abstract

This research study conducted at City College of Angeles, Arayat Boulevard, Angeles City, Philippines, during the academic year 2023-2024 aimed to evaluate consumer acceptability regarding the utilization of Saresa and Butterfly Pea Flower as primary ingredients in butter spread production. The research adopted a descriptive research methodology to gauge respondents' assessments of "Puresa butter" based on various parameters, including taste, appearance (inner characteristics), texture, and packaging (outer characteristic). The researchers employed the 5-point hedonic scale developed by Dave Peryam with a total of ninety (90) participants, including eighty-five (85) Technical Vocational Teacher Education students and five (5) food experts, who were asked to provide ratings for the product. The results of the study revealed that for the food experts, the taste of Puresa butter is Acceptable (4), appearance is Acceptable (4), texture is Acceptable (4), and packaging is Acceptable (4), as results showed for the Technical Vocational Teacher Education Students that the taste of butter is Acceptable (4), appearance is Acceptable (4), texture is Acceptable (4), and packaging is Acceptable (4). Furthermore, the research results showed that the direct material expenses for the formulated products were more budget-friendly compared to the control samples employed as fillings for butter spread, and the study also suggested conducting further tests related to product formulation and shelf life to enhance the product's overall quality and marketability.

Keywords: *Saresa (Muntingia calabura), butterfly pea flower (Clitoria ternetea), food acceptability, utilization*

INTRODUCTION

Muntingia calabura tree in the global context is commonly known as Saresa, was introduced to the Philippines from tropical America during the Spanish era, where it quickly spread and adapted extensively as its utilization spans regions worldwide, including Southeast Asia has led to its cultivation in urban settings such as gardens and parking lots in India. In Mexico, saresa fruits are commonly sold in markets, while in Brazil, the tree is cultivated near riverbanks to attract fish that aid fishermen in their catch; however, in Indonesia, where the fruits are frequently consumed raw, which makes saresa is rarely sold due to its abundant availability during the fruiting season (Barral, 2012).

Studies conducted by Tandang et al. (2017) delve into the genetic diversity and geographic distribution of saresa in the Philippines, indicating its potential for domestication and cultivation as saresa is locally acknowledged as one of the indigenous fruit species for its significance in biodiversity conservation and regional economies (Carlos et al., 2014). Descriptions of saresa as a native tree in the Philippines highlight its cultural significance in Filipino cuisine, as documented in articles like "Philippine Native Trees 101: Up Close and Personal with the Kamias, Aratiles, and Duhat Trees" by the Philippine Daily Inquirer.

Saresa (*Muntingia Calabura*) trees frequently vanish in the region due to various factors such as removal, mortality, and neglect by the community for this reason that the saresa trees are cut down and eventually removed to make room for development projects. The ripe fruits of saresa

trees are declining due to temperature and rainfall changes, which impact plant species' distribution and survival. Likewise, overharvesting without using sustainable management techniques may occur when saresa trees are exploited for other things besides fruit, leaves, or wood. The fruit is eaten by small children straight off the tree in many tropical regions, including the Philippines, and it is never sold on a large scale. The fruit is great to eat just out of hand (Osborne, 2017). The saresa fruits have never been introduced to the market, and only a few or limited products utilize saresa and butterfly pea flowers as raw ingredients. As a connection, the researchers thought the product of saresa with butterfly pea flowers would encourage people to plant saresa trees to develop saresa with butterfly pea flower butter and introduce it to the market when refined to its finest.

Many individuals commonly consume saresa fruit in its raw or unprocessed form. However, the researchers developed this study to alter perceptions regarding the consumption of saresa fruits, highlighting their suitability for raw consumption. Despite being abundant, saresa fruits are often overlooked, with many people failing to recognize their value. Saresa is a rapidly growing tree with fruit resembling cherries, offering numerous health benefits (Febrero, 2019). Saresa (*Muntingia calabura*) trees are abundant in the backyard and along the roadsides of Iloilo City but have yet to receive much attention. Motivated by a personal connection to the devastating impact of diabetes on several family members, a sixteen-year-old Maria Isabel Layson from Iloilo National High School investigated the antioxidant and anti-diabetic properties of the fruit, later on discovered that the Jamaican cherry, widely known in the Philippines as saresa, has the potential to treat type 2 diabetes (Malig, 2019).

The discovery of an abundance of saresa fruits in the past year prompted the exploration of their potential, particularly in connection with the development of saresa with butterfly pea flower butter. Saresa was chosen as the primary fruit for the butter due to its beneficial properties, which warrant further recognition and awareness among individuals. Meanwhile, butterfly pea flowers, known for their robust growth and drought tolerance, are commonly cultivated as ornamentals in gardens or growing wild in their native Asia as they also have a rich history of traditional medicinal use (Rojas-Sandoval et al., 2018). According to Jaehaeron (2019), saresa fruits were previously used in recreational activities, such as a game involving throwing them at each other; however, their potential extends beyond such uses, as demonstrated by the researchers' study and the development of food products utilizing saresa fruits which showcases their versatility and exceeding people's perceptions.

The research on puresa butter aims to explore the sensory attributes, nutritional benefits, and consumer acceptance of incorporating *Muntingia calabura* (Saresa) and *Clitoria ternatea* (Butterfly pea flower/ Puki Puki) as unnoticeable raw ingredients into a spread formulation that sheds light on the potential contribution to gastronomic pleasure and health-conscious culinary practices.

Literature Review

The origins of peanut butter can be traced back to the ancient South American Incas, who were among the first to grind peanuts into a paste (Gujarat, 2023); nonetheless, it was not until 1895 when Dr. John Harvey Kellogg unveiled a variation of peanut butter in the United States (Wheeling, 2021). His innovation, aimed at providing a protein substitute for patients at the Battle Creek Sanitarium, marked a significant milestone. Peanut butter gained widespread attention at the St. Louis World's Fair in 1904, capturing the interest of fair attendees and solidifying its place in culinary history (Gujarat, 2023). The resurgence of peanut butter in the modern era can be attributed to Dr. Kellogg's efforts, and its global reach expanded, including a pivotal moment in 1972 when Newborn Food Products, Inc. transformed it into a widely distributed commodity in the Philippines (Rusenko, n.d.).

Peanut butter production has evolved from manual labor to mechanized factory processes.

Initially, farmers harvested and processed peanuts manually, but mechanization boosted harvest yields, leading to larger milling plants and increased peanut butter consumption. Today, peanut butter is made by grinding mature peanut kernels with added salt and other seasonings, stabilizers, and nutritional ingredients permitted by regulatory standards (Roberson et al., 1966). The manufacturing process involves several steps: stone removal, roasting, grinding, and packaging. Quality standards ensure that peanut butter meets specific flavor, texture, scent, and packaging criteria. National standards and regulatory papers outline these requirements to ensure standardization and quality throughout the industry. For instance, peanut butter must have a pleasant and nutty flavor and scent, devoid of undesirable components like bitterness or rancidity, as the texture can vary between smooth and crunchy, which emphasizes consistency. Packaging specifications are also essential to preserve the product's quality and safety during storage and transit (Philippine National Standards et al., 2023).

The saresa tree, scientifically classified as *Muntingia calabura*, exhibits remarkable adaptability and ecological significance as Barral (2012) notes that saresa is a small tree that typically attain heights ranging from five to ten meters as characterized by its spreading branches that enhances the accessibility of its fruits, making it a favored resource, especially for children. Notably, saresa demonstrates resilience to various environmental conditions that thrives in poor soil, acidic or alkaline environments, and even enduring periods of drought (Barral, 2012). Moreover, the rapid growth of the saresa tree contributes to its ecological importance, as Osborne (2013) highlighted that the swift development is accompanied by producing distinctive fruits with a cotton candy-like flavor. These fruits, resembling blueberries in size, undergo a color transformation from unripe green to vibrant orange and red upon ripening as the interior of the saresa fruit is described as juicy and somewhat gelatinous, containing hundreds of tiny yellow seeds that offers a delightful texture reminiscent of rice crispy crunches (Osborne, 2013).

Additionally, the saresa tree exhibits an intriguing reproductive pattern, as Osborne (2013) noted. Upon the ripening of its fruits, the tree promptly forms additional flowers, ensuring a continuous and prolific yield. This cyclical process underscores the plant's abundance, particularly during warmer months, when it generously offers its fruits daily. Furthermore, based on childhood memories documented in Childhood Memories (2015), the saresa fruit reportedly has an 82 percent edible portion with notable nutritional content; per 100 grams, it contains 75.0 kcal of water, providing 100 kcal of energy. It offers 2.0 grams of protein, 0.6 grams of fat, 21.6 grams of carbohydrates, 2.4 grams of crude fiber, 104 milligrams of calcium, 52 milligrams of phosphorus, 0.3 milligrams of iron, 0.03 milligrams of thiamine, 0.04 milligrams of riboflavin, 0.5 milligrams of niacin, and 150 milligrams of ascorbic acid (Childhood Memories, 2015) which makes the saresa tree stands out for its adaptability, rapid growth, distinctive fruits, intriguing reproductive pattern, and nutritional value.

According to the Polish naturalist Jakób Breyne (2024), the botanical species known as *Clitoria ternatea* is commonly referred to as the Ternatea flower of the clitoris has a rich history dating back to its initial mention in 1678 by as its species epithet, "*ternatea*" is derived from Ternate Island that is located within the Maluku Islands. This have a various colloquial names including blue ternatea, blue ternate, and asian pigeon wings, holds cultural significance and is referred to as "pukingan," "pukinggan," "samsamping," "puking-reyna," and "puki ng reyna" in Tagalog and Filipino that goes by common names such as Darwin's pea, bluebell vine, blue pea, butterfly pea, and cordofan pea (Chen, 2018). The butterfly pea flower as introduced to the Philippines thrives in thickets in populated areas at low and medium elevations throughout the country, where it is grown for its striking blue flowers as its resemblance to the female external genitalia is the source of both its scientific and common names, with "pukingan" derived from the Tagalog word for vagina and "*clitoria*" from the clitoris, despite objections to the vulvar association, the genus

"*Clitoria*" endured, named for the female clitoris, which bears flowers resembling vulvas (Philippine Alternative Medicine, n.d.).

The Butterfly Pea Flower (*Clitoria ternatea*) is esteemed for its vibrant blue petals and diverse applications in both culinary and medicinal contexts as its striking blue color is attributed to anthocyanin pigments Yoshida et al. (2012), while its antioxidant properties, mediated by flavonoids, are highlighted by Promprom et al. (2014). The flower's pH sensitivity, causing color changes depending on the substance it is mixed with, has been explored by Goh et al. (2015), and its traditional medicinal uses are discussed by Mukherjee et al. (2019). Its culinary uses in Southeast Asian cuisines are investigated by Naksong et al. (2017), who found it to be a symbol of cultural significance and scientific interest due to its historical roots, unique appearance, and diverse uses.

According to AgriBusiness - Business Diary Philippines (n.d), the saresa tree and butterfly pea flower are botanical species renowned for their multifaceted culinary, medicinal, and cultural applications: leaves brewed into tea, bark utilized in rope-making and skirt fiber production, and fruits processed into jams, jellies, and juices and its timber serves light carpentry and firewood purposes, while its flowers exhibit applications as an antiseptic for treating abdominal cramps (Salac & Dizon, 2015).

Research on saresa highlights its significant health benefits, including antibacterial properties comparable to standard antibiotics and antinociceptive, anti-inflammatory, and antipyretic properties attributed to its leaves. Moreover, newly discovered cytotoxic flavonoids in saresa roots suggest potential anti-cancer properties as its environmental advantages include its resilience in poor soil conditions, tolerance to various environments, and role as a fast-growing pioneer plant aiding reforestation through soil improvement (AgriBusiness - Business Diary Philippines, n.d).

Filipino children favor the acidic and sweet flavor of saresa fruits, which find application in various culinary preparations, including tarts and bread, with potential texture challenges. Despite its popularity, the utilization of saresa in product manufacturing still needs to be improved, indicating untapped potential for innovation and product development (Salac & Dizon, 2015) that correspondently offers diverse applications. In Southeast Asia, its blue petals are commonly used in herbal drinks and Indian puja rituals. At the same time, the immature pods serve as vegetables in the Philippines (Rachael et al., 2021) that act as a natural food coloring agent due to their polyacrylate anthocyanin content and impart a vibrant blue hue to culinary creations (Hasanah et al., 2023).

The *Clitoria ternatea* blossom, a rich blue hue derived from anthocyanin chemicals, is a natural dye and finds applications in traditional medicine for various ailments with its bioactive compounds exhibit medicinal properties, including antibacterial, analgesic, antioxidant, and nootropic effects that extends across culinary and therapeutic realms (Hasanah et al., 2023).

Peanut butter, on the other hand is a popular food product and medicinal plants like saresa and butterfly pea flowers offer various health benefits but pose concerns regarding overconsumption and potential allergic reactions contributing to heart health and blood sugar regulation. Its protein content makes it suitable for individuals adhering to vegetarian or vegan diets, while its low carbohydrate content benefits those with prediabetes (Yauger, 2022). Saresa and butterfly pea flowers offer diverse health advantages. Saresa possesses antitumor, anti-inflammatory, and antioxidant properties as these attributes render it highly beneficial in the food and pharmaceutical sectors. (Guzman, 2016). Butterfly pea flowers contain antioxidants that benefit skin and hair health and may aid in weight loss efforts Pelonara (n.d.) which exhibit promise in regulating glucose levels and mitigating symptoms associated with diabetes (Haider, 2018).

Despite their benefits, overconsumption of peanut butter may lead to allergic reactions and inflammation, particularly in individuals with

peanut intolerance Minchen (n.d.) that is specifically increasingly prevalent in children as it poses a risk of severe allergic reactions (Mayo Clinic, 2022). In addition, concerns arise regarding the potential for mold contamination and rancidity due to peanuts' moisture content (Tigar, 2022) as the excessive saturated fat intake from peanut butter may increase the risk of cardiovascular disease (Harvard Health, 2019). Similarly, while butterfly pea flowers offer potential health benefits, there is no conclusive evidence regarding their long-term and potential side effects, such as nausea and stomach pain Pelonara (n.d.) that why it is recommended to exercise moderation, particularly among individuals with pre-existing health conditions or those undergoing medical treatment. Peanut butter and medicinal plants like saresa and butterfly pea flowers offer diverse health benefits, from heart health and blood sugar regulation to antioxidant properties; however, concerns regarding allergic reactions, mold contamination, and potential side effects warrant caution and moderation in consumption.

Mukherjee et al. (2008) states that the traditional medicine has long made use of blue butterfly pea flowers for cognitive enhancement and the treatment of a variety of health issues as these flower are believed to have potential health benefits as the bioactive components of saresa fruit were shown to have potential as a diabetic treatment in 2019 (Bunag, 2023). The high level antioxidant content of saresa fruit notes counteract cell damage associated with aging and various diseases like cancer and heart disease, and the blue butterfly pea flower shows significant antioxidant properties that means that both fruits can protect the body from free radical damage. In a similar vein, (Venkateshwaran, 2015; Pasukamonset, 2018) emphasizes scientific proof that blue butterfly pea flowers have antioxidant qualities that may counteract free radical damage and oxidative stress as the unique anthocyanins and other compounds found in blue butterfly pea flowers to improve the visual appeal and nutritional content of goods.

The butterfly pea flower's possible health advantages have been further highlighted by evaluations of its non-enzymatic antioxidant levels, such as ascorbic acid, reduced glutathione, and total carotenoids, in its blooms as there are some similarities between the blue butterfly pea flower and the saresa fruit, but there are also some important differences which make the saresa fruit can treat a variety of bacterial infections, although the blue butterfly pea flower cannot (Haider, 2018). The blue butterfly pea flower on the other hand has garnered attention for its numerous health benefits and distinctive aesthetic appeal as it is increasingly recognized in the Philippines with various advantages such as antioxidant properties, improvement of blood circulation, prevention of hair loss and graying, blood purification, enhancement of night vision, and revitalization of skin and hair (Dizon, 2014). Studies have confirmed the safety of butterfly pea herb consumption with no significant adverse effects reported as the young pods of the blue butterfly pea flower are consumed as vegetables while the seeds are applied as a poultice to relieve inflamed joints (Stapes, 1992; Pwee, 2004).

Butterfly pea flower tea is associated with a range of health benefits such as calming effects, anti-cancer properties, better sleep, fever reduction, weight loss assistance, and promotion of brain health, and both sources recognize its historical importance in Ayurvedic medicine for memory improvement and stress relief, and emphasize its use in traditional recipes and as a natural food coloring agent. Siti Azima et al. (2017) contend that extracts from butterfly pea blossoms have unique benefits compared to other plant-based colorants, which include extended shelf life, user-friendly application, and the capacity to provide a natural blue hue to food items that acknowledge the potential economic advantages of extensive propagation and sustainable production techniques. Authors like Hapinat (2020) offer a comprehensive analysis of the nutritional profile and market segmentation of blue ternate flower tea, with a specific focus on millennial and baby boomer consumers; Tan (2022) discusses the present trend of using butterfly pea flowers in the Philippines' culinary industry and its possible economic impact, without delving into its origins; Mintel (n.d.) highlights the prevalence of butterfly pea flowers in various traditional recipes

across countries such as Singapore, Thailand, Malaysia, and Myanmar, extending beyond beverages.

The nutritional profile of the saresa fruit encompasses its edible portion, energy content, macronutrient composition (including protein, fat, carbohydrates, and fiber), and a spectrum of micronutrients such as calcium, phosphorus, iron, thiamine, riboflavin, niacin, and ascorbic acid. These details are sourced from scholarly works such as Childhood Memories (2015) & Glorious Food (n.d.). Additionally, they acknowledge the saresa fruit, also known as Aratiles fruit in the Philippines, as a functional food due to its rich, complex bioactive phytochemicals, as stated by Alcantara (n.d.), particularly its abundance in vitamin C. Furthermore, both sources highlight the culinary usage of the saresa fruit, noting its consumption raw by small children straight off the tree in tropical regions, including the Philippines. The saresa fruit's nutritional composition and culinary usage originates According to Childhood Memories (2015) and also offers specific details about the saresa fruit, including its nutritional breakdown and utilization in product development while acknowledging its functional food status. According to Glorious Food (n.d.), this discrepancy in sourcing suggests potential variations in perspectives and the saresa fruit, describing it briefly as resembling red currants and noting its color-changing ripening process. An alternate name is also provided for the fruit, although it needs more details about its nutritional content or applications in product development.

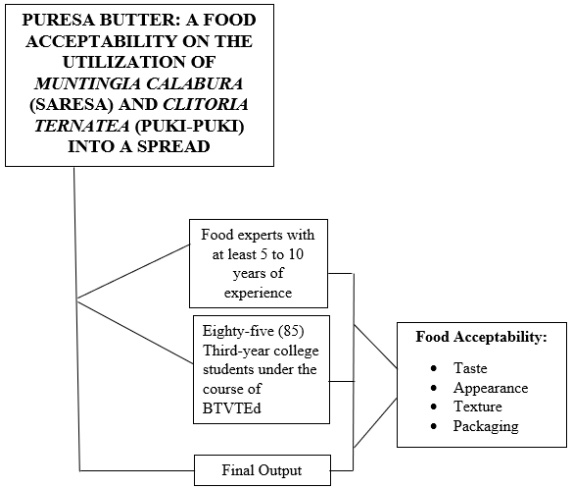
According to the Harmonized National Research Agenda (2022-2028), focusing on Functional Foods, these are described as foods or components that offer health benefits beyond essential nutrient functions. The agenda emphasizes the need to determine the health benefits and safety assessment of such foods in reducing the risk of lifestyle-related diseases, including cardiovascular disease, diabetes, and cancer. The priority foods highlighted are local berries such as duhat, lipote, saresa, and bignay. The agenda also includes the characterization, safety assessment, establishment of health benefits, and product development of various items like saresa and butterfly pea flowers. However, the potential utilization of saresa and butterfly pea flowers is constrained due to their underutilization as food resources, and despite possessing valuable properties, these products need more effective marketing and promotion for consumption.

Based on the information gathered from various sources, researchers aim to utilize saresa fruits and butterfly pea flowers to create a butter product. Utilization, as defined by Seels and Richey (1994), involves a systematic approach to leveraging resources to support learning. Considering the medicinal properties and availability of the raw ingredients, the researchers aim to produce a beneficial product. Saresa fruits, butterfly pea flowers, and honey are chosen as key ingredients due to their accessibility throughout the year, particularly during the summer or warm seasons. According to the Wildlife Sanctuary (n.d), saresa trees bear fruit year-round but are most abundant in the summer months. Likewise, butterfly pea flowers thrive during the summer, with rapid growth and pod maturation occurring within a relatively short time frame. Staples (1992) notes that butterfly pea flowers are native to various environments, including grasslands, woodlands, and disturbed areas. Additionally, the researchers highlight the safety of honey in homemade spreads, emphasizing its composition primarily of sugars (40% fructose and 30% glucose), water (17%), and trace amounts of other nutrients.

The research seeks to create an innovative butter spread utilizing saresa fruits and butterfly pea flowers. In butter production, researchers will use a developmental way of producing a saresa with butterfly pea flower butter or puresa butter spread. According to Bates and Parkinson (n.d), production aims to meet the demand for such converted resources. Production is the structured process of transforming raw materials into completed products through commodities and services. The researchers will apply a schematic procedure in making the butter: First, wash the saresa fruits and butterfly pea flowers. In the

second step, remove the hard external center part and the outer skin of each saresa fruit to extract the pulp. Utilize measuring tools such as a cup and spoon to quantify the amount of saresa fruit pulp and butterfly pea flowers, followed by blending them for approximately 8 minutes. In the third step, add one tablespoon of honey and blend for 2 minutes. Fourth, after blending, transfer the mixture to a pan and cook it for 25 to 35 minutes under low heat. During the fifth step, stir the mixture regularly using a wooden spoon until it thickens and most liquid evaporates. In the sixth step, pasteurize the bottles needed for the finished product, and after cooling, put the mixture in a sterilized clean glass jar. Seal the jar tightly and pasteurize it for 10 minutes. The researchers want to utilize a new and unique butter spread to produce an additional option to the currently available butter spreads. One of the researchers' aims is to utilize raw ingredients like saresa and butterfly pea flowers that benefit everyone. The result of this study will determine the general acceptability of saresa with butterfly pea flower butter on the personal perceptions of the respondents.

Conceptual Framework



Statement of the Objectives

This study aims to determine the food acceptability of saresa butter combined with butterfly pea flowers. The researchers utilized the saresa fruits and butterfly pea flowers in butter spread to create a unique flavor of butter in a case of product development. The objectives that followed were expressly intended to be attained by this study:

1. To prepare a bread filling using Saresa *(Muntingia Calabura)* and Butterfly Pea Flower *(Clitoria ternatea)*

2. To subject the product to food tasting validation by the experts in terms of:

   2.1 Taste
   2.2 Appearance
   2.3 Texture
   2.4 Packaging

3. To determine the food acceptability of the product among consumers (Third year BTVTEd Students participants) through food tasting in terms of:

   3.1 Taste
   3.2 Appearance
   3.3 Texture
   3.4 Packaging

Significance of the Study

The results of this study may offer an expanded insight into making various butter spreads, such as fruit butter made using *Clitoria ternatea* and *Muntingia calabura*. The researchers created an innovation by combining the generally available saresa fruit and butterfly pea flower to create a sensory acceptable fruit butter. The following will benefit from the study's findings:

To **Technical Vocational and Livelihood students**, are the focus of this research and its primary beneficiaries. Through this study, they will learn the advantages of Puresa butter and how to create a butter spread with a delectable new or distinctive flavor utilizing the saresa fruits and butterfly pea flowers, a fast-growing tree accessible in the Philippines.

To the **teachers**, CCA instructors can help students develop the capacity and expertise necessary to become more effective researchers.

To **curriculum planners** within the field of BTVTEd (Bachelor of Technical-Vocational Teacher Education) by facilitating the refinement of subjects that align more closely with the needs and competencies of the students. This study will equip students with enhanced knowledge and skills, specifically focusing on their ability to design and create products directly applicable to their future professional endeavors.

To **the local populace**, regardless of their socioeconomic standing, the outcome will assist the local populace in establishing small companies in order to generate income. Additionally, saresa fruits with butterfly pea flowers are accessible fruits and flowers that will be transformed into a delectable butter spread that is considered to be new and unique to the locals and consumers.

To **farmers**, this study may help them gain ideas and produce saresa fruits and butterfly pea flowers for selling purposes, or they can be entrepreneurs who plant raw materials for the Puresa butter or Saresa with butterfly pea flower butter at the same time they are producers too.

To **aspiring researchers**, future researchers will be able to create better research with the help of the baseline data and guidelines provided by this study. This study will benefit future researchers by providing more details about using saresa and butterfly pea flowers in butter production. It will also be used as a source for investigations that build on this research.

To **the parents**, in this study, parents play a crucial role since they offer the researchers moral support in fulfilling the study about product development.

Scope and Delimitation

This study focused on the acceptance of Saresa (*Muntingia calabura*) butter with Butterfly Pea Flower (*Clitoria ternatea*) or Puresa butter among the community, specifically in Angeles City. Participants in the study are focused on one or more distinct groups of people, such as food experts and students. To maintain geographic homogeneity, participants are chosen from areas of Angeles City that are within the scope of the City College of Angeles.

Survey questions are used in the study to collect information on participants' rates of how accepted Puresa butter is as food as participants are asked to rate and offer feedback on a variety of acceptability-related factors, including taste, appearance, texture, and packaging. However, participants with dietary restrictions or specific medical conditions that have an impact on their ability to choose foods are excluded.

METHODS

This section presents the method and procedure used by the researchers in the conduct of the study.

Research Design

This study employed a descriptive-style methodology that specifically focuses on development as the descriptive approach, also known as statistical research, was utilized to provide a thorough account of information and characteristics related to the population or phenomenon under investigation which involved emphasizing the description of data through the use of averages and various statistical calculations, as suggested by Calderon (2008) and cited by Alberto et al. (2011).

The rationale behind utilizing a descriptive-style methodology was to obtain a comprehensive understanding of the population or phenomenon being studied to present a detailed account of relevant information that allows for a nuanced analysis of the subject matter. The incorporation of developmental research principles served the purpose of systematically examining the design, development, and evaluation of instructional programs, processes, and products to ensure internal consistency and effectiveness in these educational endeavors that also aligns with the principles outlined by Seels and Richey (1994, p. 127).

A descriptive-style methodology was implemented in this study to achieve its goal, as it focuses on statistical research techniques, which involve the collection and analysis of data using averages as means and various statistical calculations. Concurrently, developmental research principles guided the systematic examination of the design, development, and evaluation of instructional programs, processes, and products that ensured a comprehensive and detailed exploration of the subject matter while also assessing the internal consistency and effectiveness of educational endeavors within the developmental framework. In summary, the study combined a descriptive approach with developmental research principles to gather and present comprehensive information about the population or phenomenon being studied, ensuring a robust and thorough analysis.

Sample and Sampling Technique

This study utilized two sampling methods, namely purposive and random sampling methods. In the case of non-probability sampling, the purposive sampling technique was particularly useful for studying a specific cultural domain with experienced experts within it. The selection of the purposive sample was crucial to the validity of the data collected; hence, ensuring the informant's dependability and competency was essential (Tongco, 2007). A population subset that was randomly selected was referred to as a simple random sample. Each person in the population had an exact equal probability of being chosen using this sampling technique (Thomas, 2022).

Whereas this study was conducted among five (5) food experts who had at least 5 to 10 years of experience and eighty-five (85) students from the Institute of Education, Arts, and Sciences with a specific course and year level under the Bachelor of Technical-Vocational Teacher Education (BTVTEd) third-year college students, who were randomly selected to serve as the research respondents.

Research Instrument

The researchers utilized a self-made survey questionnaire for the food taste testing. During the real-time gathering of data through the survey, the respondents took part in the food taste testing and answered the questionnaire to provide feedback on the Puresa butter product. They were instructed to check their preferred scale number as a measurement of their sensory perception under the categories of taste, texture, appearance, and packaging. The questionnaire used a five-point hedonic scale, divided into four sensory characteristics: taste (sweetness), texture (mouthfeel), appearance (color), and packaging (outer appeal). The respondents rated each sensory attribute on a scale of 1 (Dislike Extremely) to 5 (Like Extremely) based on their own free will.

Data Collection Procedure

The researchers sought permission from the Dean of the Institute of Education, Arts, and Science to conduct the study. After obtaining approval and permission, the researchers distributed the questionnaires to the five (5) food experts with at least 5 to 10 years of experience and eighty-five (85) consumers, specifically third-year college students under the course of BTVTEd, divided into 3 sections of City College of Angeles. Upon gaining consent to conduct the study and participation permission from the respondents, the researchers proceeded to explain their objectives to the respondents along with the necessary instructions. The respondents personally received the self-made survey form questionnaires, which they were asked to fill out according to their personal judgment and preference, along with a sample Puresa butter product and a small piece of plain crackers (sky flakes) for food taste testing and examination before filling out the survey form consisting of sensory perception scales. The researchers conducted the process of collecting data in a consistent and similar manner among the food experts around Angeles City and among the third-year college students of City College of Angeles as respondents. A suitable statistical tool was used to evaluate and interpret the collected data in accordance with the study's goals.

Statistic Treatment

The researchers employed weighted mean (sub-mean & general mean) as statistical tools, with data collected through Excel serving as the basis for the formula incorporated within the application. Additionally, the researchers utilized data gathered by the research team that is organized and presented through statistical tables as the researchers utilized a weighted mean approach to assess the overall acceptability of saresa with butterfly pea flower butter or the Puresa butter to determine the general average ratings for four sensory characteristics, namely taste, appearance, texture, and packaging.

Ethical Consideration

The researchers asked for permission from those who are involved with the study before beginning their investigation in order to uphold ethical norms in research as the respondents were made to be aware of the study's goals and kept their identities private. In order to protect the participants and their authorization, according to the University of Nevada (2021), it is mandatory to preserve the information that respondents are disclosing.

The researchers had taken meticulous measures to safeguard the well-being of the respondents to ensure their nonmaleficence throughout the study as confidentiality of the study's findings was considered paramount as participants were systematically informed of their entitlements that encompasses the autonomy to opt out of participation, access to comprehensive information regarding the study, and acknowledgment of potential adverse consequences that enable them to make informed decisions regarding their involvement. The survey was administered at the City College of Angeles, targeting third-year college students pursuing a Bachelor of Technical-Vocational Teacher Education and, around Angeles City, food experts as the designated cohort.

Data Analysis Method

The information from the respondents was counted, arranged, examined, organized, and deciphered. In analyzing the data, the researchers used descriptive statistics, particularly the mean. The researchers employed a 5-point hedonic scale (Scale: 1-dislike extremely; 2-dislike slightly; 3-neither like nor dislike; 4-like slightly; 5-like extremely) to determine the degree of overall sensory acceptability of the Puresa butter in terms of its taste, texture, appearance, and packaging.

Five - Point Hedonic Scale

Interval Scale	Verbal Descriptors
1	Dislike extremely
2	Dislike Slightly
3	Neither Like nor Dislike
4	Like Slightly
5	Like Extremely

Food Acceptability Scale (Five - Point Hedonic Scale and Range of Scores)

Scales	Range Scores	Level of Acceptability
1	1.00 - 1.49	Dislike Extremely (De)
2	1.50 - 2.49	Dislike Slightly (Ds)
3	2.50-3.49	Neither Like nor Dislike (NLD)
4	3.50 -4.49	Like Slightly (Ls)
5	4.50-5.00	Like Extremely (Le)

RESULTS

1. The researchers prepared a bread filling using Saresa *(Muntingia Calabura)* and Butterfly Pea Flower *(Clitoria ternatea).*

Final Treatment: Recipe	
1. Preparation of Saresa with Butterfly pea flower butter or Puresa butter spread	
1.1 Ingredients & Measurements	
Quantity & Unit	**Ingredients**
1 cup and 2 Tbsp	Saresa fruits (Freshly picked) without outer skin
15 pieces whole, fully grown	Butterfly pea flower (Freshly picked)
1 Tbsp	Honey
1.2 Tools and Equipment	
• Pot • Bowls • Wooden Spoon • Spatula	• Measuring Cups/ Spoons • Blender • Glass jar • Spoon
1.3 Procedure	
Preparation Procedure:	
1. Wash/rinse well the saresa fruits and butterfly pea flowers. 2. Remove the hard external center part and the outer skin or exocarp of each saresa fruit to get the pulp. 3. Remove the green part or the sepals bud of the butterfly pea flower. 4. Sterilized the glass jar for butter for about 10 minutes.	
Actual Procedure:	
1. Using a measuring cup and a measuring spoon, measure the quantity of the saresa fruit pulp. 2. Put the saresa fruits without the outer skin or exocarp and the butterfly pea flower without sepals in the blender, then blend it for about eight (8) minutes. 3. Then add 1 tablespoon of honey and blend again for about two (2) minutes. 4. After the process of blending it using an electric blender, it's time to transfer it to the pan and cook it for about twenty-five (25) minutes to thirty (35) minutes under low heat. 5. Stir frequently with a wooden spoon or spatula until the mixture thickens and most of the liquid has evaporated. 6. Then let it cool for about ten (10) minutes in a clean, dry place to be ready for bottling or putting in the butter spread glass jar. 7. After cooling the puresa butter, put it in a sterilized clean glass jar and seal it tightly. Then pasteurized it for ten (10) minutes.	
1.4 Final Treatment Product (Puresa Butter Spread)	
This is the actual final outcome, product, and packaging of the Saresa with Butterfly Pea Flower Butter or Puresa Butter Spread.	

2. The researchers subjected the product to food tasting validation by the experts in terms of taste, appearance, texture, and packaging. Data of the Puresa Butter Spread after the taste testing of Food Experts:

Table 1
Sensory Acceptability of Puresa Butter or Saresa with Butterfly pea flower butter spread in terms of Taste

#	Indicator	Rating	Verbal Interpretation
1	The sweetness of the Puresa butter spread or saresa with butterfly pea flower butter is acceptable	4	Like Slightly (Ls)
2	The taste of Puresa butter compliments with baked products/goods	4	Like Slightly (Ls)
3	The taste of the saresa and butterfly pea flower complement each other	3.60	Like Slightly (Ls)
	Mean	**4**	**Acceptable**

Table 1 shows the results of the respondent's evaluation on the product's taste. Getting a mean of 4, the product's sweetness is rated as Like slightly. Majority of the respondents agreed (4) that the taste of Puresa butter spread compliments with baked products/goods. Lastly, five of respondents rated the taste of the saresa, and butterfly pea flower complement each other a 3.60 or like slightly. Spread enhances taste and adds moisture, Nebraska, 2017.

Table 2
Sensory Acceptability of Puresa Butter or Saresa with Butterfly pea flower butter spread in terms of Appearance

#	Indicator	Rating	Verbal Interpretation
1	The tiny substance of saresa is visible	3.80	Like Slightly (Ls)
2	The ability of the saresa is to hold its shape with butterfly pea butter is observed	3.40	Neither Like nor Dislike (NLD)
3	The vibrant blue or violet-hued is distinct	4.00	Like Slightly (Ls)
	Mean	**4**	**Acceptable**

Table 2 shows the sensory acceptability rating of Puresa butter spread based on its appearance. The evaluation towards the product size garnered a mean of 4. This means that the majority of the respondents rated it Acceptable. The tiny substance is visible gained a mean of 3.80 which equates to a rating of Like Slightly. The ability is holding shape and observed gained a mean 3.40 which equates to a rating of Neither Like nor Dislike. The vibrant blue or violet-blued is distinct gained a mean of 4.00 which equates to a rating of Like Slightly. According to Skogerson (2005), butters like peanut butter should be kept glossy, colorful, and in the same form to avoid the oil from the butter separating from the solids portion.

Table 3
Sensory Acceptability of Puresa Butter or Saresa with Butterfly pea flower butter spread in terms of Texture

#	Indicator	Rating	Verbal Interpretation
1	The consistency of the Puresa butter is visible	4.00	Like Slightly (Ls)
2	The tiny texture of saresa is crunchy	3.20	Neither Like nor Dislike (NLD)
3	Saresa with butterfly pea flower butter has a chunky texture that is noticeable	3.80	Neither Like nor Dislike (NLD)
	Mean	**4**	**Acceptable**

Table 3 shows the result of the respondents' evaluation on the product's texture. The majority of the respondents agreed that the consistency of the Puresa butter is visible which equates to 4.00 mean. The tiny texture of saresa is crunchy which gained a mean of 3.20 that equates to a very acceptable rating. Lastly, the product gained a 3.80 mean for its chunky. Texture plays a crucial role in shaping consumers' perceptions of food, as it is closely linked to various sensory attributes.

According to Amy Fleming (2013) Texture is large business and the study of food structure even has its own ology: food rheology. But in our consistently happiness regarding eating, texture is much of the time thought about the unfortunate

connection of taste and smell (US research found that textural mindfulness was in many cases). Yet, the experts know quite well that, while the tangible spotlight might fall on flavor while we're enjoying a significant piece, misunderstand the surface and its game over.

Table 4

Sensory Acceptability of Puresa Butter or Saresa with Butterfly pea flower butter spread in terms of Packaging

#	Indicator	Rating	Verbal Interpretation
1	The color of packaging of Puresa butter spread or saresa with butterfly pea flower butter can stimulate appetite	3.40	Neither Like nor Dislike (NLD)
2	The logo and branding of Puresa butter creates a sense of familiarity and trust	4.40	Like Slightly (Ls)
3	The glass jar is best option for preserving saresa with butterfly pea flower butter spread	4.60	Like Extremely (Le)
	Mean	**4**	**Acceptable**

Table 4 shows the results of the respondent's evaluation on the packaging. Majority of the respondents agreed that the color of packaging can stimulate appetite which equates to a 3.40 mean Neither Like or Neither Dislike. The logo and branding created a sense of familiarity and trust which gained a mean of 4.40 that equates to a like slightly. Lastly the glass jar is the best option for preserving Puresa butter spread gained 4.60 means for its like extremely. According to Rundh (2019) asserts that a package increases a brand's visibility, draws attention to it, and modifies consumers' opinions about the goods.

3. The researchers determined the food acceptability of the Puresa Butter among consumers (third year BTVTEd student's participants) through food tasting in terms of taste, appearance, texture, and packaging. Data of the Puresa Butter Spread after the taste testing of the BTVTEd students:

Table 5

Sensory Acceptability of Puresa Butter or Saresa with Butterfly pea flower butter spread in terms of Taste

#	Indicator	Rating	Verbal Interpretation
1	The sweetness of the Puresa butter spread or saresa with butterfly pea flower butter is acceptable	4.14	Like Slightly (Ls)
2	The taste of Puresa butter compliments with baked products/goods	4.11	Like Slightly (Ls)
3	The taste of the saresa and butterfly pea flower complement each other	4.07	Like Slightly (Ls)
	Mean	**4**	**Acceptable**

Table 5 shows the results of the respondent's evaluation on the product's taste. Getting a mean of 4.14, the product's sweetness is rated as like slightly. Majority of the respondents agreed (4.11) that the taste of Puresa butter compliments with baked products/goods. Lastly, 85 respondents rated the taste of the saresa, and butterfly pea flower complement each other a 4.07 or like slightly. According to Beeren et al. (2019), spreads can be encountered in various forms, such as a paste, sweetener, or liquid, crafted from fruits, nuts, cheese, or yeast extract.

Table 6

Sensory Acceptability of Puresa Butter or Saresa with Butterfly pea flower butter spread in terms of Appearance

#	Indicator	Rating	Verbal Interpretation
1	The tiny substance of saresa is visible	3.80	Like Slightly (Ls)
2	The ability of the saresa is to hold its shape with butterfly pea butter is observed	3.88	Like Slightly (Ls)
3	The vibrant blue or violet-hued is distinct	4.16	Like Slightly (Ls)
	Mean	**4**	**Acceptable**

Table 6 shows the sensory acceptability rating of Saresa with Butterfly pea flower butter based on its appearance. The evaluation towards the product size garnered a mean of 4. This means that the majority of the respondents rated it Acceptable. The tiny substance is visible and gained a mean of 3.80 which equates to a rating of Like Slightly. The ability of holding shape was observed to have gained a mean 3.88 which equates to a rating of Like Slightly. The vibrant blue or violet-blued is distinctly gained a mean of 4.16 which equates to a rating of Like Slightly. The Roman gourmet Apicius is credited as saying, "We eat first with our eyes." For the purpose of determining how fresh food is, its appearance is equally crucial.

Table 7

Sensory Acceptability of Puresa Butter or Saresa with Butterfly pea flower butter spread in terms of Texture

#	Indicator	Rating	Verbal Interpretation
1	The consistency of the Puresa butter is visible	4.18	Like Slightly (Ls)
2	The tiny texture of saresa is crunchy	3.52	Like Slightly (Ls)
3	Saresa with butterfly pea flower butter has a chunky texture that is noticeable	3.45	Neither Like nor Dislike (NLD)
	Mean	**4**	**Acceptable**

Table 7 shows the result of the respondents' evaluation on the product's texture. The majority of the respondents agreed that the consistency of the Puresa butter is visible which equates to 4.18 mean. The tiny texture of saresa is crunchy which gained a mean of 3.52 that equates to a very acceptable rating. Lastly, the product gained a 3.45 mean for its chunky.

According to Lu Ann Williams, in 2019, Innova Market Insights conducted their own consumer research and found that seven out of ten people around the world believed that the texture of food and drinks added an extra layer of excitement to the experience. What's fascinating is that when it comes to reaching out to younger folks, incorporating interesting textures can be a powerful strategy. About 56% of individuals between the ages of 26 and 35 told us that they cared more about how a product felt in their mouth than they did about the list of ingredients it contained. On the other hand, only 37% of those who were over 55 shared a similar interest in texture.

Table 8
Sensory Acceptability of Puresa Butter or Saresa with Butterfly pea flower butter spread in terms of Packaging

#	Indicator	Rating	Verbal Interpretation
1	The color of packaging of Puresa butter spread or saresa with butterfly pea flower butter can stimulate appetite	4.04	Like Slightly (Ls)
2	The logo and branding of Puresa butter creates a sense of familiarity and trust	4.26	Like Slightly (Ls)
3	The glass jar is best option for preserving saresa with butterfly pea flower butter spread	4.54	Like Extremely (Le)
	Mean	**4**	**Acceptable**

Table 8 shows the results of the respondent's evaluation on the packaging. Majority of the respondents agreed that the color of packaging can stimulate your appetite which equates to a 4.04 mean Like Slightly. The logo and branding create you a sense of familiarity and trust which gained a mean of 4.26 that equates to a like slightly. Lastly the glass jar is the best option for preserving Puresa butter gained 4.54 means for its like extremely.

According to Professor William J. Stanton (2023) defines packaging as the culmination of all the processes involved in creating a product's wrapper or container. Assuring product safety, maintaining quality, improving presentation, and facilitating effective transportation are among its main goals.

DISCUSSION

This study assessed the sensory acceptability of saresa (*Muntingia Calabura Linn*) with butterfly pea flower (*Clitoria Ternatea*) butter or Puresa butter spread in terms of taste, texture, appearance, and packaging. The researchers used a 5 - point Hedonic Scale by David Peryam considered as a significant figure in the development of sensory and hedonic scales to determine the sensory acceptability of the Puresa butter product.

The research study was conducted at City College of Angeles with a total of eighty-five (85) students, or respondents, from the Institute of Education, Arts, and Sciences with a specific course and year level under the Bachelor of Technical-Vocational Teacher Education (BTVTEd) third-year college students and five (5) food experts specifically with at least 5 to 10 years of experience in the field. All the data gathered were analyzed using the descriptive survey research method.

1. The researchers prepared a bread filling using Saresa *(Muntingia Calabura)* and Butterfly Pea Flower *(Clitoria ternatea).*

In the final treatment of preparing Puresa Butter, the researchers did excessive thinking and planning in incorporating this final treatment. The researchers altered the peotraco muscovado sugar into a natural honey to produce a natural-colored butter from the saresa fruits and butterfly pea flowers. The quantity of ingredients under the measurement of saresa without outer skin and the number of butterfly pea flowers used are also adjusted to come up with a most delectable puresa butter spread. In this final treatment, researchers fulfill the aims of eliminating the bitterness of the butter and producing the natural color of the raw, processed ingredients and maintaining the appropriate thickness. The researchers finally prepared and produced a successful bread filling product utilizing the saresa *(Muntingia calabura)* and butterfly pea flower *(Clitoria ternatea) as butter.*

2. The researchers subjected the product to food tasting validation by the food experts in terms of taste, appearance, texture, and packaging.

Food Experts

In the course of the study, after preparing the saresa with butterfly pea flower butter or puresa butter spread, the researchers distributed samples

of this newly developed product to five food experts in the industry, each possessing a professional background encompassing at least 5 to 10 years of experience in the field. Each expert was furnished with a comprehensive researcher's self-made questionnaire spanning two pages, a small piece of baked product (Sky Flake Cracker), and a sufficient amount of puresa butter or saresa with butterfly pea flower butter. After completing the data collection process, the researchers subsequently undertook the task of aggregating through tallying, tabulating, computing, and analyzing the gathered information. The data collected were the scores of the five (5) food expert's respondents on the sensory acceptability of saresa with butterfly pea flower butter in terms of taste, appearance, texture, and packaging.

The general mean of data of Puresa Butter Spread after the taste testing of Food Experts:

The overall sensory acceptability evaluations data collected from food experts for Puresa Butter or Saresa with Butterfly pea flower butter spread in terms of these four sensory, Taste, Appearance, Texture, and Packaging. The overall calculated sub-mean of taste gained four favorable taste profile of saresa with butterfly pea flower, indicating its suitability as a palatable option for consumers. The general determined mean score of 4 for appearance implies that saresa with butterfly pea flower butter is acceptable in terms of appearance. Saresa's visually stunning butterfly pea flower Butter confirms that it is a suitable and aesthetically pleasing option for customers. The texture evaluation in Puresa Butter or Saresa with Butterfly Pea Flower Butter spread yielded an overall computed sub-mean of 4, showing acceptability in molding consumer preferences and highlighting positive reception. An overall computed mean score of 4 was obtained from the sensory evaluation of the packaging for Puresa Butter or Saresa with Butterfly Pea Flower Butter spread. This rating confirms the packaging's acceptability and satisfactory quality, as well as its compatibility for customer preferences. These collective endorsements show Saresa with Butterfly Pea Flower Butter as a potential option, meeting customers' sensory preferences in a variety of ways.

3. The researchers determined the food acceptability of the Puresa Butter among consumers (third year BTVTEd student's participants) through food tasting in terms of taste, appearance, texture, and packaging.

Student Respondents (Consumers)

Data of the Puresa butter spread or Saresa with butterfly pea flower butter after the taste testing of City College of Angeles students, or respondents with a total number of eighty-five (85), from the Institute of Education, Arts, and Sciences with a specific course and year level under the Bachelor of Technical-Vocational Teacher Education (BTVTEd) third-year college students.

In the course of the study, after preparing the saresa with butterfly pea flower butter, the researchers distributed samples of this newly developed product to eighty-five (85) student respondents from the Institute of Education, Arts, and Sciences. The student participants are specifically enrolled in the Bachelor of Technical-Vocational Teacher Education (BTVTEd) program, currently in their third year. Each participant received a comprehensive printed researcher's self-made questionnaire printed on both sides of a single page, along with a small piece of baked product (Sky Flake Cracker) and a sufficient amount of Puresa butter spread. After completing the data collection process, the researchers subsequently undertook the task of aggregating through tallying, tabulating, computing, and analyzing the gathered information. The data collected were the scores of the eighty-five (85) third-year college student participants from the City College of Angeles on the sensory acceptability of saresa with butterfly pea flower butter in terms of taste, appearance, texture, and packaging.

The general mean of data of Puresa Butter Spread after the taste testing of the BTVTEd students:

The overall results were interpreted from students' responses about the sensory

acceptability of Puresa Butter from the indicators of Taste, Appearance, Texture, and Packaging. With a mean of 4, the taste of the Puresa butter is rated as acceptable, highlighting its sweetness and compatibility with baked products. The overall results from the appearance of the Puresa butter gained a mean score of 4, deemed acceptable, with its size, color, and ability to hold shape receiving positive ratings. The texture, characterized by visible consistency and a crunchy texture, was also perceived positively, contributing to the spread's acceptability, and gained a mean score of 4. Furthermore, the overall calculated sub-mean of packaging gained 4, with its appetizing appearance and suitable glass jar container garnering approval ratings, enhancing the product's overall acceptability as these student responses suggest that the Purea Butter or Saresa butter with butterfly pea flower spread meets consumer expectations across key sensory and practical dimensions that positions it as a suitable option in the market.

CONCLUSION

Based on the finding of this study, the researchers were able to obtain the following:

Theoretical Implications of the Study

The researchers aimed to investigate the sensory perception of Puresa Butter according to its taste, appearance, texture, and packaging. This study takes a comprehensive approach by examining each of these sensory characteristics. It is resulted that consumers and food experts expressed positive views about Puresa Butter due to its aesthetic appeal, taste, texture, and packaging design as all of these factors should be considered to help the manufacturers achieve their customers' overall satisfaction and have an edge over competitors. Businesses may obtain their long-term clients' trust and improve their brand image by aligning them with the characteristics to consider which highlights the significance of quality assurance procedures that ensure excellence and consistency in all sensory dimensions, from appearance, taste, texture, and packaging that fosters consumer trust and brand advocacy.

Practical Implications of the Study

The development of Puresa butter, which is derived from the main raw ingredients saresa, butterfly pea flowers, and honey, provides plant-based healthy alternatives and distinctive flavors as butter. The utilization of underutilized ingredients contributes to the preservation of biodiversity and sustainable agriculture, which can lead to economic benefit for farmers. The nutritional benefits of Puresa butter appeal to consumers who are concerned about their health and are looking for functional foods, as the ingredients that are procured locally not only support regional food systems but also correspond with attitudes for sustainability, which encourages gastronomic discovery and cultural appreciation while also giving educational opportunities regarding the nutritional worth of the food.

Limitations of the Study

There are several limitations that occur as a result of our inability to control external elements which include the fact that changing lighting conditions during product evaluations and changes in production or storage might impact color perception. The complexities of color perception can also be influenced by these factors as it is also possible for the unpredictability of weather to cause disruptions in the data collecting process from saresa, which may lead to a partial loss of ingredients that also can have an effect on the dependability and completeness of our conclusions.

Future Research Directions

Future research should conduct extensive studies about the shelf-life and stability of Puresa butter in order to gain insights into its long-term viability and commercial potential for preservation of taste and color while maintaining compliance with food safety regulations. Aspiring researchers should explore different techniques in preparing the Puresa butter, especially when processing the butterfly pea flower, which can be in the form of dehydration or powderization, to extend the usability and preservation of the flower; examine the theoretical implications of blue butterfly pea flower infusion on the nutritional profile of

saresa, analyzing changes in antioxidants, phytochemicals, and key nutrients; and evaluate the practical applications of incorporating saresa into blue butterfly pea flower butter across various food industries that explore potential market expansion opportunities and consumer acceptance. Future research should explore other alternative edible, healthy flower ingredients, such as lilies, roses, and beebalm that replicate saresa's distinctive red color, which expands the range of natural colorants available for food applications.

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