**RESEARCH PLAN**

**Research Title:** Feasibility of Coconut Pulp (*Cocos nucifera L.*) with Malunggay Pellets (*Moringa oleifera*) as an Alternative Poultry feed

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**RATIONALE**

The poultry industry is a vital component of global agriculture, providing a primary source of protein through meat and eggs. However, one of the most significant challenges faced by poultry farmers, especially small-scale operators, is the rising cost of commercial poultry feed. Feed expenses constitute up to 70% of total production costs, making it crucial to explore alternative, sustainable, and cost-effective feed sources.

Coconut pulp (*Cocos nucifera L*.), a byproduct of coconut milk production, is widely available in tropical regions. It is often discarded or used minimally despite its potential as a valuable source of fiber, fat, and nutrients. Similarly, malunggay (Moringa oleifera) is recognized as a "superfood" due to its high protein, vitamin, and mineral content. Malunggay leaves are readily available in many regions and can be processed into pellets for easy incorporation into animal feeds.

Combining coconut pulp and malunggay into poultry feed aligns with sustainable agricultural practices by utilizing underutilized resources. This approach not only reduces feed costs but also minimizes waste, promoting a circular economy. Moreover, the nutritional profiles of these ingredients suggest their potential to support poultry growth and health while offering an alternative to synthetic feed additives.

This study seeks to address the dual challenge of economic sustainability and nutritional adequacy in poultry farming. By investigating the feasibility of coconut pulp and malunggay pellets (Moricoco Pellets) as alternative feed, this research contributes to the development of affordable, eco-friendly feed solutions that can benefit farmers, reduce dependence on commercial feeds, and enhance food security.

**RESEARCH QUESTIONS**

**General Questions**

In general, the researcher aims to answer the question:

Is the use coconut pulp and malunggay pellets more effective for farmers instead of using traditional poultry feed?

**Specific Questions**

1. What are the specific nutritional content of Moricoco pellets.

2. What are the difference of costs between Moricoco pellets and standard chicken feed?

3. Is there a significant difference on the nutritional content of Moricoco pellets compared to commercial poultry feed?

**HYPOTHESIS**

: There is no significant difference between Moricoco pellets and commercial poultry feed.

: There is a significant difference between Moricoco pellets and commercial poultry feed.

**RESEARCH OBJECTIVES**

The research aims to determine whether Moricoco pellets made from coconut pulp and malunggay can be an effective alternative for commercial poultry feed. Specifically, it aims to study the effectivity of Moricoco in terms of price, accessibility and ease of manufacture, and nutritional content in comparison with standard brands of commercial poultry feed. By analyzing their protein, fiber, vitamin, and mineral content, the study will assess whether these pellets provide comparable or superior nourishment to standard poultry feed. Additionally, it will examine the economic advantages of Moricoco production, considering factors such as ingredient availability, production costs, and market accessibility in comparison with commercial feeds. The study also aims to determine whether the ease of manufacturing Moricoco pellets can offer a more practical and self-sufficient feeding option for poultry farmers

**RESEARCH METHODS**

The study will follow a systematic approach to procure materials, create Moricoco pellets, analyze their nutritional content, and compare them with standard poultry feed using statistical methods.

1. **Material Procurement**

First, the necessary materials will be gathered, including malunggay leaves, coconut pulp, cornstarch as an aggregate, two 500g commercially available poultry feeds for comparison, a manual pellet machine, and appropriate storage containers. The malunggay leaves and coconut pulp will serve as the primary ingredients for Moricoco pellets, while cornstarch will act as a binding agent to ensure proper pellet formation.

1. **Moricoco Pellet creation**

Once the materials are acquired, the process of creating the Moricoco pellets will begin. The malunggay and coconut pulp will be mixed in varying ratios of 20:80, 40:60, 60:40, and 80:20 to determine the optimal formulation for poultry nutrition. In each mixture, 60 grams of cornstarch will be added as a pellet aggregate to enhance the structural integrity of the pellets. The mixture will then be processed through a manual pellet machine to create uniform feed pellets suitable for poultry consumption.

1. **Nutrition Content Testing**

After pellet production, both the Moricoco pellets and the selected commercial poultry feeds will undergo nutritional analysis. The samples will be tested at Ateneo de Manila University to assess their nutritional composition, including protein, fiber, fat, vitamins, and minerals. This analysis will provide quantitative data on the nutrient content of Moricoco pellets compared to standard poultry feed.

**D. Data Analysis and Comparison**

To evaluate the effectiveness of Moricoco pellets as an alternative poultry feed, statistical analysis will be conducted. A t-test and ANOVA (Analysis of Variance) will be used to determine whether there is a statistically significant difference between the nutritional content of Moricoco pellets and commercial poultry feed. These tests will provide objective evidence to support or refute the research hypothesis, ensuring that conclusions are based on robust data analysis.

**EXPECTED OUTCOMES**

The study is expected to determine the nutritional composition of Moricoco pellets, analyzing their protein, fiber, fat, vitamin, and mineral content to assess their suitability as poultry feed compared to commercial alternatives. It will also evaluate the cost-effectiveness of Moricoco pellets by comparing production costs with standard poultry feed, potentially identifying a more affordable option for farmers. Statistical analysis using t-tests and ANOVA will establish whether there is a significant difference in nutritional content, providing empirical evidence to support or refute the hypothesis. Additionally, the research will assess the feasibility of Moricoco pellet production, considering ingredient accessibility and the ease of manufacturing using a manual pellet machine. If found nutritionally adequate and economically viable, Moricoco pellets could present a sustainable alternative, promoting self-sufficiency among farmers while utilizing agricultural byproducts efficiently

**DATA ANALYSIS**

The data analysis will be conducted based on the nutritional composition obtained from laboratory testing of Moricoco pellets and commercial poultry feed. Multiple samples of Moricoco pellets, formulated with varying malunggay-to-coconut pulp ratios, will undergo quantitative assessment to determine their protein, fiber, fat, vitamin, and mineral content. These results will then be systematically compared to the nutritional profile of commercially available poultry feed to evaluate relative differences in composition.

To determine statistical significance, the study will employ a two-sample t-test to compare the means of the nutritional values between Moricoco pellets and standard poultry feed. The test will be conducted at a significance level of ( to assess whether the observed differences are statistically significant. If the -value obtained is less than or equal to 0.05, the null hypothesis (which states that there is no significant difference between Moricoco pellets and commercial feed) will be rejected in favor of the alternative hypothesis, indicating a significant difference in nutritional content. Additionally, ANOVA may be utilized to analyze the variation in nutritional content across different Moricoco formulations to identify the most nutritionally optimal ratio.

**RISK AND SAFETY**

One of the primary risks in this study is contamination and spoilage of raw materials, as improper handling, storage, or processing of malunggay leaves and coconut pulp can lead to microbial growth, spoilage, or mycotoxin formation, which may pose health risks to poultry. To mitigate this, proper drying and storage in airtight, moisture-free containers should be ensured, along with strict hygienic handling procedures. Another concern is the potential for allergic reactions or toxicity in poultry due to excessive consumption of certain compounds in malunggay or coconut pulp, which could lead to digestive issues or other adverse effects. This risk can be minimized through toxicity screening and maintaining ingredient proportions within recommended dietary guidelines. Furthermore, the manual pellet machine used in feed preparation poses a mechanical hazard, with the potential for hand injuries if not operated correctly. To ensure safety, proper training should be provided, protective gloves used when necessary, and machine operation guidelines provided by the manufacturer is strictly followed.

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