

Exploring Oyster Mushroom (*Pleurotus Ostreatus*) as Meat Alternative Ingredients in Longganisa Production

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ABSTRACT: This study was carried out to determine the acceptability of longganisa (garlic, sweet and spicy) made of Oyster Mushroom as Alternative to Meat. This study was conducted to 40 respondents who were selected through the use of purposive sampling: 10 children, 10 adult, 10 teenager, 10 food experts. This study was carried out at the Isabela State University Ilagan Campus, during the school year of 2023-2024. This study employed experimental and descriptive research designs to determine the level of acceptability of (garlic, sweet and spicy) longganisa made of oyster mushroom as alternative to meat. The researchers conducted an experiment on how to utilize the frozen food products made from oyster mushroom and tested the level of acceptability through actual sampling of the product. The statistical tools utilized in this study were Mean, Standard Deviation (SD) and One Way Between Group Analysis of Variance. A 5point Likert scale was used in the determination of the evaluators' rating.

The acceptability of garlic-flavored mushroom longganisa made from oyster mushrooms was high across all evaluated categories: appearance, aroma, taste, and texture, demonstrated by overall mean scores ranging from 4.55 to 4.73. All within the "Very Satisfied" range. The sweet-flavored mushroom longganisa received high satisfaction ratings across all evaluated categories: appearance, aroma, taste, and texture, with overall means ranging from 4.64 to 4.68. All classified as "Very Satisfied," indicating a generally positive reception of the product. The spicy-flavored mushroom longganisa is rated as "Very Satisfied" across all evaluated attributes: appearance, aroma, taste, and texture, with overall means ranging from 4.50 to 4.64, indicating a high level of consumer satisfaction with the product.

KEYWORDS: Oyster Mushroom. Longganisa, Garlic, Sweet, Spicy

I. INTRODUCTION

In recent years, there has been a growing interest in finding sustainable and nutritious alternatives to meat products, driven by concerns about health, environmental sustainability, and animal welfare. The research aims to tackle critical Sustainable Development Goals (SDG's) by SDG 1. "No Poverty" creating new income opportunities to those Mushroom Farmers. By engaging in mushroom production, farmers can generate additional income and improve their livelihood, thus reducing poverty in their communities and can help address food insecurity and malnutrition, SDG 2 "Zero Hunger" and SDG 12

"Responsible Consumption and Production" contributing to the goal of ending hunger and responsible consumption and production by using mushrooms as a sustainable and plant-based alternative to meat in longganisa production. Through this, it can help reduce the environmental impact of meat production and promote more sustainable consumption patterns. Among these alternatives, mushrooms have emerged as a versatile and promising option, offering a range of benefits both for consumers and food manufacturers. This paper aims to explore the potential of mushrooms as meat alternative ingredients in frozen food products, examining their nutritional profile, culinary versatility, and sustainability credentials.

A mushroom is the fleshy, spore-bearing fruiting body of a fungus, typically produced above ground on soil or on its food source. The standard for the name "mushroom" is the cultivated oyster mushroom, *Agaricus bisporus*, hence the word mushroom is most often applied to fungi (Basidiomycota, Agaricomycetes) that have a stem (stipe), a cap (pileus), and gills (lamellae, sing. lamella) on the underside of the cap just as do store-bought white mushrooms. However, "mushroom" can also refer to a wide variety of gilled fungi, with or without stems, and the term is used even more generally to describe both the fleshy fruiting bodies of some Ascomycota and the woody or leathery fruiting bodies of some Basidiomycota, depending upon the context of the word. Forms deviating from the standard form usually have more specific names, such as "puffball", "stinkhorn", and "morel", and gilled mushrooms themselves are often called "agarics" in reference to their similarity to *Agaricus* or their placement in the order

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Agaricales. By extension, "mushroom" can also designate the entire fungus when in culture or the thallus (called a mycelium) of species forming the fruiting bodies called mushrooms. (Alice Beetz and Michael Kustudia 2003)

Mushrooms are a low-calorie food and pack a nutritional punch. Loaded with many health-boosting vitamins, minerals, and antioxidants, they have long been recognized as an important part of any diet. Mushrooms exposed to ultraviolet light are a good source of vitamin D, an important component for bone and immune health. (WebMD 2023)

Incorporating mushrooms into frozen food products presents an opportunity for food manufacturers to create innovative and healthier options that cater to the growing demand for plant-based alternatives. By leveraging the nutritional, culinary, and sustainability benefits of mushrooms, companies can develop products that meet the needs and preferences of today's consumers while contributing to a more sustainable food system.

Through research and development, collaboration with mushroom growers, and creative culinary experimentation, the potential of mushrooms as meat alternative ingredients in frozen food products can be fully realized, offering consumers delicious, nutritious, and environmentally-friendly options for meals and snacks.

Oyster mushrooms hold great potential as a meat substitute in longganisa production, but several research gaps need to be addressed. There is a lack of detailed studies comparing the nutritional content of oyster mushroom-based longganisa with traditional pork versions, especially in terms of protein, amino acids, vitamins, minerals, and fiber. Additionally, there is a shortage of research on the sensory qualities, such as taste, texture, color, and aroma, and how consumers perceive these factors. The functional properties of oyster mushrooms, including their water-holding capacity and fat-binding abilities, have not been fully studied in the context of longganisa, raising concerns about the product's texture and structural integrity. Furthermore, little is known about the shelf life, microbial stability, and appropriate preservation techniques for mushroom-based longganisa. The economic viability of commercial production, including cost-effectiveness and scalability, also needs further exploration. Lastly, there is limited research on the health effects of regularly consuming oyster mushroom longganisa and on consumer acceptance in cultures where pork longganisa is traditionally preferred. Addressing these research gaps is essential for the successful development and acceptance of oyster mushroom-based longganisa.

II. MATERIALS AND METHODS

The following tools, equipment and ingredients were used in the conduct of the study.

Table 1. Tools and Equipment Used in the Conduct of the Study.

DESCRIPTION					
Preparation tools	Measuring tools	Mixing tools	Cutting tools	Cooking tools	Equipment
Table	Measuring cups	Mixing bowls	Knife	Sauce pan	Refrigerator
Utility tray	Measuring spoon	spoon	Chopping board	Ladle	Digital weighing scale
Strainer			Scissor	Gas Range	
Packaging					

Ingredients

Table 2. Proportion of Ingredients used in the Preparation of Four Flavored Macaroons from the Three Varieties of Bamboo Shoots.

Measurements				
Ingredients	Garlic Mushroom Longganisa	Sweet Mushroom Longganisa	Spicy Mushroom Longganisa	No. Of Yield
Oyster Mushrooms	106 grams	106 grams	106 grams	5-7 yield
Garlic (minced)	25grams			
Brown sugar	15 grams	50 grams	87 grams	
Oyster sauce	20 grams	20 grams	20 grams	
Paprika	5 grams	5 grams		
Pepper (ground)	5 grams		4 grams	

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Salt	7 grams	6 grams	7 grams
Garlic powder	10 grams	5 grams	5 grams
Accord	28 grams	28 grams	28 grams
Cornstarch	44 grams	44 grams	44 grams

Developmental Procedure

To ensure that the research study was performed properly, the flow chart in making oyster mushroom as longganisa products was followed consistently. This study used oyster mushroom as meat alternative in longganisa production. The developmental procedure starts with the selection of oyster mushroom, after which were use process in (garlic, spweet and spicy) longganisa roducts. The process is shown in figure 18.

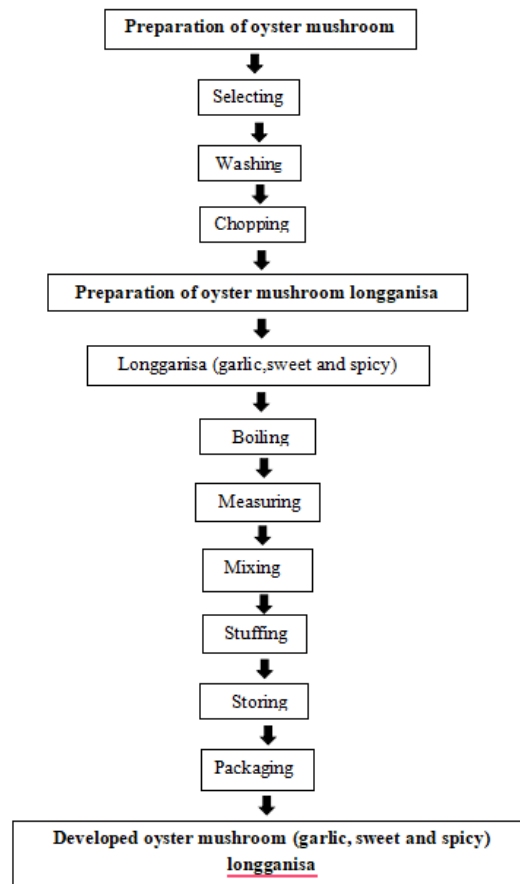


Figure 18. Flow Diagram of the Procedure in Making Oyster Mushroom (garlic, sweet and spicy) longganisa

Sensory Evaluation

The conducted study used a questionnaire as a tool for gathering data provided by the respondents who participated in this study. The researchers employed the Likert scale, in determining the acceptability of (garlic, sweet and spicy) longganisa made of Oyster Mushroom as an Alternative to Meat. The Rubrics for evaluation and questionnaire were used by the respondents in rating the treatment. It was used because of its suitability in measuring the acceptability of the products in terms of aroma, appearance, taste, texture and acceptability.

Scale	Numerical Rating	Descriptive Rating
5	4.20-5.00	Very Satisfied
4	3.40-4.19	Satisfied
3	2.60-3.39	Neutral
2	1.80-2.59	Dissatisfied
1	1.00-1.79	Very Dissatisfied

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Statistical Tools Used

All data were collected via questionnaires distributed to the evaluators:

1. Mean. This was utilized to gauge the level of acceptability of oyster mushroom (garlic, sweet and spicy) longganisa as the respondents' age group and criteria used.
2. Standard Deviation (SD). This was utilized to determine the homogeneity or average distances of the level of acceptability scores around the computed mean.
3. One Way Between Group Analysis of Variance. This was utilized to determine the differences of the level of general acceptability of oyster mushroom (garlic, sweet and spicy) longganisa across the four age groups.

Product Evaluation

Table 8. Level of Acceptability of Longganisa in Garlic Flavor Made of Oyster Mushroom in Terms of Appearance, Aroma, Taste, and Texture

Mushroom Longganisa (Garlic Flavor)	Mean	Sd	Description
Appearance/Color			
The garlic mushroom longganisa is visually appealing	4.63	0.05856	Very Satisfied
The product is palatable	4.48	0.7157	Very Satisfied
Overall Mean	4.55	0.6181	Very Satisfied
Aroma			
The sample product has a savory smell	4.53	0.7157	Very Satisfied
It has no unpleasant smell	4.63	0.7048	Very Satisfied
Overall Mean	4.58	0.6558	Very Satisfied
Taste			
The sample product taste similar to pork longganisa	4.70	0.6000	Very Satisfied
It has no aftertaste of garlic mushroom longganisa	4.75	0.5362	Very Satisfied
Overall Mean	4.73	0.5117	Very Satisfied
Texture			
The sample product is like ground meat	4.70	0.6000	Very Satisfied
The sample product is meaty, tender	4.73	0.5911	Very Satisfied
Overall Mean	4.71	0.5578	Very Satisfied

As evident in the table, across all categories: appearance, aroma, taste, and texture, the longganisa received a high level of satisfaction, indicated by the overall means ranging from 4.55 to 4.73, all falling within the "Very Satisfied" range.

In terms of appearance, the respondents rated the visual appeal of the garlic mushroom longganisa quite favorably with a mean score of 4.63, indicating they found the product aesthetically pleasing. Also, the the longganisa were also seen as palatable with a mean score of 4.48, suggesting they were acceptable and desirable in appearance. The high ratings suggest that the appearance and visual quality of the longganisa are strong points, contributing positively to their overall acceptability.

As to its Aroma, with a mean score of 4.53, the longganisa was noted to have a savory smell indicating an appealing aroma. The lack of unpleasant smells with mean score of 4.63 further supports the positive reception of the product's aroma. The aroma of the longganisa was well-received, enhancing the overall sensory experience and contributing to the high level of satisfaction.

Regarding the taste, the longganisa was rated highly with a mean score of 4.70 for tasting similar to pork longganisa, indicating a favorable comparison with a familiar flavor.

Also, the absence of an undesirable aftertaste, with mean score of 4.75, further underscores the taste's acceptance. This means that the taste was particularly well-received, with high ratings reflecting successful flavor replication and overall enjoyment.

The texture was positively evaluated with mean score of 4.70 suggesting that the respondents finding it similar to ground meat which is desirable. Similarly, the longganisa was also described as meaty and tender with mean score of 4.73, reinforcing their pleasant texture. This implies that the texture of the longganisa was well-regarded, contributing to the overall positive evaluation of the product

Table 9. Level of Acceptability of Longganisa in Sweet Flavor Made of Oyster Mushroom in Terms of Appearance, Aroma, Taste, and Texture

Mushroom Longganisa (Sweet Flavor)	Mean	Sd	Description
Appearance/Color			
The sweet mushroom longganisa is visually appealing.	4.73	0.5911	Very Satisfied
The product is palatable.	4.60	0.6345	Very Satisfied
Overall Mean	4.66	0.5633	Very Satisfied

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Aroma

The sample product has a savory smell.	4.65	0.6144	Very Satisfied
It has no unpleasant smell.	4.70	0.6403	Very Satisfied
Overall Mean	4.68	0.5868	Very Satisfied

Taste

The sample product taste similar to pork longganisa.	4.63	0.6200	Very Satisfied
It has no aftertaste of sweet mushroom longganisa.	4.65	0.6144	Very Satisfied
Overall Mean	4.64	0.6019	Very Satisfied

Texture

The sample product is like ground meat.	4.68	0.6078	Very Satisfied
The sample product is meaty, tender.	4.65	0.6144	Very Satisfied
Overall Mean	4.66	0.5851	Very Satisfied

As shown in the table, the mushroom longganisa with a sweet flavor has received high satisfaction ratings across all categories with overall means ranging from 4.64 to 4.68. All classified as "Very Satisfied." This indicates a generally positive reception of the product.

As to the appearance, the longganisa was rated highly 4.73 for visual appeal, indicating that consumers find them attractive. The palatability was also rated positively with 4.60, suggesting that the appearance makes the product desirable. The appearance of the sweet mushroom longganisa is a strong aspect, contributing to overall high satisfaction. The product's visual appeal and palatability reinforce its positive reception.

In terms of Aroma, the longganisa was rated 4.65 for having a savory smell, suggesting that the aroma is pleasant and appealing. In addition, the lack of unpleasant smells was rated slightly higher with 4.70, indicating that the aroma is well-received and does not detract from the product's overall acceptability. The aroma of the sweet mushroom longganisa is favorably viewed, which enhances the sensory appeal of the product and contributes to its high acceptability was rated at 4.63, indicating that the flavor profile is successfully mimicking a familiar and desirable taste. The absence of an undesirable aftertaste was rated slightly higher with 4.65, further supporting the positive reception of the taste. Data suggest that the taste of the sweet mushroom longganisa is well-regarded, successfully replicating familiar flavors and avoiding any unpleasant aftertastes, which contributes to the overall satisfaction.

Moreover, the texture was rated at 4.68 with the longganisa being perceived as similar to ground meat which is a favorable characteristic. The longganisa was also rated positively (4.65) for being meaty and tender which enhances the overall eating experience. Findings indicate that the texture of the longganisa is highly satisfactory with positive ratings reflecting a desirable consistency and mouthfeel that contributes to the overall enjoyment of the product.

Table 10. Level of Acceptability of Longganisa in Spicy Flavor Made of Oyster Mushroom in Terms of Appearance, Aroma, Taste, and Texture

Mushroom Longganisa (Spicy Flavor)	Mean	Sd	Description
<i>Appearance/Color</i>			
The spicy mushroom longganisa is visually appealing.	4.58	0.6300	Very Satisfied
The product is palatable.	4.50	0.6325	Very Satisfied
Overall Mean	4.54	0.5957	Very Satisfied
<i>Aroma</i>			
The sample product has a savory smell.	4.58	0.7378	Very Satisfied
It has no unpleasant smell.	4.58	0.7710	Very Satisfied
Overall Mean	4.58	0.7207	Very Satisfied
<i>Taste</i>			
The sample product taste similar to pork longganisa.	4.58	0.7378	Very Satisfied
It has no aftertaste of spicy mushroom longganisa.	4.43	0.8913	Very Satisfied
Overall Mean	4.50	0.7746	Very Satisfied
<i>Texture</i>			
The sample product is like ground meat.	4.70	0.5568	Very Satisfied
The sample product is meaty, tender.	4.58	0.7378	Very Satisfied
Overall Mean	4.64	0.6224	Very Satisfied

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As presented in the table, overall, the spicy-flavored mushroom longganisa was generally rated as "Very Satisfied" across all evaluated attributes, with overall means ranging from 4.50 to 4.64. This indicates a high level of consumer satisfaction with the product. With regard to Appearance, the longganisa was rated 4.58 for visual appeal, suggesting they are considered attractive and appealing. Further, the product's palatability is rated slightly lower at 4.50, but still within the "Very Satisfied" range, indicating that its appearance makes it desirable. Findings suggest that the appearance of the spicy mushroom longganisa is well-received, contributing to overall satisfaction. While the mean rating for palatability is slightly lower than visual appeal, it still reflects a positive consumer perception. As to Aroma, longganisa has a savory smell, rated at 4.58, indicating that the aroma is pleasing and appealing. Also, the lack of unpleasant smells is also rated at 4.58, suggesting that the aroma is consistently positive and enhances the product's acceptability. Results show that the aroma of the longganisa is highly satisfactory, with consistent ratings indicating that it positively impacts the overall sensory experience. In terms of Taste, the longganisa was rated 4.58 for tasting similar to pork longganisa, which suggests that the flavor closely resembles a familiar and desirable taste. Additionally, the aftertaste was rated lower at 4.43, indicating that while the taste is generally satisfactory, there might be a minor issue with aftertaste. Overall, the taste of the spicy mushroom longganisa is positively received, though there is a slight decrease in satisfaction due to the aftertaste. However, the high overall mean indicates that this does not significantly detract from the product's acceptability.

The texture was highly rated at 4.70, suggesting that it is considered similar to ground meat which is desirable, and the longganisa was also rated 4.58 for being meaty and tender, indicating a favorable eating experience. This implies that the texture of the longganisa is one of the strongest attributes with high ratings reflecting a positive consumer response to the longganisa's consistency and mouthfeel.

Table 11. General Level of Acceptability of the Longganisa in Garlic, Sweet, and Spicy Flavors Made of Oyster Mushroom in Terms of Appearance/Color, Aroma, Taste, and Texture as Evaluated by the Children

<i>Product</i>			<i>Mean</i>	<i>Sd</i>	<i>Description</i>
<i>Garlic Flavor Oyster Mushroom Longganisa</i>		Appearance/Color	4.70	0.4000	Very Satisfied
		Aroma	4.75	0.5123	Very Satisfied
		Taste	4.80	0.3317	Very Satisfied
		Texture	4.85	0.3202	Very Satisfied
	Overall Mean		4.78	0.3482	Very Satisfied
<i>Sweet Flavor Oyster Mushroom Longganisa</i>		Appearance/Color	4.80	0.3316	Very Satisfied
		Aroma	4.85	0.3202	Very Satisfied
		Taste	4.60	0.4899	Very Satisfied
		Texture	4.75	0.4031	Very Satisfied
	Overall Mean		4.75	0.3400	Very Satisfied
<i>Spicy Flavor Oyster Mushroom Longganisa</i>		Appearance/Color	4.60	0.4899	Very Satisfied
		Aroma	4.70	0.4583	Very Satisfied
		Taste	4.65	0.5500	Very Satisfied
		Texture	4.70	0.4583	Very Satisfied
	Overall Mean		4.66	0.4679	Very Satisfied

The garlic-flavored longganisa was rated highly for appearance, with a mean of 4.70. This indicates that the visual appeal of these longganisa is well-received by children. With a mean of 4.80, the taste was the highest rated attribute, indicating a very favorable flavor profile. This means that the garlic-flavored longganisa excel in all sensory attributes with taste and texture receiving the highest ratings. This flavor appears to be particularly well-liked by children.

Also, the sweet-flavored longganisa received the highest rating for aroma at 4.85, suggesting they are very appealing visually. However, the taste is rated slightly lower at 4.60 compared to garlic-flavored longganisa but still within the "Very Satisfied" range. Results show that the sweet-flavored longganisa is highly satisfactory across all attributes with the aroma and appearance being particularly strong. The taste is slightly less favored compared to garlic flavor but still very satisfactory.

The spicy longganisa has the lowest rating for appearance at 4.60, which is still considered "Very Satisfied" but slightly lower than the other flavors while the aroma and texture both were rated at 4.70, indicating a strong positive response. This indicates that the spicy-flavored longganisa is positively received overall though slightly less favorably than the garlic and sweet flavors. The aroma and texture are strong point

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Table 12. General Level of Acceptability of the Longganisa in Garlic, Sweet, and Spicy Flavors Made of Oyster Mushroom in Terms of Appearance/Color, Aroma, Taste, and Texture as Evaluated by the Teenagers

<i>Product</i>		<i>Mean</i>	<i>Sd</i>	<i>Description</i>
Garlic Flavor Oyster Mushroom Longganisa	Appearance/Color	4.35	0.5500	Very Satisfied
	Aroma	4.30	0.6403	Very Satisfied
	Taste	4.70	0.4000	Very Satisfied
	Texture	4.80	0.4000	Very Satisfied
Overall Mean		4.54	0.2503	Very Satisfied
Sweet Flavor Oyster Mushroom Longganisa	Appearance/Color	4.70	0.3317	Very Satisfied
	Aroma	4.80	0.2449	Very Satisfied
	Taste	4.70	0.4000	Very Satisfied
	Texture	4.70	0.3317	Very Satisfied
Overall Mean		4.73	0.2291	Very Satisfied
Spicy Flavor Oyster Mushroom Longganisa	Appearance/Color	4.40	0.3742	Very Satisfied
	Aroma	4.55	0.6103	Very Satisfied
	Taste	4.15	0.6727	Very Satisfied
	Texture	4.55	0.5220	Very Satisfied
Overall Mean		4.41	0.4368	Very Satisfied

In addition, the taste was rated highly at 4.70, showing that teenagers find the flavor of garlic longganisa to be very enjoyable. The texture received the highest rating of 4.80, indicating that the consistency and mouthfeel of the garlic longganisa are particularly well-received. This means that the garlic-flavored longganisa is appreciated for their taste and texture, but the appearance and aroma are slightly less favorably rated by teenagers. Despite this, the overall mean reflects a high level of satisfaction.

Rated at 4.70, the sweet-flavored longganisa was well-regarded for their appearance, taste, and texture, suggesting they are visually appealing to teenagers, showing that the sweet flavor is well-liked, and reflecting a favorable response to the longganisa' consistency, respectively. Likewise, with a mean of 4.80, the aroma is the highest rated attribute, indicating a very pleasant and appealing smell. Results imply that the sweet-flavored longganisa is the most highly rated overall, with strong scores in all attributes. Teenagers find them appealing in terms of appearance, aroma, taste, and texture, leading to the highest overall mean score.

For spicy-flavored mushroom longganisa, with a rating of 4.55, the aroma is well-received though not as highly rated as the sweet-flavored longganisa. **Also, the** texture rating of 4.55 reflects a generally positive response though still slightly lower than the garlic and sweet versions. **On contrast, the** taste received the lowest rating of 4.15, indicating that the spicy flavor is less favored compared to garlic and sweet flavors. Findings suggest that the spicy-flavored longganisa has the lowest overall mean, reflecting a generally positive but less enthusiastic reception compared to the garlic and sweet flavors. The lower taste rating particularly impacts the overall satisfaction.

Table 13. General Level of Acceptability of the Longganisa in Garlic, Sweet, and Spicy Flavors Made of Oyster Mushroom in Terms of Appearance/Color, Aroma, Taste, and Texture as Evaluated by the Adults

<i>Product</i>		<i>Mean</i>	<i>Sd</i>	<i>Description</i>
Garlic Flavor Oyster Mushroom Longganisa	Appearance/Color	4.80	0.4000	Very Satisfied
	Aroma	4.90	0.2000	Very Satisfied
	Taste	4.80	0.3317	Very Satisfied
	Texture	4.70	0.5099	Very Satisfied
Overall Mean		4.80	0.3500	Very Satisfied
Sweet Flavor Oyster Mushroom Longganisa	Appearance/Color	4.85	0.2291	Very Satisfied
	Aroma	4.80	0.3317	Very Satisfied
	Taste	4.90	0.3000	Very Satisfied
	Texture	4.90	0.3000	Very Satisfied
Overall Mean		4.86	0.2589	0.2589

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Spicy Flavor Oyster Mushroom Longganisa	Appearance/Color	4.80	0.3317	Very Satisfied
	Aroma	4.90	0.3000	Very Satisfied
	Taste	4.90	0.3000	Very Satisfied
	Texture	4.90	0.3000	Very Satisfied
Overall Mean		4.88	0.2958	Very Satisfied

In addition, the taste was rated highly at 4.70, showing that teenagers find the flavor of garlic longganisa to be very enjoyable. The texture received the highest rating of 4.80, indicating that the consistency and mouthfeel of the garlic longganisa are particularly well-received. This means that the garlic-flavored longganisa is appreciated for their taste and texture, but the appearance and aroma are slightly less favorably rated by teenagers. Despite this, the overall mean reflects a high level of satisfaction.

Rated at 4.70, the sweet-flavored longganisa was well-regarded for their appearance, taste, and texture, suggesting they are visually appealing to teenagers, showing that the sweet flavor is well-liked, and reflecting a favorable response to the longganisa' consistency, respectively. Likewise, with a mean of 4.80, the aroma is the highest rated attribute, indicating a very pleasant and appealing smell. Results imply that the sweet-flavored longganisa is the most highly rated overall, with strong scores in all attributes. Teenagers find them appealing in terms of appearance, aroma, taste, and texture, leading to the highest overall mean score.

For spicy-flavored mushroom longganisa, with a rating of 4.55, the aroma is well-received though not as highly rated as the sweet-flavored longganisa. **Also,** the texture rating of 4.55 reflects a generally positive response though still slightly lower than the garlic and sweet versions. **On contrast,** the taste received the lowest rating of 4.15, indicating that the spicy flavor is less favored compared to garlic and sweet flavors. Findings suggest that the spicy-flavored longganisa has the lowest overall mean, reflecting a generally positive but less enthusiastic reception compared to the garlic and sweet flavors. The lower taste rating particularly impacts the overall satisfaction.

Table 13. General Level of Acceptability of the Longganisa in Garlic, Sweet, and Spicy Flavors Made of Oyster Mushroom in Terms of Appearance/Color, Aroma Taste, and Texture as Evaluated by the Adults

Product		Mean	Sd	Description
Garlic Flavor Oyster Mushroom Longganisa	Appearance/Color	4.80	0.4000	Very Satisfied
	Aroma	4.90	0.2000	Very Satisfied
	Taste	4.80	0.3317	Very Satisfied
	Texture	4.70	0.5099	Very Satisfied
Overall Mean		4.80	0.3500	Very Satisfied
Sweet Flavor Oyster Mushroom Longganisa	Appearance/Color	4.85	0.2291	Very Satisfied
	Aroma	4.80	0.3317	Very Satisfied
	Taste	4.90	0.3000	Very Satisfied
	Texture	4.90	0.3000	Very Satisfied
Overall Mean		4.86	0.2589	0.2589
Spicy Flavor Oyster Mushroom Longganisa	Appearance/Color	4.80	0.3317	Very Satisfied
	Aroma	4.90	0.3000	Very Satisfied
	Taste	4.90	0.3000	Very Satisfied
	Texture	4.90	0.3000	Very Satisfied
Overall Mean		4.88	0.2958	Very Satisfied

As exhibited in the table, all three flavors: garlic, sweet, and spicy were rated as "Very Satisfied" by adults. The overall means reflect high satisfaction with the spicy flavor receiving the highest average rating.

For Garlic-Flavored longganisa, the highest rating at 4.90 suggests that the aroma is particularly pleasing and contributes significantly to the overall satisfaction. Rated slightly lower at 4.70, but still within the "Very Satisfied" range, indicating good texture but not as highly rated as appearance, aroma, or taste. Rated 4.90, the sweet-flavored longganisa has the highest rating both for taste and texture, reflecting a high level of satisfaction with texture and indicating a strong preference and satisfaction with the sweetness. The sweet-flavored longganisa was highly rated across all attributes particularly, for taste and texture. The overall mean score is the highest among the three flavors, indicating the strongest overall satisfaction.

For Spicy-Flavored longganisa, across all levels was rated with a mean score of 4.90 except for appearance with a mean score of 4.80 but still, all respondents were Very Satisfied about the product. This means that the spicy-flavored longganisa is highly

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acceptable, with very high ratings for all attributes, resulting in the highest overall mean. This indicates strong overall satisfaction with the spicy flavor.

Table 14. General Level of Acceptability of the Longganisa in Garlic, Sweet, and Spicy Flavors Made of Oyster Mushroom in Terms of Appearance/Color, Aroma, Taste, and Texture as Evaluated by the Food Experts

<i>Dish</i>		Mean	Sd	Description
Garlic Flavor Oyster Mushroom Longganisa	Appearance/Color	4.35	0.8382	Very Satisfied
	Aroma	4.35	0.8382	Very Satisfied
	Taste	4.60	0.8000	Very Satisfied
	Texture	4.50	0.8062	Very Satisfied
Overall Mean		4.45	0.7483	Very Satisfied
Sweet Flavor Oyster Mushroom Longganisa	Appearance/Color	4.30	0.9000	Very Satisfied
	Aroma	4.25	0.9287	Very Satisfied
	Taste	4.35	0.8958	Very Satisfied
	Texture	4.30	0.9000	Very Satisfied
Overall Mean		4.35	0.9000	Very Satisfied
Spicy Flavor Oyster Mushroom Longganisa	Appearance/Color	4.35	0.8958	Very Satisfied
	Aroma	4.15	1.0500	Satisfied
	Taste	4.30	1.1000	Very Satisfied
	Texture	4.40	0.9428	Very Satisfied
Overall Mean		4.30	0.8789	Very Satisfied

The data shows that all three flavors: garlic, sweet, and spicy were rated as "Very Satisfied" by food experts with some differences in ratings among the flavors.

Data also show that the ratings for appearance/color are fairly consistent across all three flavors, suggesting that the visual appeal of the longganisa is uniformly well-regarded regardless of flavor. The garlic flavor and Spicy Flavor both received 4.35 while the sweet flavor got the lowest mean score of 4.30.

The aroma ratings are slightly lower for the spicy flavor which received a "Satisfied", with a mean score of 4.14 rating rather than "Very Satisfied." This could indicate that the aroma of the spicy longganisa was perceived as slightly less appealing compared to the garlic and sweet flavors. The aroma of the garlic-flavored longganisa received the highest mean of 4.35.

In terms of taste, all flavors received "Very Satisfied". Taste was rated highest for the garlic flavor, followed by the sweet and spicy flavors. The garlic flavor stands out as the most preferred in terms of taste, while the spicy flavor is slightly lower though still rated very positively.

Texture ratings are high across all flavors, with the garlic and spicy flavors slightly edging out the sweet flavour with mean scores of 4.50 and 4.40, respectively. This suggests a generally favorable perception of the longganisa' texture.

Table 15. Comparison on the General Level of Acceptability of Oyster Mushroom Longganisa in Garlic, Sweet, and Spicy Flavors as An Alternative to Meat in Terms of Appearance, Aroma, Taste, and Texture as Perceived by the Different Groups of Respondents

Longganisa	Criteria	F-Value	p-Value	Decision	Remarks
Garlic-Flavored Mushroom Longganisa	Appearance/Color	1.4943	0.2325	Accept H_0	Not Significant
	Aroma	2.2261	0.2019	Accept H_0	Not Significant
	Taste	0.3235	0.8080	Accept H_0	Not Significant
	Texture	0.7356	0.5377	Accept H_0	Not Significant
Sweet- Flavored Mushroom Longganisa	Appearance/Color	2.1587	0.1104	Accept H_0	Not Significant
	Aroma	2.5639	0.0699	Accept H_0	Not Significant
	Taste	1.7829	0.1684	Accept H_0	Not Significant

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Spicy- Flavored Mushroom Longganisa	Texture	2.0149	0.1292	Accept H_0	Not Significant
	Appearance/Color	1.2166	0.3186	Accept H_0	Not Significant
	Aroma	2.0451	0.1249	Accept H_0	Not Significant
	Taste	2.0146	0.1292	Accept H_0	Not Significant
	Texture	1.1628	0.3373	Accept H_0	Not Significant

In the data provided, all p-values are greater than the common significance level (usually 0.05). This means the null hypothesis is accepted, there is no statistically significant difference in the acceptability of mushroom longganisa based on the criteria listed.

Specifically, for garlic-flavored, sweet-flavored, and spicy-flavored mushroom longganisa, there are no significant differences in acceptability based on appearance, aroma, taste, or texture. This suggests that this flavor variant is generally consistent in all these attributes across different groups.

CONCLUSIONS

In conclusion, careful preparation of oyster mushrooms in longganisa production is crucial to achieving the desired texture, flavor, and quality of the final product. Each step, from selecting and washing the mushrooms to finely chopping and mixing them, ensures that the mushrooms contribute effectively to the overall taste and consistency of the longganisa. Proper shaping, packaging, and storage further maintain the freshness and quality resulting and a product that, meets high standards and satisfies consumer expectations. Garlic Flavor was generally perceived as the best overall, with the highest mean scores for taste and texture. The Sweet Flavor is well-regarded but slightly lower in taste and aroma compared to the garlic flavor. The Spicy Flavor has slightly lower in overall mean and aroma, but still receives high satisfaction ratings. The flavor of the mushroom longganisa (garlic, sweet, or spicy) does not have a substantial impact on their sensory attributes (appearance/color, aroma, taste, and texture) as perceived by the respondents. This could imply that the choice of flavor may not be a critical factor in terms of these sensory aspects for the respondents, or that all flavors are equally acceptable or similar in terms of the evaluated criteria. It can be concluded that respondents did not perceive significant variation in acceptability based on the flavor of the mushroom longganisa concerning the four evaluated criteria. The lack of substantial differences suggests that, within this study, the flavor whether garlic, sweet, or spicy, does not notably affect the sensory attributes (appearance/color, aroma, taste, and texture) as perceived by the respondents, indicating that flavor may not be a crucial factor for these aspects or that all flavors are similarly acceptable.

RECOMMENDATIONS

Considering the findings in conclusions of this study, the following recommendations are offered:

1. Home makers, students or anyone interested is encouraged to make longganisa using oyster mushroom as main ingredient as the one used in this study.
2. Care and accuracy are to be observed by the producer* when making mushroom longganisa to ensure high quality product.
3. Farmers may consider different varieties of mushroom not just for their personal consumption but also for additional income of the family.
4. Result of this study may be submitted to the department of science and technology (DOST) for laboratory to validate the nutritional value of the developed product for overall product improvement, likewise the department may give assistance on how to patent, label, pack and market the newly developed product.
5. The researcher in partnership with the barangay officials should extend help to the women of the community in developing more products made of mushroom.
6. LGU Officials organize workshops and training sessions for local farmers on mushroom cultivation focusing on oyster mushrooms as they are suitable for longganisa production.
7. Dietician recommend mushrooms longganisa for individuals with dietary restrictions or preference, such as those reducing meat intake for health reasons or following plant - based diets.

REFERENCES

- 1) Montes , A. P. (2020, November 13). *Edible Mushrooms as Novel trend in the development of healthier meat products.*
- 2) Singh , U. (2023, December 10). *Edibles Mushrooms: A sustainable novel ingredient for meat analogs.*
- 3) Kakon, A. (2012, October 19). Mushroom is an ideal food supplement
- 4) Kurek, M. A. (2022, March 25). *Novel protein sources for application in meat- alternative products- insight and challenges*
- 5) Vargas, E. R. (2021, November 3). *Edible Mushrooms as a natural source of food ingredient/ additive replacer.*
- 6) Rosmiza, M. (n.d.). *Prospect for increasing commercial mushroom product in Malaysia: challenges and opportunities .*
- 7) Obsioma, V. (2020a, December 4). *Linking Socio-demographics of Meat Vendor-processors to Residual Nitrite in Skinless Native Sausage Sold in a Typical Public Market in the Philippines.*

Exploring Oyster Mushroom (*Pleurotus Ostreatus*) as Meat Alternative Ingredients in Longganisa Production

- 8) Selani, M. M. (2021a, December 9). *Consumer's perception and expected liking of labels of burgers with sodium reduction and addition of mushroom flavor enhancer*.
- 9) Ogbo, F. (2023, July 16). *ACCEPTABILITY AND ANTIOXIDANT PROPERTIES OF CONVENIENCE FOOD PRODUCTS FORTIFIED WITH MUSHROOMS*. http://bioscientistjournal.com/index.php/The_Bioscientist/article/view/149
- 10) Selani, M. M. (2021, November 26). *Consumer's perception and expected liking of labels of burgers with sodium reduction and addition of mushroom flavor enhancer*. <https://www.sciencedirect.com/science/article/pii/S0309174021003065>
- 11) Ramle, N. (2021, June 19). *Replacing animal fat with edible mushrooms: a strategy to produce high-quality and low-fat buffalo meatballs*.
<https://search.proquest.com/openview/31a553dbed51f37each7e172f1cfea64/1?pq-origsite=gscholar&cbl=816390>
- 12) Jeong, H. G. (2021, May 1). *Alternative of Phosphate by Freeze- or Oven-Dried Winter Mushroom Powder in Beef Patty*.
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8112311/>
- 13) Kortei, N. K. (2020, March 3). *Sensory evaluation, descriptive textural analysis, and consumer acceptance profile of steamed gamma-irradiated *Pleurotus ostreatus* (Ex. Fr.) Kummer kept in two different storage packs*.
<https://www.sciencedirect.com/science/article/pii/S2468227620300661>
- 14) Keerthana, K. (2020, May 19). *Development of fiber-enriched 3D printed snacks from alternative foods: A study on button mushroom*. <https://www.sciencedirect.com/science/article/pii/S0260877420302144>
- 15) Tuzon, R. (2017, July 22). *Utilization of Marine Fishes (Indian Mackerel (*Rastrelliger kanagurta*), Mackerel Scad (*Decaoterus macarellus*), and Surgeonfish (*Acanthuridae*)) for Fish Longganisa*. <https://www.dlsu.edu.ph/wp-content/uploads/pdf/conferences/research-congress-proceedings/2017/FNH/FNH-I-005.pdf>
- 16) Rosli, W. W. (2014, July 27). *The ability of oyster mushroom in improving nutritional composition, β -glucan and textural properties of chicken frankfurter*
<https://citeseerx.ist.psu.edu/document?repid=rep1&type=pdf&doi=61cf74717f4a6b3ee77da30acab297967a04e314>
- 17) Obsioma, V. (2020, July 8). *Linking Socio-demographics of Meat Vendor-processors to Residual Nitrite in Skinless Native Sausage Sold in a Typical Public Market in the Philippines*.
https://philjournalsci.dost.gov.ph/images/pdf/pjs_pdf/vol149no4/linking_socio_demographics_of_meat_vendor_processors.pdf
- 18) Miller, A. M. (2014, August 14). *Flavor-Enhancing Properties of Mushrooms in Meat-Based Dishes in Which Sodium Has Been Reduced and Meat Has Been Partially Substituted with Mushroom*