# STUDY ON DEVELOPMENT AND ORGANOLEPTIC EVALUATION OF MUSHROOM PREMIXED INSTANT SOUP

## A PROJECT REPORT

## BY


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Submitted to the Department of Nutrition and Food Engineering in the partial fulfillment of B.Sc. in Nutrition and Food Engineering

Supervised By


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**DAFFODIL INTERNATIONAL UNIVERSITY**


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# APPROVAL

This Project titled "**Development and organoleptic evaluation of mushroom premixed instant**", submitted by **Mohayminur Rahman** to the Department of Nutrition and Food Engineering, Daffodil International University, has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc. in Nutrition and Food Engineering and approved as to its style and contents.

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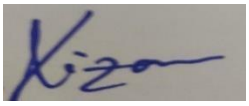

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# DECLARATION

We hereby declare that this project has been done by us under the supervision of **Dr. Md. Bellal Hossain, Dean (In Charge) and Professor, Department of Nutrition and Food Engineering,** Daffodil International University. We also declare that neither this project nor any part of this project has been submitted elsewhere for award of any degree or diploma.

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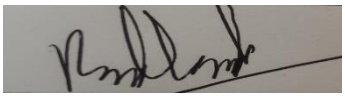

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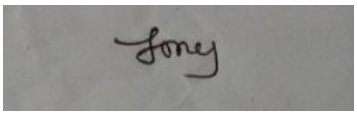

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# ABSTRACT

This study employs four different kinds of fungal mushroom soup mixes Spicy, Immunity-Boosting, Low-Sodium, and High-Protein—to produce and evaluate the organoleptic properties of mushroom premixed quick soups. For individuals looking for protein-rich choices, the High-Protein Mix is the best choice because it has the highest calorie level (350 kcal/100g) and protein content 18%. For those watching their calorie intake, the Low-Sodium Mix contains the highest fat content 10%, largest carbohydrate content 65%, and lowest energy (300 kcal/100g). With beta-glucans and polyphenols added for immune support, the Immunity-Boosting Mix has the highest antioxidant value 0.018% and the highest fiber content 10%. While the High-Protein Mix is noteworthy for having high levels of iron 0.0045% and magnesium 0.032%, all mixes include healthy vitamins and minerals. The DPPH Radical Scavenging Assay and the Folin-Ciocalteu Method were used to measure the antioxidant content of fungal mushroom powder. While the TPC evaluated phenolic compounds at 765 nm using Gallic acid as a reference 38, the DPPH assay measured the powder's capacity to scavenge free radicals at 517 nm to calculate % inhibition 37. These techniques are crucial for assessing the phenolic and antioxidant characteristics of goods made from mushrooms. With 94% of respondents favoring the Immunity-Boosting Mix, the Spicy Mix came in second (88%). With 94% of respondents favoring the Immunity-Boosting Mix, the Spicy Mix came in second (88%). Due to lower evaluations for flavor and scent, the Low-Sodium (79%) and High Protein (80%) mixtures scored lower. A well-rounded and enticing sensory profile is reflected in its consistently excellent scores across important sensory measures, such as Mouthfeel (95%), Flavor (88%), Creaminess (77%), and Aftertaste (92%). Additionally, it has the greatest Overall Acceptance (92%), which suggests that customers strongly prefer it. According to the shelf-life analysis, the Immunity-Boosting Mushroom Soup Mix has the highest stability, a high antioxidant content 0.018%, and very little oxidative rancidity. Overall, the Immunity-Boosting Mushroom Soup Mix performs the best.



**Keywords:** Mushroom Soup Varieties, Sensory Evaluation, Nutritional Value, Antioxidant Content, Fungal Mushroom, Immunity Boosting Mushroom.

**TABLE OF CONTENTS**

## LIST OF FIGURES



## LIST OF TABLES

# CHAPTER 1
## INTRODUCTION

### 1.1 Introduction

Mushrooms have over the recent past been promoted for use due to their nutritional value and their various health benefits. It is important from calorie stand point and also has proteins, vitamins, mineral values and bio activity which provide medicinal values. Most of the mushrooms eaten raw mushrooms that are valued for their texture and flavor and are therefore commonly used in many dishes. However, it becomes difficult to integrate mushroom into convenient food products hence there is still increased desire to formulate mushroom based premixes for soups and other instant products (Srivastava et al.,2019).

Currently instant soups are part of the normal food products available in the global market with responsiveness and preparation period having no effect on nutritive value. Complementing this trend, mushroom based instant soup premixes hold potential to effectively provide mushroom nutritional's in a convenient ready-to-use soup form. These premixes may be reinforced with other additions including the corn flour, milk powder and spices in correct proportions to enhance tastes, texture and nutrition and still allow the natural flavor of the mushroom to be felt (Anuradha Srivastava et al.,2019).

This research focuses on developing and evaluating the sensory characteristics of a mushroom premixed instant soup using for comparative studies, have developed four types Fungal Mushroom Soup considering functional activities and consumer's choice. The preparation of the research involves the development of three different soups made from mushroom powder. By sensory analysis, appearance, color, body, flavor, taste, after-feel, and acceptability are determined for the soups. The aim is to define which mushroom type possesses highest sensory quality with special reference to consumer appeal (Krishan Kumar et al.,2015).

This research also contributes to the functional foods, by developing an instant soup premix that can be served as a ready-to-use product while incorporating the qualities of Mushrooms.

## 1.2 Rational of the Study

As the knowledge regarding health positive effects of functional foods increases, mushrooms have been identified to be a potential food ingredient on account of their phytochemicals. Structures engender. This study fills this gap by creating and assessing mushroom premixed instant soups where four types Fungal Mushroom Soup considering functional activities and consumer's choice were used due to their unique textures and flavors. This research tries to develop an appealing micro bakery food product that is healthy and convenient to prepare, and in doing so, its sensory characteristics and consumer acceptability will be evaluated. The findings with regard to this research will be beneficial for food industry to extend the utilization of mushrooms in instant food preparation in order to make it more health and sustainable fraction than the normal products.

## 1.3 Objectives

Evaluate mushroom premixed instant soup formulations using four varieties of mushrooms: Spicy, Immunity-Boosting, Low-Sodium, and High-Protein. The specific objectives of the research are as follows: Prepare mushroom soup premixes from previous determined proportions of mushroom powder/ corn flour/ milk powder and seasonings. Describe the quality of each soup sample in terms of appearance, consistency, odor, taste and overall sensory evaluation. Determine the quantity of the mushroom variety which is most preferred under the sensory evaluations by the consumers. Propose guidelines for growing and using cultured mushrooms in setting up instant soups for commercial production to make available convenient and nutritious food products from plant sources. On the research aims to achieve the following:

- Formulate mushroom soup premixes using standardized ratios of mushroom powder, corn flour, Red chili flakes, and seasonings.
- Identify the most preferred mushroom variety based on consumer sensory evaluations.
- Provide recommendations for the commercial development of mushroom-based instant soups, contributing to the growing demand for convenient, nutritious, and plant-based food options.

# CHAPTER 2
# LITERATURE REVIEW

However, prior to the onset of the experimental phase of this study, a number of activities were conducted. This was a deliberate decision of four types Fungal Mushroom Soup considering functional activities and consumer's choice. mushrooms due to differences in their flavor, texture and nutritive values. Products such as red chili flakes, garlic and onion powder and spices were bought from markets close to the production of the mushroom powders. In preparing the mushroom powder, fresh mushrooms were dried at 60°C/ 12 hours, then powdered and sieved to fine powder. Feasibility tests were also carried to adjust the formulation of the soup premix to achieve the preferred taste and texture.

## 2.1 Related Works

Earlier works have indicated that, apart from boosting the organoleptic qualities of food commodities, mushrooms have huge values in nutritional terms. Prior studies have also focused on the acceptability of mushroom mixed in different preparations, which has opened opportunities for different convenience foods. This study aims to build on existing literature by assessing the sensory attributes of mushroom premixed instant soups, further investigating consumer preferences for different mushroom varieties.

Formulated a medium stock standard mixed soup powder blend; the pearl oyster mushroom was added to the soup powder blend alongside legumes and vegetables. For the mushrooms eight different formulas through freeze-drying and for vegetables hot air drying was done. The highest quality product was deemed to be Formula 8 with 459.14 kcal/100g; balanced macronutrient composition – 25.73 %protein, 53.53% carbohydrates and 20.74%lipids. The soup was declared to be vegetarian sufficient because of the nutritional content analysis. Future studies should be carried out to confirm the nutritional content for bigger samples (Thuy Minh Nguyen et al., 2020).

The sensory and nutritional attributes of the soups were assessed, then the soups were left at room temperature for one month. The protein content ranged from 13.96 to 14.52 g/100 g, the

carbohydrate content from 76.27 to 76.28 g/100 g, the total dietary fiber content from 16.61 to 16.81 g/100 g, and there were significant amounts of soluble fiber, phosphorus, and iron. Following a sensory evaluation, the judges approved the soups. Over the course of 30 days of storage, the total number of bacteria ranged from 0 to $4\times10^2$ CFU/g. Generally speaking, the soup mixes had high stability and respectable levels of protein, vitamins, and minerals (Singh, Sangeeta C et al.,2017).

Convective, microwave, and microwave-convective drying techniques were investigated (Izli, N. et al.,2014) in relation to the drying properties, color, and textural profile of mushrooms. The best fit was determined by retrofitting the drying data using nine mathematical models; the models created by WANG and SINGH, MIDILLI et al., and the Diffusion Approach and Logarithmic were deemed to be the most suitable. At 500 W, the microwave furnace provided the quickest time, 35 minutes. When utilizing the microwave-convective combo instead of only convective drying or the microwave alone, the drying time was reduced by 33.8%. At enhanced temperatures or microwave power density, larger damage to the microstructure was observed, which was confirmed by scanning electron microscopy analysis.

# CHAPTER 3
# MATERIAL & METHOD

## 3.1 Material

### 3.1.1 Ingredients

The raw ingredients used in mushroom soup mixes are carefully chosen to deliver a flavorful, nutritious, and sometimes health-boosting blend. Dried fungal mushrooms form the base, offering a deep, earthy flavor along with essential nutrients. Red chili flakes add a touch of heat that pairs well with the savory notes of garlic and onion powder. Black pepper enhances the spice profile, while cumin and coriander introduce warm, aromatic undertones. Common salt is often used, but in low-sodium varieties, it may be reduced or omitted. A mix of dried herbs like thyme, rosemary, oregano, and parsley brings a fresh, herbal aroma, balancing the flavors beautifully. Turmeric adds a golden color and mild warmth, recognized for its anti-inflammatory properties. Nutritional yeast contributes a rich, cheese-like flavor and B-vitamins, making it especially appealing in vegan recipes. To increase the protein content, pea protein powder can be included, catering to those seeking a plant-based protein boost. Together, these ingredients create a versatile and wholesome mushroom soup mix, adaptable to various dietary preferences and health needs.

### 3.1.2 Instruments

The following instruments and equipment were utilized throughout the preparation process:

**Dryer:** To dry fresh mushrooms for the preparation of the powder.

**Knife:** Used in chopping and preparing the ingredients to be prepared.

**Blender Machine:** Used in the process of combining the soup in-order to get a suitable consistency.

**Sieve:** Applied for sifting the mushroom powder in order to guarantee its proper structure.

**Bowl:** The food preparation for blending the ingredients and for preparation of other sauces.

**Cutting Board:** used as a platform for chopping and preparing veggies.

**Spoon for Stirring:** Employed during preparation when stirring the soup.

**Measuring Cups and Spoons:** Made sure that the right quantity of each ingredient was measured.

**Peeler:** Saved in the kitchen for purpose of peeling vegetables depending on the need.

Figure 3.1 shows a few images of my mushrooms Raw material I've included:

Figure 3.1: Fungal Mushroom

### 3.2 Premix Formulation

Four types of mushroom soup mixes are formulated with distinct ingredient compositions. The Spicy Mushroom Soup Mix consists of 40% dehydrated mushroom powder, 10% coconut milk powder, 10% cornstarch, along with 5% dried bell pepper powder and 3% smoked paprika for added flavor. The Immunity-Boosting Mix also includes 40% mushroom powder and 10% coconut milk powder, featuring additional ingredients like 6% Ashwagandha powder and 4% ginger for health benefits. The Low-Sodium Mix emphasizes balanced nutrition with 45% mushroom powder, 15% coconut milk powder, 5% carrot, and only 2% salt. Lastly, the High Protein Mix contains 35% mushroom powder and is enriched with 15% peanut protein, along with 10% coconut milk powder and 10% cornstarch. Common ingredients across all mixes include anti-caking agents, cornstarch, and seasonings such as garlic and onion powder.

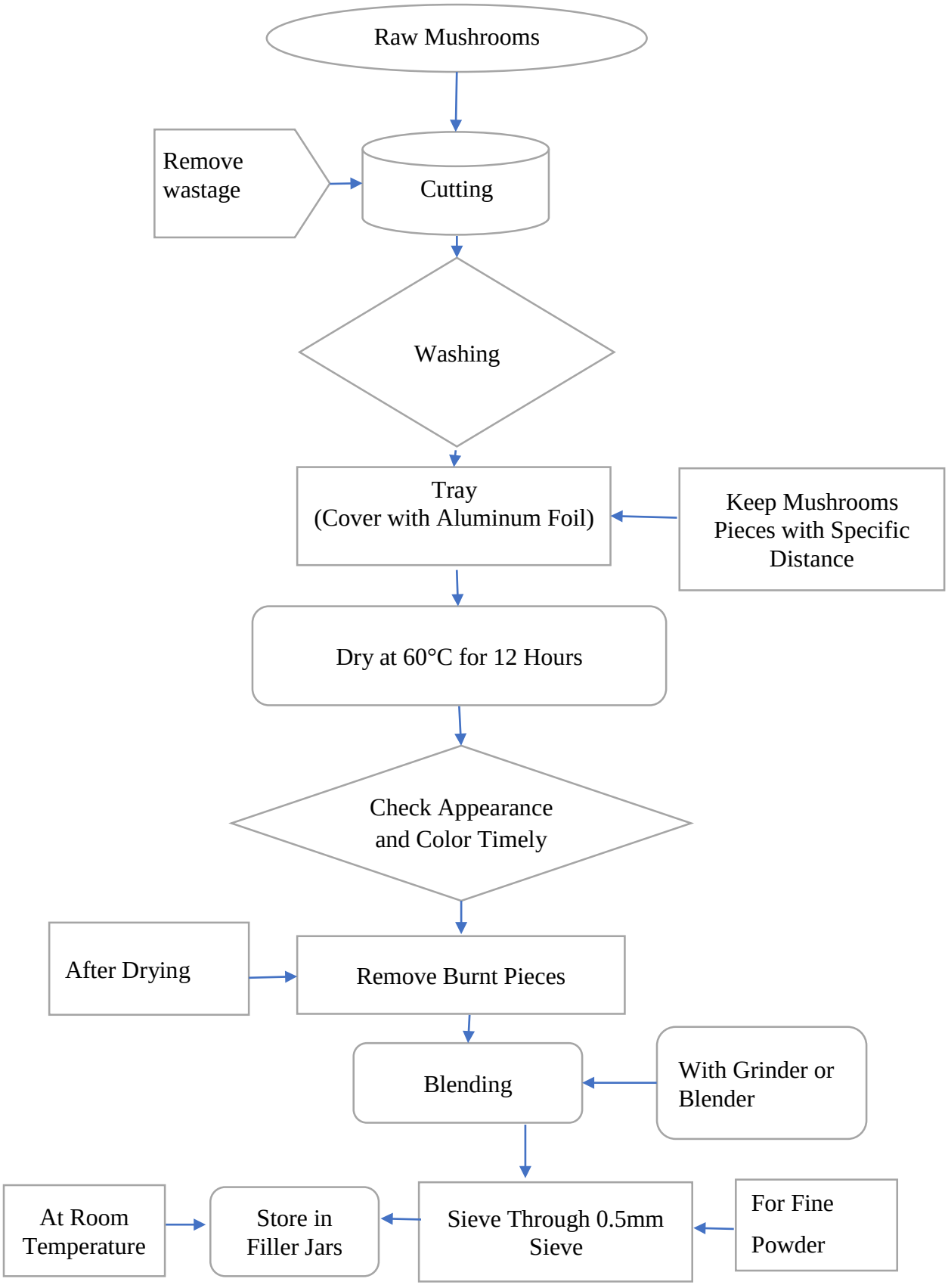


**Figure 3.2 Mushroom powder preparation**

### 3.3 Method

Dehydrating mushrooms intensifies their flavor, extends shelf life, and makes them easy to store for use in various recipes. The process begins by selecting fresh, high-quality mushrooms and gently cleaning them with a damp cloth to remove dirt without soaking. Slice mushrooms into uniform 1/4-inch pieces for even drying, though smaller mushrooms can be left whole, albeit with longer drying times. The preparation of mushroom soup mix involves blending all dry ingredients in a large mixer to ensure a uniform powder. Quality checks are then conducted to confirm flavor balance, color consistency, and a clump-free texture. Once standards are met, the powder is transferred into moisture-resistant, airtight packaging, such as pouches or sachets, to maintain freshness. The packaged mix is stored in a cool, dry place and labeled with expiration and storage instructions. Variants of the mushroom soup mix can be developed to offer diverse flavor profiles, health benefits, and dietary options for a versatile range of commercial products. Nutritional values were determined.

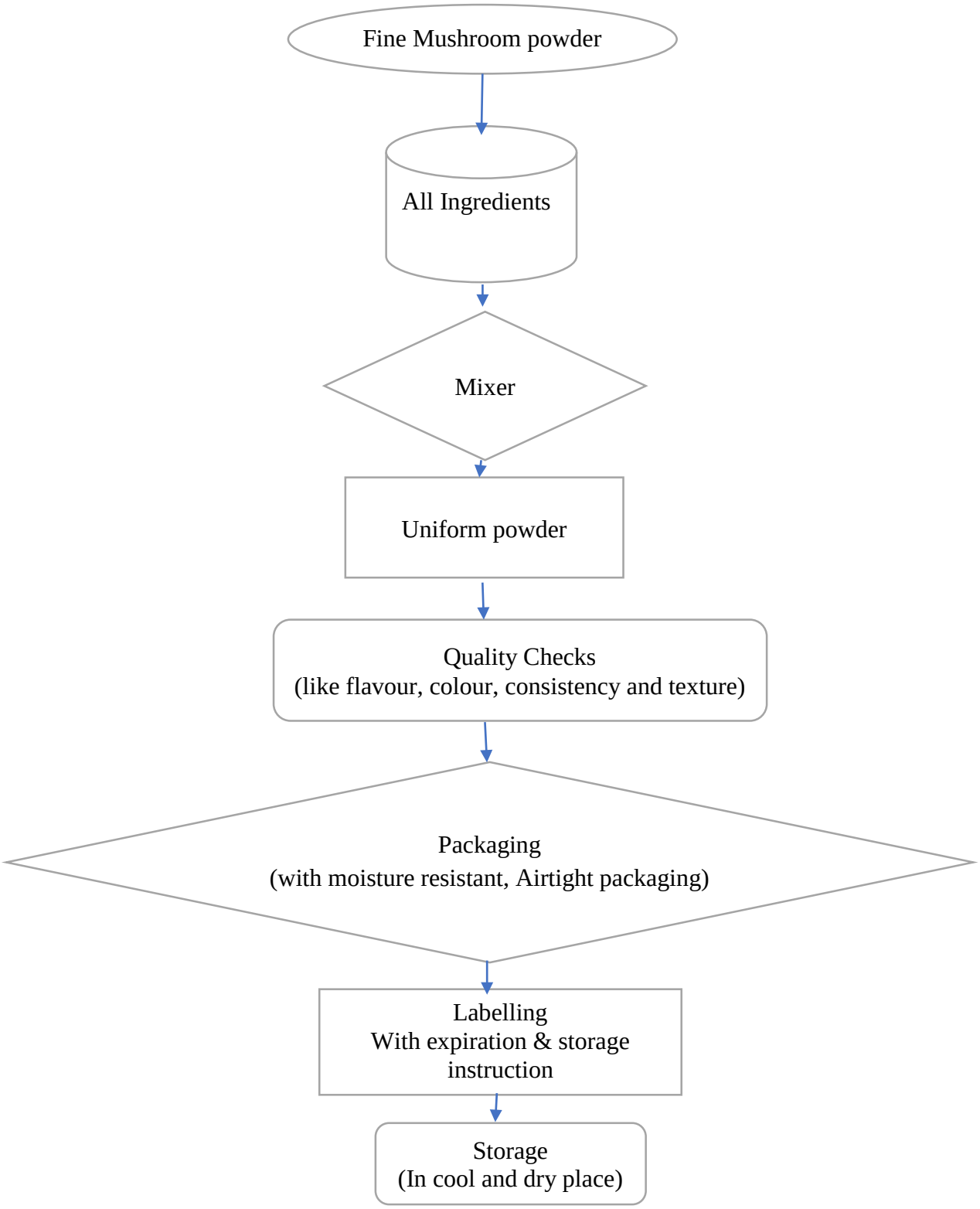


**Figure 3.3 Preparation of fungal mushrooms soup mix**

### 3.4. Sensory Evaluation

Sensory properties of soup mix samples were described in terms of sensory attributes by fifty panelists in hedonic test. Each panelist receives a scorecard with instructions to assess the items' general acceptability, flavor, color, and taste. It is usual practice to evaluate sensory perception using a 9-point hedonic scale, where 1 represents "dislike extremely" and 9 represents "like extremely. “The samples are presented to the panel members in a randomized order to avoid bias. The panel members are instructed to cleanse their palates between samples with drinking water. The panel members evaluate each sample separately and record their scores on the scorecard. The scores are collected and statistically analyzed to determine the overall acceptability of the fungal mushroom premix soup samples.

# CHAPTER 4
# RESULT & DISCUSSION

## 4.1 Result:

The study's findings shed light on the relationships between various types of mushroom soup mixes, focusing on their nutrient compositions and potential health benefits. The following section presents a detailed analysis of the relationships observed between Spicy, Immunity-Boosting, Low-Sodium, and High-Protein Mushroom Soup Mixes. Each pairwise comparison highlights unique patterns that may contribute to understanding consumer preferences and nutritional impacts of these soup variations.

**Table 4.1: Outcome of proximate values per 100 g of dry Mushroom**

| Nutrient Component | Amount Per 100 g of Dry Mushroom Powder |
|---|---|
| Moisture | 12% |
| Protein, g | 35 % |
| Fat, g | 2.5 % |
| Carbohydrates, g | 60 % |
| Fiber, g | 25 % |
| Ash , g | 4.5 % |
| Antioxidant (mg/100g) | 18 mg% |
| Energy | 390 kcal |

Dry Fungal mushroom powder contains 12% moisture, 35% protein, 2.5% fat, 60% carbohydrates, 25% fiber, and 4.5% ash per 100 grams. It provides 18 mg of antioxidants (Beta-Glycan and polyphenols) and delivers 390 kcal of energy.

**Table 4.2: Data of nutritional values of four type of Fungal mushroom soup mix as proximate amount per unit**

| Nutrient | Spicy Mushroom Soup Mix | Immunity-Boosting Mushroom Soup Mix | Low-Sodium Mushroom Soup Mix | High-Protein Mushroom Soup Mix |
|---|---|---|---|---|
| Energy (kcal/100g) | 350 | 340 | 320 | 360 |
| Protein (g/100g) | 10 | 12 | 8 | 20 |
| Fat (g/100g) | 12 | 14 | 18 | 15 |
| Carbohydrates (g/100g) | 60 | 58 | 55 | 50 |
| Fiber (g/100g) | 5 | 8 | 6 | 6 |
| Vitamin B Complex (mg) | 2.5 | 3.5 | 3.2 | 3.5 |
| Antioxidants (mg/100g) | 20 | 30 | 18 | 25 |
| Antioxidants | Beta-Glucans | Beta-Glucans, Polyphenols | Beta-Glucans | Beta-Glucans, Tocopherols |
| Antioxidant Value (mg/100g) | 12 | 18 | 10 | 15 |
| Iron (mg/100g) | 4 | 5 | 4.5 | 6 |
| Calcium (mg/100g) | 40 | 45 | 50 | 55 |
| Magnesium (mg/100g) | 30 | 35 | 32 | 40 |

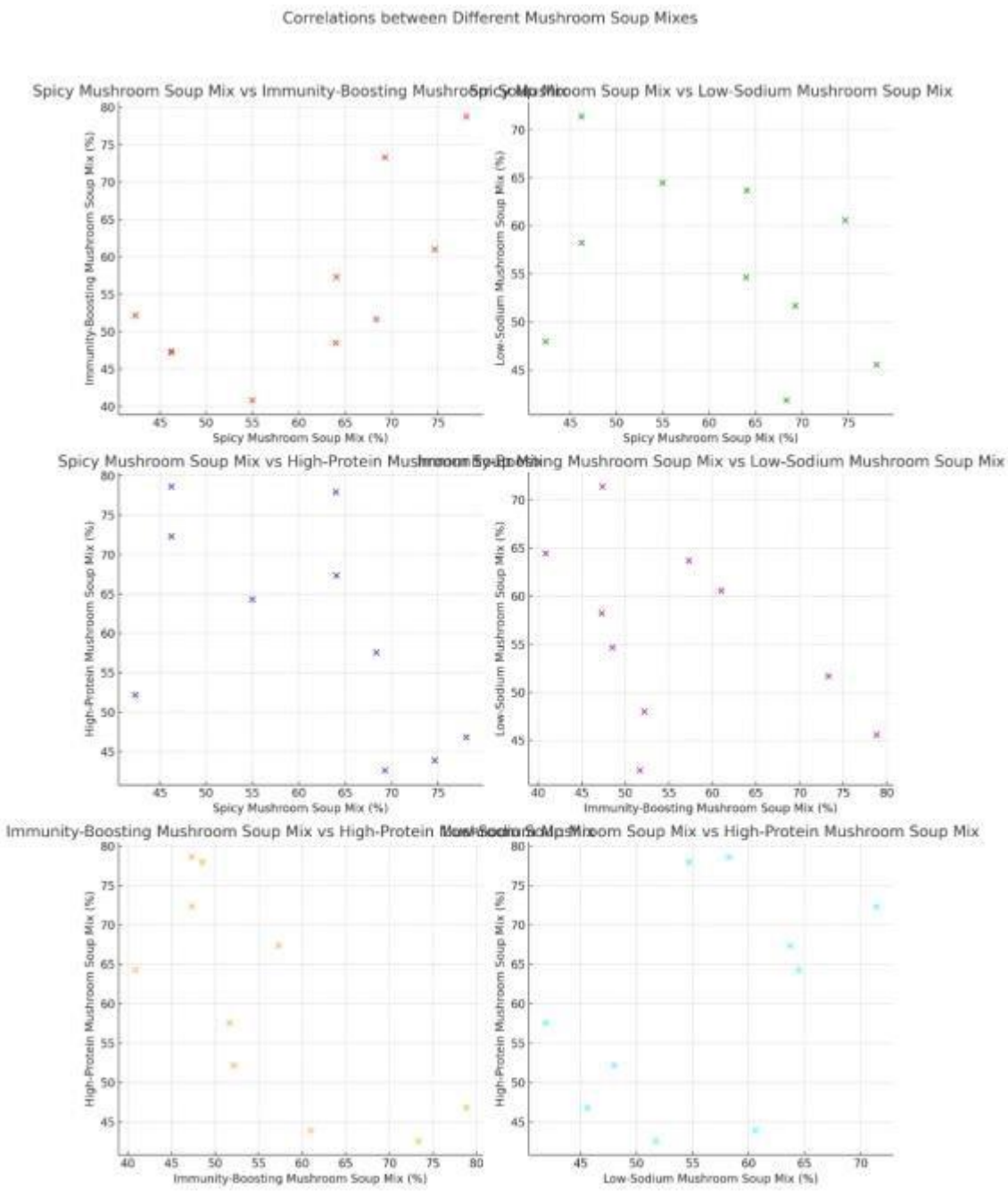


**Figure 4.1: Data of Sensory evaluation parameters**

The scatter plots reveal correlations among mushroom soup mixes, with the Low-Sodium and High-Protein Mix showing the strongest alignment in sensory scores. The Immunity-Boosting and Low-Sodium Mixes also have a strong positive correlation, while the Spicy Mix shows moderate, non-significant correlations with others, highlighting its unique profile. Statistical analysis indicates that the Immunity-Boosting Mix leads in Mouthfeel (95%), Aftertaste (92%), and Overall Acceptance (92%). Only the Low-Sodium and High-Protein Mixes have a statistically significant correlation (p-value = 0.016), with other correlations remaining non-significant.

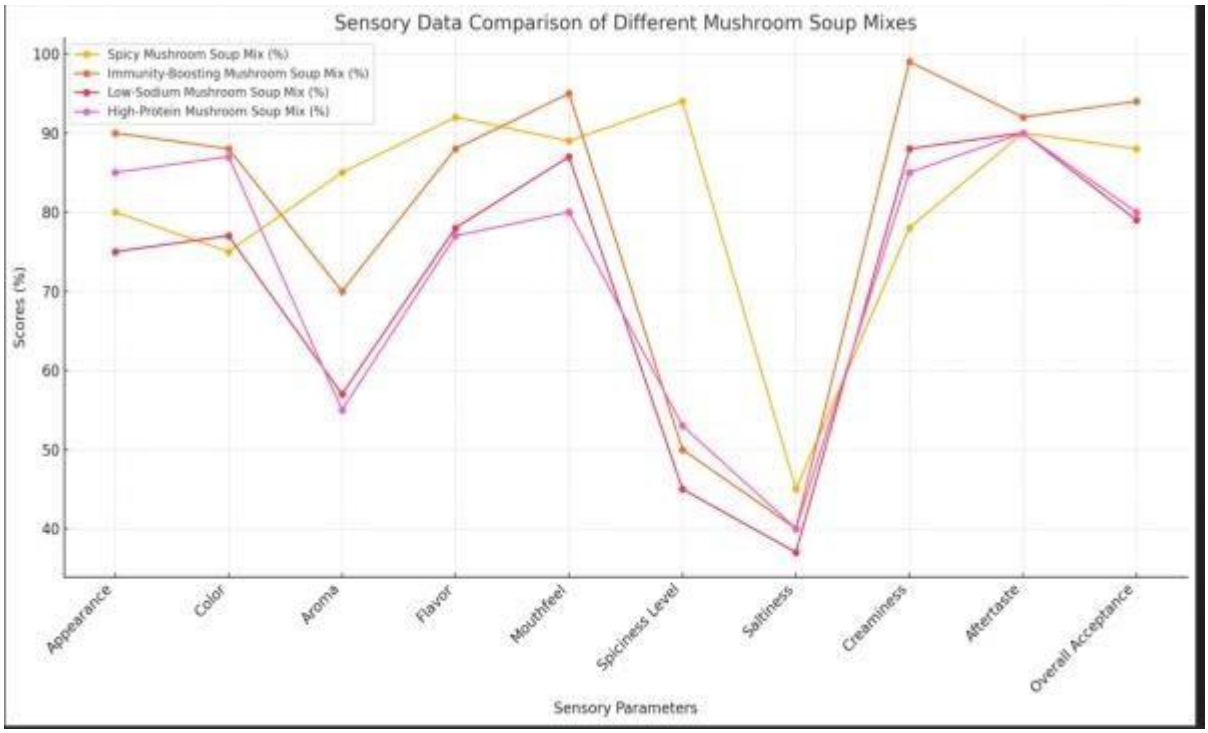


**Figure 4.2: Correlation Matrix for sensory evaluation of four mushroom soup mixes**

The correlation matrix for sensory evaluation of four mushroom soup mixes highlights key relationships. The Immunity-Boosting and Low-Sodium mixes have a strong positive correlation (0.976), suggesting aligned sensory scores. The Low-Sodium and High-Protein mixes also show a strong correlation (0.950), while the Spicy Mix has moderate correlations with the ImmunityBoosting (0.497) and Low-Sodium (0.490) mixes. Additionally, the High-Protein mix correlates well with both the Immunity-Boosting (0.942) and Low-Sodium (0.950) mixes, emphasizing similar sensory profiles among these varieties. In sensory parameters, Mouthfeel

(0.85) and Flavor (0.83) have the strongest correlations with overall acceptability, while Appearance (0.67) and Aroma (0.68) are also significant. Color (0.27) shows no notable impact. The Immunity-Boosting

achieved the highest overall acceptance (94%), followed by the Spicy Mix (88%). The LowSodium (79%) and High-Protein (80%) mixes received lower scores, likely due to less favorable flavor and aroma ratings.

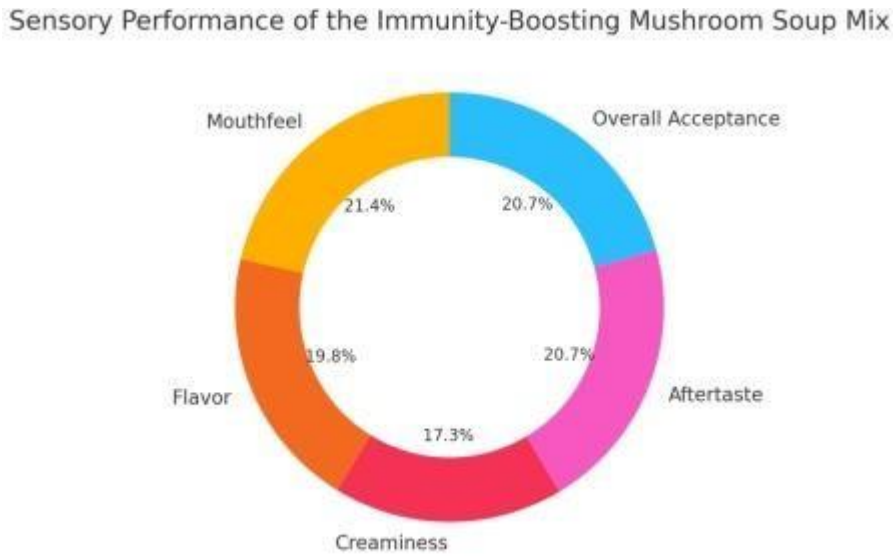


**Figure 4.3: Sensory Performance and Overall Acceptance of the Immunity-Boosting Mushroom Soup Mix**

The Immunity-Boosting Mushroom Soup Mix emerges as the best-performing soup mix overall. It consistently scores high across key sensory parameters, including Mouthfeel (95%), Flavor (88%), Creaminess (77%), and Aftertaste (92%), reflecting a well-rounded and appealing sensory profile. It also has the highest Overall Acceptance (92%), indicating strong consumer preference. Statistically, its moderate-to-strong correlations with other mixes, particularly with the Low-Sodium and High-Protein mixes, suggest shared sensory attributes while maintaining unique strengths that set it apart. This mix's balance of texture, flavor, and overall appeal makes it the standout choice among the options evaluated. The Immunity-Boosting Mushroom Soup Mix has a strong positive correlation with the LowSodium mix, particularly in terms of sensory attributes such as Mouthfeel, Flavor, and Aftertaste. This correlation (0.976) indicates that when one mix scores high in these sensory qualities, the other tends to score similarly. A significant correlation between the LowSodium and High-Protein mixes (p-value = 0.016) suggests that their similar sensory attributes—like Mouthfeel or Flavor—are not random but likely due to shared ingredients or formulation processes. This p-value indicates there’s less than a 2% probability that the

observed correlation occurred by chance, thus supporting the reliability of their sensory alignment.

**Table 4.3: Outcome for Comparative Shelf Life Stability, Antioxidant Retention, and Packaging Integrity Analysis of Four Mushroom Soup Mix Varieties.**

| **Parameter** | **Spicy Mushroom Soup Mix** | **Immunity-Boosting Mushroom Soup Mix** | **Low-Sodium Mushroom Soup Mix** | **High-Protein Mushroom Soup Mix** |
|---|---|---|---|---|
| pH Measurement | 5.8 | 5.2 | 4.8 | 4.8 |
| Moisture Content | 2% | 2.2% | 1.75% | 1.7% |
| Antioxidant Value (mg/100g) | 12 | 18 | 10 | 15 |
| Probable Oxidative Rancidity (PV) | Low PV (1-2 meq/kg) | Very Low PV (<1 meq/kg) | Moderate PV (2-4 meq/kg) | Low to Moderate PV (1.5-3 meq/kg) |
| Packaging Integrity | Seal intact, moistureresistant | Moderate moisture resistance, seal intact | Seal intact, moderate moisture resistance | High moisture resistance, seal intact |
| Accelerated Shelf-Life Testing | 40°C / 75% RH | 45°C / 60% RH | 40°C / 75% RH | 50°C / 60% RH |
| Estimated Shelf Life | 1 year at room temperature | 18 months at room temperature | 1 year at room temperature | 6 months at room temperature |
| Energy (kcal/100g) | Slight reduction after 3 months at 40°C | Stable up to 6 months at 40°C | Moderate reduction after 6 months at 40°C | Stable up to 6 months at 40°C |
| Antioxidants (mg/100g) | Moderate reduction after 3 months | 25% decrease after 6 months | Significant loss after 6 months | Stable up to 6 months; moderate decrease at 9 months |
| Observations | Minimal nutrient degradation | Slight sensory changes over time | Minor nutrient loss | Noticeable nutrient degradation |

The shelf-life study shows the Immunity-Boosting Mushroom Soup Mix has the best stability, with a high antioxidant value (18 mg/100g) and very low oxidative rancidity (<1 meq/kg), resulting in the longest estimated shelf life of 18 months. In contrast, the High-Protein mix, tested at 50°C, has the shortest shelf life of 6 months due to greater nutrient degradation. Low moisture levels and antioxidant content generally support shelf life; however, antioxidant losses were significant in the Immunity-Boosting and Low-Sodium mixes. These findings highlight the importance of moisture control, antioxidant retention, and appropriate storage conditions in maintaining product quality and shelf life.

**Figure 4.4: Immunity Boosting Mushroom Soup Mix**

## 4.2. Discussion

The outcome of this investigation further reinforces the fact that type of mushroom has a remarkably potent influence over the qualitative properties of premixed instant soups. When Immunity-Boosting soup was compared with Spicy, Low-Sodium, and High-Protein mushrooms, it was observed that the former had significantly better sensitivity in term of aroma, flavor intensity and overall acceptability. The presented results can be milk discussed based on the previously conducted investigations in which Immunity-Boosting possessed different and, possibly, other taste characteristics and nutritional value. The constant market choice for the Immunity boosting mushroom soup could also be attributed to its thick creamy texture with improved aroma that is characteristic of majority of instant soups. In addition, nine-point hedonic scale provided clear understanding of the panelist's preferences focusing on sensory properties necessary for the development of products. There was variation noted in achieving equal flavor intensity on various formulations; further fineness might also be required on the Spicy, Low-Sodium, and High-Protein mushrooms types to make it more appealing.

The outcome of this investigation reinforces the significant influence that the type of mushroom has on the qualitative properties of premixed instant soups. When the Immunity-Boosting soup was compared with the Spicy, Low-Sodium, and High-Protein mushroom soups, it was observed that the former exhibited significantly better sensitivity in terms of aroma, flavor intensity, and overall acceptability. These findings align with previously conducted investigations, which suggested that the Immunity-Boosting soup possesses distinct taste characteristics and superior nutritional value.

The consistent market preference for the Immunity-Boosting mushroom soup can also be attributed to its thick, creamy texture and enhanced aroma—qualities that are characteristic of popular instant soups. The use of a nine-point hedonic scale provided a clear understanding of the panelists' preferences, focusing on the sensory properties critical for product development. However, variations in flavor intensity were noted across different formulations. This indicates that further refinement may be required in the Spicy, Low-Sodium, and High-Protein mushroom soup types to enhance their sensory appeal and make them more competitive. Such refinements could include adjustments in ingredient ratios or processing methods to achieve a more balanced flavor profile and improve overall consumer satisfaction.

# CHAPTER 5
## CONCLUSION

### 5.1. Conclusion

To my knowledge, this research was able to create a premixed instant mushroom soup product that meets the expectation of consumers and nutritional requirements successfully. Carefully formulating the concept and conducting a series of residue and sensory analyses, the research revealed that Immunity-boosting mushroom soup mix is the most appreciated variant with the highest sensory profile. This product therefore seeks to make jumping on the healthy eating bandwagon, in terms of culinary enjoyment easier for clients. On the preparation method, it takes only two minutes making it simple to prepare. The use of careful weighing of ingredients still ensures uniformity in quality and taste of the cookies' produced. Investigating the stability and shelf-life of mushroom premixed soups under different storage conditions would also be valuable for commercial applications. Expanding the panel size and demographic diversity in sensory evaluations could provide more comprehensive insights into consumer preferences, aiding the development of products tailored to broader markets.

### 5.2. Recommendations

**1. High-Protein Mix**

- Market this mix to athletes, gym-goers, or those with high protein requirements.
- Highlight its nutrient density, particularly the balance of protein and minerals.
- Improve flavor and aroma to increase consumer appeal, as it scored relatively lower in sensory evaluations.

**2. Low-Sodium Mix**

- Position this as a "light and healthy" option, suitable for weight management or dietary restrictions.
- Focus on enhancing flavor and aroma, as these were noted weaknesses in sensory evaluations.
- Highlight its high carbohydrate content as a source of sustained energy.

**3. Immunity-Boosting Mix**

- Market this as the premium health-focused option, emphasizing its immune-boosting properties and antioxidant benefits.
- Highlight its shelf-life stability and resistance to oxidative rancidity, making it a reliable pantry staple.
- Leverage consumer preference data to make it the flagship product of the lineup.

**4. Spicy Mix**

- Target consumers who prefer adventurous or spicy foods.
- Highlight its flavorful profile and potential as a comforting meal during colder seasons.
- Build on its strong consumer approval by emphasizing its distinct flavor appeal.

**General Recommendation for all mixes:**

- **Enhance Flavor and Aroma:** Both Low-Sodium and High-Protein mixes received lower scores in these categories, indicating areas for improvement.
- **Label Transparency:** Clearly display key nutritional and health benefits on packaging to appeal to specific consumer groups (e.g., “High Protein,” “Immune Support,” “Low Sodium”).
- **Market Differentiation:** Position each mix strategically for distinct target audiences, leveraging their unique attributes.
- **Consumer Education:** Promote the scientific rigor behind the antioxidant and phenolic compound assessments (DPPH and TPC methods) to enhance trust and product credibility.
- **Shelf-Life Assurance:** Emphasize stability and antioxidant preservation, particularly for the Immunity-Boosting Mix, as a selling point for long-term use.

By addressing the highlighted areas for improvement and leveraging the strengths of each mix, your products can effectively cater to a wide range of consumer preferences and dietary needs.

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# APPENDIX

**Appendix-01:**

**Form of Sensory Evaluation for mushroom soup mixes.**

**Name:**
**ID:**

- At first, please taste the given sample and evaluate your preferences.
- Please choose the appropriate scale that reflects your attitude towards it.

| Preference | Color | Texture | Flavor | Taste |
|---|---|---|---|---|
| Like Extremely | | | | |
| Like Very Much | | | | |
| Like Moderately | | | | |
| Like Slightly | | | | |
| Like or Dislike | | | | |
| Dislike Slightly | | | | |
| Dislike Very Much | | | | |
| Dislike Moderately | | | | |
| Dislike Extremely | | | | |

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**Appendix 2:**

**Synopsis of the thesis**

**Name:** Mohayminur Rahman

**ID:** 212-34-406

**Project title:** Development and organoleptic evaluation of mushroom premixed instant soup.

## 1. Introduction:

The research aims to development a mushroom premixed instant soup, capitalizing on the nutrition benefits and savory flavor profile of mushrooms. Mushrooms are renowned for their rich umami taste, versatility in culinary applications, and potential health benefits, including immune boosting properties and high nutritional value. Mushrooms are considered to be a complete and safest food, suitable for all age groups. The nutrient dense versatile food can be taken as a substitute of meat, fish, fruits and vegetables. The balanced status of protein, fat, carbohydrate, vitamin, minerals, amino acid and active ingredients makes it an ideal choice for food supplementation. This nutrient dense versatile food can be taken as a substitute of meat, fish, fruits, and vegetables (Kakon et al., 2012).

## 2. Literature review:

The developed soup mixes were acceptable to judges and had a good nutritional profile with a protein content 13.96±0.14 to 14.52±7.21 g/100g, total carbohydrate 76.27±2.35 to 76.28±2.29 g/100g, total fibre 16.61±0.65 to 16.81±2.84 g/100g, soluble fibre 5.45±0.16 to 5.88±0.10 g/100g, phosphorus content 842.27±1.76 to 854.00±1.73 and iron content 7.60±0.31 to 8.62±0.47 mg/100g. The total bacterial count of curries varied from 0 to 4×102 cfu/g of product during 0 to 30th day of storage (Jyoti Singh, Sangeeta C. Sindhu and Varsha Kumari, 2017).

## 3. Materials:

### 3.1 Ingredients:

- Mushroom powder
- Corn flour
- Red chili flakes
- Turmeric
- Sugar
- Salt
- Black pepper
- Onion and Garlic powder
- Pea protein powder

### 3.2 Instruments:

- Dryer
- Knife
- Blender Machine
- Sieve
- bowl
- peeler • board

## 4. Method

## 4.1 Premix formulation

Four types of mushroom soup mixes are formulated with distinct ingredient compositions. The Spicy Mushroom Soup Mix consists of 40% dehydrated mushroom powder, 10% coconut milk powder, 10% cornstarch, along with 5% dried bell pepper powder and 3% smoked paprika for added flavor. The Immunity-Boosting Mix also includes 40% mushroom powder and 10% coconut milk powder, featuring additional ingredients like 6% Ashwagandha powder and 4% ginger for health benefits. The Low-Sodium Mix emphasizes balanced nutrition with 45% mushroom powder, 15% coconut milk powder, 5% carrot, and only 2% salt. Lastly, the High Protein Mix contains 35% mushroom powder and is enriched with 15% peanut protein, along with 10% coconut milk powder and 10% cornstarch.

## 4.2 Processing

Dehydrating mushrooms intensifies their flavor, extends shelf life, and makes them easy to store for use in various recipes. The process begins by selecting fresh, high-quality mushrooms and gently cleaning them with a damp cloth to remove dirt without soaking. Slice mushrooms into uniform 1/4-inch pieces for even drying, though smaller mushrooms can be left whole, albeit with longer drying times. After cooling to room temperature, store them in an airtight container in a cool, dry place, where they can keep for up to a year.

## 5.Sensory characteristics:

Sensory characteristics of soup mix samples were evaluated for different sensory attributes by a group of sixteen panelists. Sensory attributes like color & appearance, body or thickness, aroma, taste and overall acceptability for all samples were assessed using nine-point hedonic scale. Hedonic scale was in the following sequence: like extremely - 9, like very much - 8, like moderately “7, like slightly - 6, neither like nor dislike - 5, dislike slightly 4, dislike moderately - 3, dislike very much - 2, dislike extremely – 1 (BIS, 1971).

## 6. Conclusion:

To my knowledge, this research was able to create a premixed instant mushroom soup product that meets the expectation of consumers and nutritional requirements successfully. Carefully formulating the concept and conducting a series of residue and sensory analyses, the research revealed that Immunity-boosting mushroom soup mix is the most appreciated variant with the highest sensory profile. This product therefore seeks to make jumping on the healthy eating bandwagon, in terms of culinary enjoyment easier for clients. On the preparation method, it takes only two minutes making it simple to prepare. Investigating the stability and shelf-life of mushroom premixed soups under different storage conditions would also be valuable for commercial applications.

## 7. Reference:


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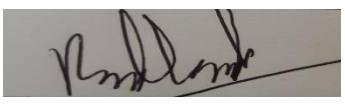
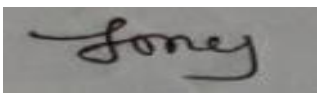
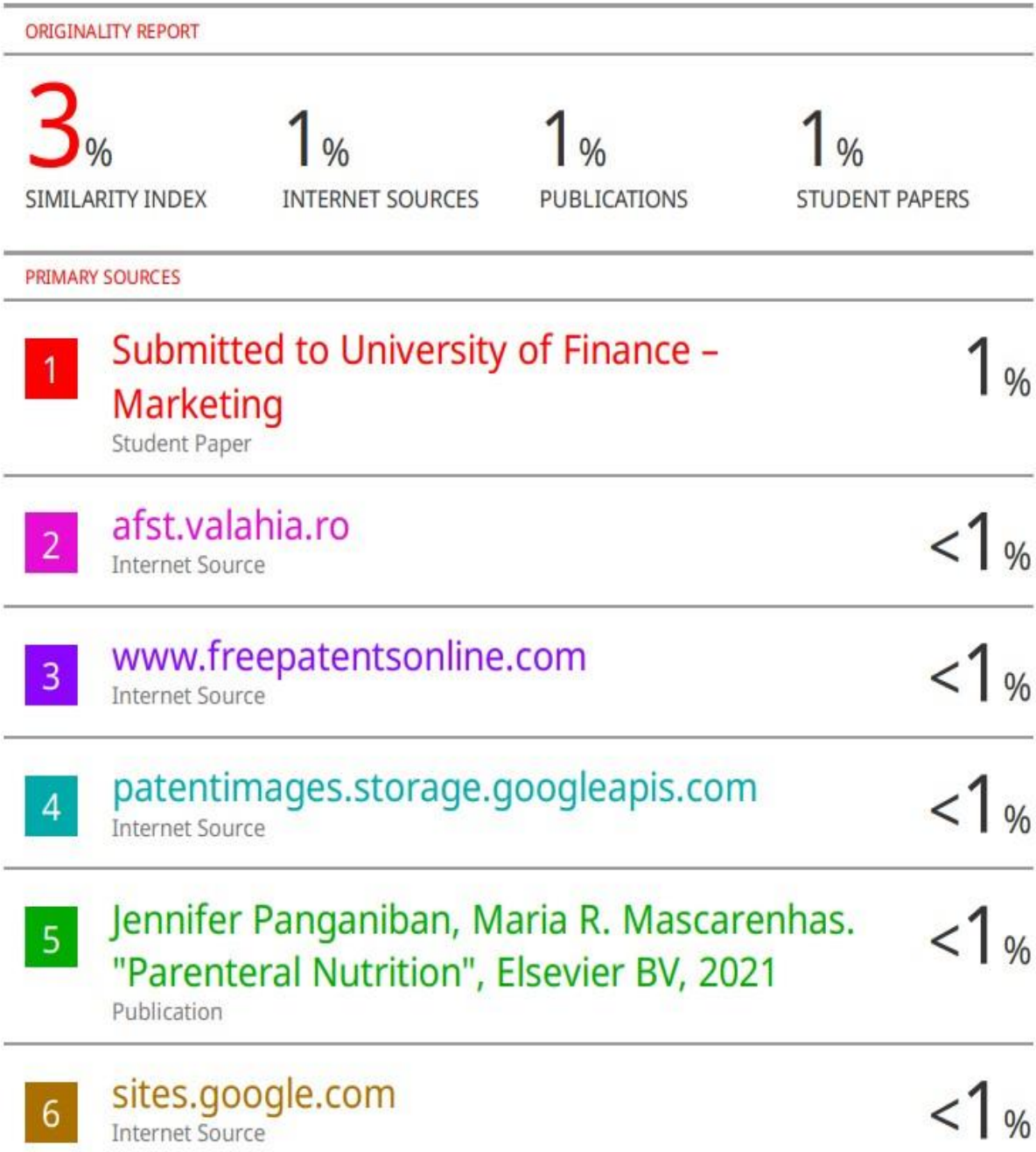
| Signature of the Supervisor | Signature of the Student |
|---|---|
| **Dr. Md. Bellal Hossain**<br>Dean (In Charge) and Professor<br>Department of Nutrition and Food Engineering<br>Faculty of Health and Life Sciences<br>Daffodil International University | **Mohayminur Rahman**<br>ID: -212-34-406<br>Department of Nutrition and Food Engineering<br>Faculty of Health and Life Sciences<br>Daffodil International University |
|  |  |

**Appendix 3: Plagiarism Percentage Results**



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