

Development Of Spring Roll Using Wrapper With Threadfin Bream (Nemipterus Japonicus) Flakes

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ABSTRACT

This study aimed to determine the Development of Spring roll using Wrapper with Threadfin Bream (*Nemipterus japonicus*) Flakes and if there were significant differences in the Development of Spring roll using Wrapper with Threadfin Bream (*Nemipterus japonicus*) Flakes using three different proportions of ingredients per treatment in terms of aroma, color, flavor, texture and general acceptability. The present investigation employed experimental design to establish the level of acceptability of the Development of Spring roll using Wrapper with Threadfin Bream (*Nemipterus Japonicus*) Flakes. There are three treatments subjected for evaluation using a Researcher made Survey questionnaire. These were Treatments A, B, and C. There were fifteen (15) trained panels composed of faculty of NIPSC Ajuy Campus that were purposely selected to evaluate the product. The data gathered were analyzed using the mean, standard deviation and the Friedman's Test (Freidman's ANOVA). The criterion for rejection and acceptance of hypothesis was set at 0.05 level of significance. The study was conducted at NIPSC-Ajuy Campus, during the 2nd Semester of School Year 2020-2021. The findings were based on the data and the results of the analysis obtained were as follows: Treatment B with 150 grams of threadfin bream flakes was found to be "extremely acceptable" and comparable with the commercial spring roll wrappers (Treatment A) in terms of aroma, color, taste, texture, and general acceptability. No significant differences was found out in the acceptability of the Development of Spring roll using Wrapper with Threadfin Bream (*Nemipterus japonicus*) Flakes in terms of aroma, color, taste, texture, and general acceptability. Spring roll using Wrapper with Threadfin Bream (*Nemipterus japonicus*) Flakes has suggested retail price of P2.65 which is more than 100 % higher compared to the commercial spring roll wrapper with selling price of P1.00 per piece. Finally, it was recommended that continuous research and development shall be pursued in case commercialization of Spring roll using Wrapper with Threadfin Bream (*Nemipterus japonicus*) Flakes is considered especially in the cost aspects. A feasibility study shall be conducted first before commercialization is pursued. Other pelagic fishes shall also be ventured and tested to fortify spring roll wrapper. Although results positive results in terms of acceptability, researcher shall look into possible ways to lower the cost of the product to ensure profitability. The Municipality of Ajuy along with the academic community and research authorities to take action on making researches that shall promote the utilization of pelagic fishes in the town. This actions shall enable the economic development of the town that can help resolve poverty and shortage of food in the Municipality of Ajuy. The said activities shall also promote entrepreneurial spirit especially the small and local businesses in the community

Keywords

Development, Threadfin Bream Flakes, Spring Roll, Wrapper

Article Received: 10 August 2020, Revised: 25 October 2020, Accepted: 18 November 2020

Introduction to the study

Rationale

This chapter is divided into five parts: (1) Background, Theoretical Framework, and Conceptual Framework of the Study, (2) Statement of the Problem and the Hypotheses, (3) Significance of the Study, (4) Definition of Terms, and (5) Delimitation of the Study.

Part One, Background, Theoretical Framework, and Conceptual Framework of the Study, gives the reasons for the choice of the problem and presents the conceptual framework upon which the study was anchored.

Part Two, Statement of the Problem and the Hypotheses, states the main and specific problems of the research as well as the hypotheses tested.

Part Three, Significance of the Study, discusses the possible contributions and applications of knowledge that might be gained from the results of the study.

Part Four, Definition of Terms, cites the conceptual and operational meanings of the important terms used in the research.

Part Five, Delimitation of the Study, specifies the scope and coverage of the important terms used in the research.

Background, Theoretical Framework, and Conceptual Framework of the Study

Food is an essential part of everyone's lives. Every living thing needs food to survive, but for humans, food has a much deeper and more complex significance. It gives as strength to response activities and becoming more active physically and mentally. Filipinos have among the worst health habits in Asia and 45% admitting to unhealthy eating habits, also in highest the region showed that Filipinos had the highest level of family history of chronic illness (sun life financial Asia 2014).

Scientific and technological developments in the field of food have marked a shift in the way people deal with food and health. Scientific research constantly provides new insights in the interaction between genetic predisposition, specific health risks and nutritional needs, and the functioning of separate nutrients. There is a growing awareness that the dietary source and form of food may affect the overall health of the consumer. With the help of these insights and the advancing (bio) technological possibilities in this field, it is possible to develop new biological active enriched foods.

The role of food as an agent for improving health has

initiated the development of new classes of food- functional foods. The term indicates a food that contains some health promoting components. Various so-called functional foods have appeared on the market. General nutritional advice such as 'eat a varied diet and not too much' or the 'five food groups', in the past is nowadays increasingly defined in terms of required intake of nutrients, whether or not geared to different target groups (Elvevoll, 2014).

Food technology had been continuously studying the possibilities of embarking new products which are both healthy and convenience, considering the busy life style of the Filipinos today. As such spring roll is one of the most demanding food to busy people. Fresh or fried spring rolls can be healthy considering the ingredients as well as the condiments that can be added to suit the tastes of the consumers.

On the other hand, the abundance of fish in particular Threadfin Bream (*Nemipterus japonicus*) in the Municipality of Ajuy provide the researcher the idea of enriching spring rolls such, with the compelled reasons of making a nutritious and convenient food and at the same time making use of the local raw materials which are readily available and affordable in the community. The present investigation was also conducted due to eagerness of the researcher to promote local fish industry in such a way that it can help augment the income of the local people as well as the uplift their standard of living.

Theoretical Framework of the Study

Research and development is one way of uplifting the economy of a particular nation. It is also one of the most effective way of looking for possible means and ways to improve the quality of life of the people through enhanced and healthy lifestyles and economic upliftments.

The present investigation was anchored on the fortification concept presented by Allen et al., (2006). Food fortification involves the addition of essential nutrients such as vitamins and minerals to staple foods to improve their nutritional value or enriching food items with added ingredients wherein can augment the constantly high nutritive value of the food.

The fortificant also should be readily available, accessible and well absorbed into the food without causing a significant change in the sensory attributes of the fortified food. Food fortification can take several forms such as mass fortification, targeted fortification and market-driven fortification. Whatever the purpose of fortification, it is pertinent to note that the food to be fortified (food vehicle) and fortificant must be compatible. Further, the fortificant must be such that, it does not improve the nutritional value of the food at the expense of the sensory properties. This is very important since consumers are first attracted by what they see and this can play a large role in determining the continuous patronage for such food commodity.

In this study, the Threadfin bream flakes to improve the nutritive quality of spring rolls had been ventured. As previously defined, fortification which is sometimes used interchangeably with enrichment involves the addition of specific micronutrients to wrapper with Threadfin Bream (*Nemipterus japonicus*) flakes to improve its overall nutritional value.

Conceptual Framework of the Study

To better understand the relationship between independent and dependent variables used in the study the conceptual framework represented by the figure below was shown.

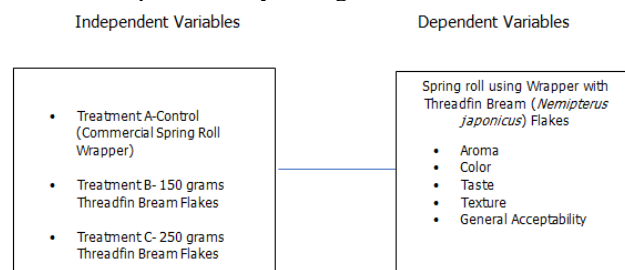


Figure 1. Level of acceptability of the different proportions of the Development of Spring roll using Wrapper with Threadfin Bream (*Nemipterus japonicus*) Flakes

Statement of the Problem

This study was conducted to determine the level of acceptability of the Development of Spring roll using Wrapper with Threadfin Bream (*Nemipterus japonicus*) Flakes as well as its economic viability.

Specifically, this study sought to answer the following questions:

1. What is the level of acceptability of the Development of Spring roll using Wrapper with Threadfin Bream (*Nemipterus japonicus*) Flakes most acceptable proportion of Threadfin Bream Flakes Spring roll Wrapper in terms of aroma, color, taste, texture, and general acceptability considering the three formulations as follows:

Treatment A –control (commercial spring roll wrapper), Treatment B 150 grams Threadfin Bream Flakes, Treatment C, 250 grams Threadfin Bream Flakes?

2. Are there a significant difference in the acceptability of the Development of Spring roll using Wrapper with Threadfin Bream (*Nemipterus japonicus*) Flakes most acceptable proportion of Threadfin Bream Flakes Spring roll Wrapper in terms of aroma, color, taste, texture, and general acceptability considering the three formulations as follows:

Treatment A –control (commercial spring roll wrapper), Treatment B 150 grams Threadfin Bream Flakes, Treatment C, 250 grams Threadfin Bream Flakes?

3. What is the economic viability of Spring roll using Wrapper with Threadfin Bream (*Nemipterus japonicus*) Flakes?

Hypothesis of the Study

Based from the aforementioned problems the following hypothesis was advanced at 0.05 level of significance:

Ho: There are no significant difference in the acceptability of the Development of Spring roll using Wrapper with Threadfin Bream (*Nemipterus Japonicus*) Flakes most acceptable proportion of Threadfin Bream Flakes Spring roll Wrapper in terms of aroma, color, taste, texture and general acceptability considering the three formulations as follows: Treatment A –control (commercial spring roll wrapper),

Treatment B 150 grams Threadfin Bream Flakes, Treatment C, 250 grams Threadfin Bream Flakes?

Significance of the Study

The present investigation as well as the underlying processes and results will benefit the following stakeholders: **The Teachers and Students in NIPSC – Ajuy Campus.** The findings if this investigation will give the teachers as well as the students with the principle of fortification. This study will encourage them to venture new products using combination of different raw materials as outputs in laboratory activities.

The Parents. The result of the study will provide useful information to parents regarding the principle of fortification using the raw materials or combination of these raw materials that can be readily found in the localities.

The Local Entrepreneurs. Insight for new business venture and opportunities can be considered by local entrepreneurs. The use of new raw material that are readily available in the community will provide the entrepreneurs big opportunity to optimize the cost of production and maximize their profits.

The Fishermen. The output of this study will be a prospects for the fishermen in the Municipality of Ajuy. The utilization of Threadfin Bream in the procedures of making spring roll wrappers will encourage fishermen as well as their counterparts to proactively act in order to promote the fishing industry in the community.

The Future Researchers. The results of the study will provide future researchers insights especially in conducting the same study. The research process involved in this study will also serve as a guide for them.

Delimitation of the Study

The present investigation employed experimental design to establish the level of acceptability of the Development of Spring roll using Wrapper with Threadfin Bream (*Nemipterus japonicus*) Flakes in terms of aroma, color, taste, texture and general acceptability. There are three treatments subjected for evaluation using a Researcher made Survey questionnaire. These were Treatments A, B, and C. There were fifteen (15) trained panels composed of faculty of NIPSC Ajuy Campus that were purposely selected to evaluate the product.

The data gathered were analyzed using the mean, standard deviation and the Friedman's Test (Freidman's ANOVA). The criterion for rejection and acceptance of hypothesis was set at 0.05 level of significance.

The study was conducted at NIPSC-Ajuy Campus, during the 2nd Semester of School Year 2020-2021.

Definition of Terms

For clarity and understanding, the following terminologies were defined conceptually and operationally:

Acceptability- refers to the quality or state of meeting one's needs adequately (Merriam-Webster Dictionary Online, 8-4-2020).

In this study, it refers to the level of acceptance perceived by the panel of evaluators of spring roll using wrapper with threadfin bream flakes in terms of aroma, color, flavor,

texture and general acceptability. In the study acceptability was measured using five-point scale.

Development- refers to the process of innovating, designing, creating, developing and marketing new products (Merriam-Webster Online, 8-6-2020).

In this study, development was used to utilize existing raw material to formulate finished product which can be useful to various benefactors. It is also the one that carried out successfully through careful evaluation of the finished product through sensory evaluation.

Aroma- this refers to a noticeable and usually pleasant smell and usually pertains to food aroma (Merriam-Webster Online, 8-4-2020).

In this study, this refers to the same but specifically pertains to the aroma of spring roll using wrapper with threadfin bream flakes.

Color- this refers to a quality such as red, blue, green yellow, etc., that a person can see (Merriam-Webster Online, 8-4-2020).

In this study, this refers to the same but specifically pertains to the color of spring roll using wrapper with threadfin bream flakes.

Texture- this refers to the way that something feels when you touch (Merriam-Webster Online, 8-4-2020).

In this study, this refers to the same but specifically pertains to the texture of spring roll using wrapper with threadfin bream flakes.

Taste- this refers to sense the flavor of something that you eat (Merriam-Webster Online, 8-4-2020).

In this study, this refers to the same but specifically pertains to the taste of spring roll using wrapper with threadfin bream flakes.

Threadfin Bream Flakes- refers to Japanese (*Nemipterus japonicus*), is a demersal species, very abundant in coastal waters (Golani and Sonin, 2006).

In this study, it refers to the same fish which is used to incorporate in spring roll wrapper for fortification purposes.

Spring roll- this refers to food items stuffed with fillings such as vegetables, meat, and seafood, and usually served as snacks, appetizers with condiments or sauce (iFood.tv 2014.)

In this study, spring roll refers to the same, however the wrappers were enriched by threadfin bream flakes.

Review of Related Literature

This chapter is divided into three parts; (1) Conceptual Literature; (2) Related Studies; and (3) Summary.

Part One, Conceptual Literature, discusses about Lagaw (*Nemipterus japonicus*) as a raw material, its nutrient values, as well as consumption patterns,

Part Two, discusses the related studies that involved Threadfin Bream in (*Nemipterus japonicus*) food production,

Part Three, Summary, summarized the literature cited regarding Threadfin Bream (*Nemipterus japonicus*).

Conceptual Literature

Japanese Threadfin Bream (*Nemipterus japonicus*).

The Japanese threadfin bream, *Nemipterus japonicus* (family Nemipteridae) is widely distributed throughout the

Indian Ocean and West Pacific (Kalhor, Memon, & Chang, 2014). The *N. japonicus* locally known as "Lagaw" in Iloilo, has a widespread distribution throughout the waters in Northern Iloilo waters. The Japanese Threadfin Bream, *Nemipterus japonicus*, is a demersal species, very abundant in coastal waters, found on mud or sandy bottoms in 5 to 80 m, usually in schools. It has a wide distribution from the Red Sea and eastern shores of Africa to the Philippines and Japan. It is one of the major species in the southern Red Sea (Ben-Yami, 1964) and in the Gulf of Suez (Ben-Tuvia and Grofit, 1973). The presence of this fish in the Mediterranean is evidently due to migration from the Red Sea via the Suez Canal (Golani and Sonin, 2006). The threadfin breams are valued food fishes in many parts of the world and are caught commercially by hook and line and bottom trawl (Puentes-Granada *et al.*, 2004).

Threadfin Bream constitute food product like fish pickle. A method for the preparation of fish pickles from a lean variety of fish namely pink perch (*Nemipterus japonicus*) is described. Dipping the fish in 10% sodium chloride solution containing 6% acetic acid before pickling, was found desirable for retaining the meaty texture of the product. The product has no fish smell or flavor and has a shelf life of more than six months at ambient temperatures and scored very well in organoleptic tests. Pickling is a traditional method of preservation of fish in India. A variety of fish pickles with vinegar and spices are produced and marketed in Germany, North European countries, China, Japan, Philippines and several other countries (Borgstrom & Paris, 1965; Stansby, 1963; Tanikawa, 1971).

In India a few spiced and pickled products like "padda" and "mallei" from seer and "Colombo cured pickle" from oil sardines and mackerels are prepared on a domestic scale. A considerable quantity of Colombo cured fish used to be exported to Ceylon (Nicholson, 1930). Although some work has been done in India on the preparation and preservation of pickles from fatty fishes like sardine and mackerels (Rao & Nair, 1950; Vasavan & Verma, 1959; Rao & Valsan, 1962; Balachandran & Muraleedharan, 1975; Devadasan *et al.*, 1975), feasibility of preparing spiced pickles from lean varieties of fish suited to our tastes seems to have not been reported.

Nutrients and Health Benefits

Eating fish is an important source of omega-3 fatty acids. These essential nutrients keep our heart and brain healthy. Two omega-3 fatty acids found in fish are EPA (eicosapentaenoic acid) and DHA (docosahexaenoic acid). Our bodies don't produce omega-3 fatty acids so we must get them through the food we eat. Omega-3 fatty acids are found in every kind of fish, but are especially high in fatty fish.

Threadfin Bream (*Nemipterus japonicus*) is a low-fat high quality protein. Rich in omega-3 fatty acids and vitamins such as D, B2 (riboflavin), calcium and phosphorus and a great source of minerals, such as iron, zinc, iodine, magnesium, and potassium. The American Heart Association recommends eating fish at least two times per week as part of a healthy diet. Fish is packed with protein,

vitamins, and nutrients that can lower blood pressure and help reduce the risk of a heart attack or stroke.

The Threadfin bream found in tropical waters of the Indian and western Pacific Oceans. Threadfin bream is high on proteins and rich in vitamins and minerals such as Vitamin D and Vitamin B12. (India MART Member Since Jun 2017). Threadfin bream has fine-textured flesh and a sweet, delicate flavour. The best methods of cooking whole fish are steaming, baking or barbecuing - wrapped in foil or banana leaves (India MART Member Since Apr 2008).

Importance of Threadfin Bream in Socio-Economic Progress

Economic development is normally accompanied by improvements in a country's food supply and the gradual elimination of dietary deficiencies, thus improving the overall nutritional status of the country's population. Furthermore, it also brings about qualitative changes in the production, processing, distribution and marketing of food. Increasing urbanization will also have consequences for the dietary patterns and lifestyles of individuals, not all of which are positive.

Changes in diets, patterns of work and leisure - often referred to as the "nutrition transition" - are already contributing to the causal factors underlying non communicable diseases even in the poorest countries. Moreover, the pace of these changes seems to be accelerating, especially in the low-income and middle-income countries. Threadfin bream occupies a very important place in socio-economic development of the country and plays an important role in the commercial fisheries of west coast of India.

Japanese Threadfin breams constitute one of the most important commercial demersal stocks targeted by trawlers in the Indian EEZ. They are abundant in 30-200 m depth range. Traditionally trawlers targeted this stock in the 50 metre depth range, but over the last two decades fishery has expanded and the stock has been exploited in deeper waters as deep as 150 m along the west coast of India. Two species *Nemipterus japonicus* and *Nemipterus mesoprion* contribute 90% of the threadfin bream landings in Indian waters. They constitute a major fishery in Kerala during monsoon season, when upwelling triggers movement of threadfin breams into inshore waters (Murthy *et al.* 2003).

There is a heavy demand for threadfin breams in the surimi production in Kerala, with processing plants in this state even importing threadfin breams from other coastal states such as Karnataka and Maharashtra, when there is shortage of catches in the post monsoon period.

Threadfin bream are one of the major demersal fishery resources, contributing 4.6% to the total marine landings of India. Lagaw has a widespread distribution throughout the Indian Ocean (Russell, 1990). This fish is mostly caught in trawls all along the Indian EEZ. It is a fast growing species with a life span of around 3-4 years (Gulati, 2007; Devaraj and Gulati, 1988). They are targeted due to the high demand for surimi-based processing industries (Swatipriyanka Sen *et al.*, 2014). Threadfin bream constitutes nearly 4.3% of the total trawl catch along the Chennai coast. Lagaw are carnivorous bottom-living fishes feeding mainly on other small fishes, cephalopods, crustaceans, and polychaetes.

Used highly in the production of Surimi in factories across the world.

Literally "ground meat" -refers to a paste made from fish or other meat, as well as multiple Asian foods that use surimi as its primary ingredient. It is available in many shapes, forms, and textures, and often used to mimic the texture and color of the meat of lobster, crab, and other shellfish. The most common surimi product in the Western market is imitation crab meat. Such a product often is sold as krab, imitation crab and mock crab in the United States, and as seafood sticks, crab sticks, fish sticks or seafood extender in Commonwealth nations. In Britain the product is sometimes known as Ocean sticks, to avoid trading standards issues regarding mis-advertisement.

The utilization of waste from fish processing industry for production of value added products has attracted substantial attention. Tiger-toothed croaker (*Otolithes ruber*) and Pink perch (*Nemipterus japonicus*) are used for surimi production and have the potential of abundant supply of raw skins and bones. In order to evaluate the waste from Tiger-toothed croaker and Pink perch as a source of gelatin, the gelatin was extracted from skin and bones and its rheological and functional properties were examined. The skins of Tiger-toothed croaker and Pink perch yielded 7.56% and 5.57% gelatin, whereas their bones yielded 4.57% and 3.55% respectively indicating skin as an important source for gelatin production. The gel strength of gelatins from the skins and bones of Tiger-toothed croaker (170 g and 140 g respectively) were found higher than Pink perch skin and bone gelatins (150 g and 130 g respectively).

Similarly, the viscosity, melting point, emulsifying capacity and stability, foaming capacity and stability, and water holding capacity of gelatin extracted from Tiger-toothed croaker were in general greater than those of the gelatin from Pink perch and the values of skin gelatin were higher compared to bone gelatin in both the species. Hydroxyproline contents in skin and bone of Tiger-toothed croaker were 7.77 and 7.51mg/g and in Pink perch they were 7.63 and 7.41mg/g respectively. It can be concluded from the present study that Tiger-toothed croaker skin is a prospective source to produce gelatin in good yield with desirable functional properties comparable to commercially available mammalian gelatins.

Related Studies

Several studies have been done on *N. japonicas* in the world especially from the Indian Ocean region. *N. japonicas* constitutes an important part of the trawl catch in South China Sea Andaman Sea, W. Bay of Bengal, Persian Gulf and Oman Sea (Valinassab et al., 2006). *N. japonicas* has been studied on population dynamics on reproductive biology, maturity and spawning and fecundity, food and feeding habits, length and weight relationship and on morphological characteristics. However, there is limited work done on population dynamics of *N. japonicas* from Pakistani waters.

The length based stock assessment was frequently used where age-structure data are limited (e.g., in tropical fisheries, Sparre and Venema, 1998). Based on length frequency data collected from four demersal trawl surveys in 2009—2010 from Pakistani waters, growth and mortality

rates of Japanese thread- fin bream (*N. japonicas*) inhabiting the region were estimated. The results obtained in this study can be helpful for fish stock assessment and fishery management in Pakistan.

There is a large quantity of very small fish landed as by-catch which do not find a ready market as fresh fish. Fish processing and filleting industries turn out large quantities of fisheries waste. All these are good sources of high quality protein, fat, mineral etc. The modern fish-processing industry in our country is four decades old. Although we have exported dry fish and prawns during pre-independence; the export of marine products rose to 5 lakhs tonnes worth Rs. 5,000 crores in 2003. This phenomenal increase in export of marine products and development in fish- processing industry has been more or less based on a single commodity, prawns, which constitute about 10-20% of the total marine catch. However, this modern trend is not so apparent in various other fish products and by-products. One of the important by-products of commercial value is fish meal, produced mainly from underutilized fish species and by-catch species.

Other than these mentioned studies and researches, Huda, N. & Slam Babji, A. (2007) also conducted a study on the to develop surimi powder from dried thread bream. It was a noble experiment that enables the food industry think of all possibilities to promote fishing industry all over the world.

Summary

Literature and studies regarding the utilization of threadfin bream is very limited and there few literatures and studies that can discuss the morphology, nutrient content, as well as economic significance especially in food production. The present investigation was able to scoop out some of the valued studies regarding the raw material used in this study. It has been found out that threadfin bream has high nutrient component and common in coastal areas like West Coast, Indian Coast, and the Pacific Coast. In the Philippines it is considered as one of the pelagic fishes that is common in the coastal area of Northern Iloilo.

It is also known to be affordable and used for food especially by the poor people. Aside from its usage as food, it was also found out that threadfin bream like any other fish was processed into fishmeal. The present investigation therefore as well as the results of the present study can be a prospect for further literature regarding the utilization of threadfin bream in food production which is essential for future investigation and researches.

Research Design and Methodology

Chapter 3 is divided into two parts: (1) Research Design and, (2) Methodology,

Part one, Research Design, restates the reasons for conducting the study and the research designed used.

Part two, Methodology, describes the respondents involved in the study, the data gathering instruments used, the step of the research process as well as the procedures for data analysis.

Research Design

The present investigation employed experimental research design to evaluate the level of acceptability of the Development of Spring roll using Wrapper with Threadfin Bream (*Nemipterus japonicus*) Flakes in terms of aroma, color, taste, texture, and general acceptability. According to Blanza (2018) experimental research method is employed to determine the cause and effect relationship of certain phenomena under controlled conditions and usually employed in scientific researches or product development studies.

More specifically, the multiple parallel group design was employed through hedonic test for acceptability. The Hedonic Test for acceptability is similar to Complete Randomized Design (CRD) where each sample or Treatment was tested three times by the panel of experts in a coded manner. The sensory evaluation was repeatedly done in an interval of 5 minutes for every trial (Blanza, 2018). For every trial the panel of experts was given 25 grams of the product to be tasted. The cycle was repeated for every sensory quality namely: aroma, color, taste, texture and general acceptability.

Methodology

Participants of the Study

The participants of the study were (15) trained panels composed of faculty of NIPSC Ajay Campus that were purposely selected to evaluate the product.

The Data Gathering Technique and Instruments Used

The present investigation employed experimental design. The standardized products were subjected to sensory evaluation test. The three experimental treatments are: Treatment A-Control (Commercial Spring Roll Wrapper); Treatment B- with 150 grams Threadfin Bream Flakes; and Treatment C-with 250 grams Threadfin Bream Flakes.

A researcher made sensory evaluation sheet was used to determine the acceptability of the Development of Spring roll using Wrapper with Threadfin Bream (*Nemipterus japonicus*) Flakes with preference to the following sensory qualities such as aroma, color, taste, and texture. The general acceptability was determined through the average means of the aforementioned sensory qualities.

The evaluation sheet has a Five Point Likert Scale format, with the following scores, scale, responses and verbal interpretation:

| Score | Scale | Responses | Verbal Interpretations |
|-------|-------|------------|------------------------|
| 5 | 4.50- | Like Very | Extremely |
| | 5.00 | Much | Acceptable |
| 4 | 3.50- | | |
| | 4.49 | Like Much | Very Acceptable |
| 3 | 2.50- | | |
| | 3.49 | Like | Acceptable |
| 2 | 1.50- | Moderately | Moderately |
| | 2.49 | Like | Acceptable |
| 1 | 1.00- | | |
| | 1.49 | Not Like | Not Acceptable |

Research Procedure

The study has three phases; the first phase was the standardization of the two formulations (Treatment B and C) of spring roll wrapper using the trial and error method. The second phase was the evaluation of spring roll using Wrapper with Threadfin Bream (*Nemipterus japonicus*) Flakes and the third phase was the cost analysis to determine the viability of spring roll wrapper compared to the commercial one. Table 1 showed the standardized recipe for Treatment B and C of spring roll wrappers.

Table 1 Standardized Recipe of the Development of Spring roll using Wrapper with Threadfin Bream (*Nemipterus japonicus*) Flakes

| Ingredients | Quantity | |
|------------------------|-------------|-------------|
| | Treatment B | Treatment C |
| All purpose Flour | 250 grams | 250 grams |
| Egg | 1 pc | 1 pc |
| Evaporated Milk | 200 ml | 200ml |
| Water | 200 ml | 200ml |
| Salt | 5 grams | 5 grams |
| Seasoning | 5 ml | 5 ml |
| Ginger | 5 grams | 5 grams |
| Threadfin Bream Flakes | 150 grams | 250 grams |
| Yield: | 60 pcs | 70 pcs |

The second phase was the determination of the level of acceptability of the standardized recipes using sensory evaluation and the sensory evaluation sheet.

The third phase was the determination of economic viability of the finished the most acceptable product.

Data Analysis Procedure

The mean was used to determine the level of acceptability of the product in terms of aroma, color, taste, texture, and general acceptability. Standard deviation was used to determine the dispersion of the means. Friedman's ANOVA was used to determine the significant differences in the level of acceptability of the products considering the identified sensory qualities. Economic viability was determined using the total food cost and food factor formula.

Results

This chapter is divided into two parts, (1) Descriptive Data Analysis, (2) Inferential Data Analysis, (3) Cost Analysis of the most Acceptable Products

Part One, Descriptive Data Analysis, discusses the descriptive data as well as presents the interpretation and analysis;

Part Two, Inferential Data Analysis, discusses and presents the inferential data.

Part Three, Cost Analysis, performs and present the cost analysis of the most acceptable products.

Descriptive Data Analysis

Level of Acceptability of the Development of Spring roll using Wrapper with Threadfin Bream (*Nemipterus japonicus*) Flakes

Data in Table 2 showed that Treatment A and Treatment B were “extremely acceptable” in terms of aroma, color, taste, texture as well as general acceptability. This was revealed in the obtained mean ratings which fell within the range of 4.50-5.00 scales.

Results revealed that Treatment C was “Very Acceptable” in terms of the given sensory qualities such as aroma, color, taste, and texture. It was shown in the obtained mean score which fell within the range of 3.50-4.49 scales. Generally, Treatment C was also “Very acceptable”.

Results revealed that Treatment B has the highest level of acceptability. The obtained standard deviation in the mean score which fell within 0.1999-0.3421 showed a narrow dispersion indicating homogeneity in the responses.

Table 2 Level of Acceptability of the Development of Spring roll using Wrapper with Threadfin Bream (*Nemipterus japonicus*) Flakes in terms of aroma, color, appearance, taste, texture and general acceptability

| Sensory Quality | Mean | Verbal Interpretation | SD |
|-----------------------|--------|-----------------------|--------|
| Aroma | | | |
| Treatment (Control) | A 4.56 | Extremely Acceptable | 0.3421 |
| Treatment B | 4.55 | Extremely Acceptable | 0.2341 |
| Treatment C | 4.49 | Very Acceptable | 0.2415 |
| Color | | | |
| Treatment (Control) | A 4.51 | Extremely Acceptable | 0.2451 |
| Treatment B | 4.52 | Extremely Acceptable | 0.2415 |
| Treatment C | 4.44 | Very Acceptable | 0.2444 |
| Taste | | | |
| Treatment (Control) | A 4.51 | Extremely Acceptable | 0.2615 |
| Treatment B | 4.54 | Extremely Acceptable | 0.2512 |
| Treatment C | 4.43 | Extremely Acceptable | 0.1999 |
| Texture | | | |
| Treatment (Control) | A 4.53 | Extremely Acceptable | 0.2514 |
| Treatment B | 4.53 | Extremely Acceptable | 0.2912 |
| Treatment C | 4.48 | Very Acceptable | 0.2123 |
| General Acceptability | | | |
| Treatment (Control) | A 4.53 | Extremely Acceptable | 0.2182 |
| Treatment B | 4.54 | Extremely Acceptable | 0.2319 |
| Treatment C | 4.46 | Very Acceptable | 0.3415 |

Note: The level of acceptability of the Development of Spring roll using Wrapper with Threadfin Bream

(*Nemipterus japonicus*) Flakes in terms of sensory qualities were measured according to the following scales: Extremely Acceptable (4.50-5.00); Very Acceptable (3.50-4.49); Acceptable (2.50-3.49); Moderately Acceptable (1.50-2.49); and Not Acceptable (1.00-1.49).

Inferential Data Analysis

Differences in the Level of Acceptability of the Development of Spring roll using Wrapper with Threadfin Bream (*Nemipterus japonicus*) Flakes

Data in Table 3 showed that there are no significant differences in the acceptability of the Development of Spring roll using Wrapper with Threadfin Bream (*Nemipterus japonicus*) Flakes

in terms of all the sensory qualities identified. This were revealed in the following p values of: aroma, p value=0.991>0.05; color, p value= 0.241>0.05; taste, p value=0.271>0.05; texture, p value=0.652>0.05; and texture, p value =0.451>0.05.

With these evidences, the null hypothesis of no significant differences in the acceptability of the Development of Spring roll using Wrapper with Threadfin Bream (*Nemipterus japonicus*) Flakes in terms of all the sensory qualities identified were accepted at 0.05 level of significance.

Table 3 Friedman’s Test for the Differences in the Level of Acceptability of the Development of Spring roll using Wrapper with Threadfin Bream (*Nemipterus japonicus*) Flakes

| Variables | x ² | p value |
|-----------------------|----------------|---------|
| Aroma | 4.992 | 0.991 |
| Color | 2.561 | 0.241 |
| Taste | 2.381 | 0.271 |
| Texture | 2.351 | 0.652 |
| General Acceptability | 2.351 | 0.451 |
| Sig @0.05 alpha | | |

Cost Analysis of the Development of Spring roll using Wrapper with Threadfin Bream (*Nemipterus japonicus*) Flakes

Treatment B

Based from Table 2, Treatment B was perceived to be the most acceptable and comparable to Treatment A(control) which is the commercial spring roll wrapper, thus subjected to cost analysis give the ingredients shown in Table 4. Data revealed that Treatment B have a total yield of 60 pieces and a food cost of P1.06/ piece. Using a 2.5 food factor to obtain a mark-up of 40 % the suggested selling price of spring roll using wrapper with threadfin bream (*Nemipterus japonicus*) flakes per piece was P 2.65. The cost of commercial spring roll wrapper is P1.00 per piece which means that spring roll using wrapper with threadfin bream (*Nemipterus japonicas*) flakes has more than 100% higher cost compared to the commercial one.

Table 4

Cost Analysis of the Development of Spring roll using Wrapper with Threadfin Bream (*Nemipterus japonicus*) Flakes

| Ingredients | Quantity | Amount |
|------------------------|----------------------|---------|
| | Treatment B | |
| All purpose Flour | 250 grams | P10.00 |
| Egg | 1 pc | P7.00 |
| Evaporated Milk | 200 ml | P15.00 |
| Water | 200 ml | P1.00 |
| Salt | 5 grams | P.005 |
| Seasoning | 5 ml | P0.10 |
| Ginger | 5 grams | P0.50 |
| Lagaw Flakes | 150 grams | P30.00 |
| Yield: | 60 pcs | P63.605 |
| Cost /Pc | | P1.06 |
| Suggested Price/Pc@2.5 | Selling Food factors | P2.65 |

Summary, Conclusions, Recommendations

This chapter is divided into three parts; (1) Summary, (2) Conclusions; and (3) Recommendations.

Part One, Summary of the Problem, Method, and Findings, reports the vital points of the study and its findings.

Part Two, Conclusions, presents the conclusions drawn from the results of the investigation.

Part Three, Recommendations, offers some suggestions in relation to the findings, conclusions, and implications advanced in the study.

Summary of the Problem, Method, and Findings

Statement of the Problem

This study was conducted to determine the level of acceptability of the Development of Spring roll using Wrapper with Threadfin Bream (*Nemipterus japonicus*) Flakes as well as its economic viability.

Specifically, this study sought to answer the following questions:

1. What is the level of acceptability of the Development of Spring roll using Wrapper with Threadfin Bream (*Nemipterus japonicus*) Flakes most acceptable proportion of Threadfin Bream Flakes Spring roll Wrapper in terms of aroma, color, taste, texture, and general acceptability considering the three formulations as follows: Treatment A –control (commercial spring roll wrapper), Treatment B 150 grams Threadfin Bream Flakes, Treatment C, 250 grams Threadfin Bream Flakes?

2. Are there a significant difference in the acceptability of the Development of Spring roll using Wrapper with Threadfin Bream (*Nemipterus japonicus*) Flakes most acceptable proportion of Threadfin Bream Flakes Spring roll Wrapper in terms of aroma, color, taste, texture, and general acceptability considering the three formulations as follows:

Treatment A –control (commercial spring roll wrapper), Treatment B 150 grams Threadfin Bream Flakes, Treatment C, 250 grams Threadfin Bream Flakes?

3. What is the economic viability of Spring roll using Wrapper with Threadfin Bream (*Nemipterus japonicus*) Flakes?

Hypothesis of the Study

Based from the aforementioned problems the following hypothesis was advanced at 0.05 level of significance:

Ho: There are no significant difference in the acceptability of the Development of Spring roll using Wrapper with Threadfin Bream (*Nemipterus japonicus*) Flakes most acceptable proportion of Threadfin Bream Flakes Spring roll Wrapper in terms of aroma, color, taste, texture and general acceptability considering the three formulations as follows: Treatment A –control (commercial spring roll wrapper), Treatment B 150 grams Threadfin Bream Flakes, Treatment C, 250 grams Threadfin Bream Flakes?

The present investigation employed experimental design to establish the level of acceptability of the Development of Spring roll using Wrapper with Threadfin Bream (*Nemipterus japonicus*) Flakes in terms of aroma, color, taste, texture and general acceptability. There are three treatments subjected for evaluation using a Researcher made Survey questionnaire. These were Treatments A, B, and C. There were fifteen (15) trained panels composed of faculty of NIPSC Ajuy Campus that were purposely selected to evaluate the product.

The data gathered were analyzed using the mean, standard deviation and the Friedman's Test (Freidman's ANOVA). The criterion for rejection and acceptance of hypothesis was set at 0.05 level of significance. The study was conducted at NIPSC-Ajuy Campus, during the 2nd Semester of School Year 2020-2021.

Economic viability was also determined by computing the total food cost with the food factor of 2.5.

The important findings are:

1. Treatment B with 150 grams of threadfin bream flakes was found to be “extremely acceptable” and comparable with the commercial spring roll wrappers (Treatment A) in terms of aroma, color, taste, texture, and general acceptability.

2. No significant differences was found out in the acceptability of the Development of Spring roll using Wrapper with Threadfin Bream (*Nemipterus japonicus*) Flakes in terms of aroma, color, taste, texture, and general acceptability.

3. Spring roll using Wrapper with Threadfin Bream (*Nemipterus japonicus*) Flakes has suggested retail price of P2.65 which is more than 100 % higher compared to the commercial spring roll wrapper with selling price of P1.00 per piece.

Conclusions

Based from the results the following conclusions were deduced:

1. The trained panels must have liked much Spring roll using Wrapper with Threadfin Bream (*Nemipterus japonicus*) Flakes. It has a comparable aroma, color, taste, and texture with spring roll using commercial wrapper.
2. Each formulation of Spring roll using Wrapper with Threadfin Bream (*Nemipterus japonicus*) Flakes are comparably acceptable in terms of aroma, color, taste, texture, and general acceptability.
3. Based from the results, entrepreneurs might not consider the commercialization of Spring roll using Wrapper with Threadfin Bream (*Nemipterus japonicus*) Flakes because of the price difference. However, some reasons such as mass production of the latter may lower the cost.

Recommendation

1. Continuous research and development shall be pursued in case commercialization of Spring roll using Wrapper with Threadfin Bream (*Nemipterus japonicus*) Flakes is considered especially in the cost aspects. A feasibility study shall be conducted first before commercialization is pursued.
2. Other pelagic fishes shall also be ventured and tested to fortify spring roll wrapper. Although results positive results in terms of acceptability, researcher shall look into possible ways to lower the cost of the product to ensure profitability.
3. The Municipality of Ajuy along with the academic community and research authorities to take action on making researches that shall promote the utilization of pelagic fishes in the town. This actions shall enable the economic development of the town that can help resolve poverty and shortage of food in the Municipality of Ajuy. The said activities shall also promote entrepreneurial spirit especially the small and local businesses in the community.

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