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

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**I. INTRODUCTION**

The growing global demand for sustainable and cost-effective poultry feed has prompted researchers and experts in the agricultural and animal nutrition fields to investigate new and innovative sources of nutrition (Bahadur et al, 2024). These alternative sources aim to optimize feed formulations while addressing pressing environmental concerns linked to agricultural waste.

*Cocos nucifera*, commonly known as the coconut tree, is a remarkable member of the Arcaceae family, celebrated for its diverse applications and contributions to both the economy and local cultures. Coconut pulp, often seen as a byproduct in the processing of coconuts, is frequently discarded, contributing to environmental waste. With the rising demand for affordable poultry feed, this underutilized resource presents a promising opportunity for sustainable agricultural practices. By repurposing coconut pulp, we can not only minimize environmental waste but also address the economic challenges faced by poultry farmers seeking cost-effective feed alternatives. This study aims to explore the potential of coconut pulp as a viable ingredient in poultry rations, particularly when combined with nutritious additions such as malunggay. Known for its rich nutritional profile, malunggay provides essential vitamins and minerals, complementing the energy-rich benefits of coconut pulp (Islam et al, 2021). 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 (Srinsava & Pandey, 2023)

Recent research has revealed that incorporating coconut products into poultry diets can significantly enhance various health aspects of the birds. Studies indicate that these products, particularly coconut oil and coconut pulp, can improve digestion (Rusdiansyah et al, 2022), leading to better nutrient absorption and utilization. As a result, poultry fed with coconut-based diets often show increased growth rates and improved overall health, which are vital factors for farmers aiming to optimize production efficiency and maintain the well-being of their flocks (Obianwuna et al, 2023).

In addition to the health benefits for chickens, using coconut products and malunggay has substantial economic implications for farmers. By integrating coconut pulp into their feeding strategies, poultry producers can effectively reduce feed costs while simultaneously minimizing waste. Malunggay is easily grown and can be harvested fast. This approach not only supports sustainability practices by diverting coconut waste from landfills but also addresses economic challenges faced by farmers in the competitive poultry industry. It serves as a promising avenue for cost reduction, making poultry farming more viable and profitable.

Moricoco Pellet is the name of the product which consists of Coconut pulp and malunggay pellets as an alternative poultry feed significantly improve the growth performance, health, and cost-efficiency of poultry compared to commercial poultry feed. These hypotheses align with your research objective to test the feasibility and effectiveness of the alternative feed

The study is significant because it addresses some of the biggest challenges faced by poultry farmers today. With the rising costs of the commercial poultry feed, many small-scale farmers struggle to sustain their operations. By exploring coconut pulp and malunggay pellets as alternative feed ingredients, this research offers a practical solution that could make poultry farming more affordable and accessible. Coconut pulp, which is often treated as waste, can be repurposed into a valuable feed ingredient. At the same time, malunggay, known for its high nutritional value, could improve poultry health and productivity. Together, these natural resources could help farmers save money while maintaining the quality of their poultry products. This study also promotes sustainability by making use of agricultural byproducts and locally available materials. This could reduce waste and encourage farmers to adopt more environmentally friendly practices. Additionally, if the alternative feed proves effective, it could improve food security by making poultry farming more profitable and efficient, which benefits both farmers and consumers. Ultimately, this research is about helping farmers, protecting the environment, and contributing to a sustainable food system. The findings could pave the way for new, innovative feeding strategies in the poultry industry, benefiting communities and the agricultural sector.

The main goal of the study is to find out if coconut pulp and malunggay pellets can work as an alternative to commercial poultry feed. With the rising costs of feed, the researcher desires to explore if using these natural and locally available materials can help farmers save money while keeping their poultry healthy and productive. Another goal is to see how well chickens grow and perform when fed with this alternative feed that we made. It’s important to ensure that their health isn’t compromised and that the feed supports good weight gain and overall development. The research also aims to promote sustainable farming practices by making use of coconut pulp, which is often thrown away, and malunggay, which is easy to grow and very nutritious. This could help reduce waste and encourage farmers to use more eco-friendly materials. The researcher hopes that this study can provide useful data for other researchers and farmers who are looking for affordable and sustainable ways to improve poultry farming. If successful, this could be a big help to small-scale farmers and the agricultural community.

The scope of the study is focused on evaluating coconut pulp and malunggay pellets as alternative feed for broiler chickens. The study will assess the impact of these materials on poultry growth, health, and performance compared to traditional commercial feed. The main aim of the study is to determine whether these alternative feed ingredients are cost-effective and sustainable for poultry farming, particularly for small-scale farmers. Over the course of the study, the performance of the poultry will be monitored by tracking weight gain, feed intake, and overall health to evaluate the effectiveness of the alternative feed. The study will be conducted over 6 to 8 weeks, which aligns with the typical growth period for broiler chickens. During this time, laboratory tests will be conducted to analyze the nutritional composition of coconut pulp and malunggay pellets to ensure they meet the necessary dietary needs of poultry. This research will provide valuable insights into whether these locally sourced ingredients can be used effectively as alternatives to commercial poultry feed.

The delimitations of this study involve certain factors that limit its scope and generalizability. First, the research will focus exclusively on broiler chickens, excluding other poultry types such as layers or native chickens. Since different poultry species have unique nutritional requirements, the results of the study may not be applicable to all types of poultry. Additionally, the study will only test coconut pulp and malunggay pellets as feed ingredients, without incorporating other feed additives or variations. This limits the exploration to the specific impact of these two ingredients. The study will also be carried out in a controlled environment, meaning the results may not fully reflect what would happen in larger commercial or free-range poultry farms, where environmental factors like space and climate can influence poultry growth. Furthermore, the research will only focus on the short-term effects, tracking the growth and health of the chickens over the 6–8-week period. Long-term effects, such as impacts on reproduction or egg production, will not be addressed.Finally, the availability and quality of coconut pulp and malunggay pellets may vary due to seasonal conditions and local supply, which could affect the consistency of the feed used in the study. These delimitations help clarify the specific focus of the study while acknowledging the factors that may influence its scope and applicability.

**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.

**II. METHODOLOGY**

**Research Design:**

This study will utilize an experimental research design to determine the feasibility of coconut pulp (*C. nucifera L.*) and malunggay pellets (*M. oleifera*) as alternative poultry feed. A randomized controlled trial will be conducted with four groups of broiler chickens, each receiving different types of feed.

**Population and Sampling:**

* **Population**: Broiler chickens (age: day-old to 6 weeks).
* **Sampling Method**: Random sampling to select a representative sample of chicks, ensuring equal distribution across different treatment groups.

**Data Collection Procedure:**

1. Formulate different feed mixtures with varying ratios of Coconut Pulp and Malunggay Pellets.
2. Implement a controlled feeding schedule where each group receives their designated feed mixture.
3. Weigh chicks weekly to record weight gain.
4. Monitor for any signs of illness or mortality throughout the study.
5. Collect samples of each feed mixture for laboratory analysis to determine nutritional content.

**Research Variables:**

1. **Independent Variables:**
   * 1. Proportions of Coconut Pulp and Malunggay Pellets in the feed (e.g., 20%, 40%, 50%, 75%, and 100% replacement of commercial feed).
2. **Dependent Variables:**
   1. Growth performance metrics (weight gain, feed conversion ratio).
   2. Health indicators (mortality rate, general health observations).
   3. Nutritional analysis (protein, fat, fiber content).
3. **Controlled Variables:**
4. Age of chickens
5. Diet composition

**Research Setting:**

* Location: Poultry research facility or farm that has the capability to monitor and manage poultry feeding trials.
* Duration: The study could be conducted over a period of 4 to 8 weeks to allow for sufficient data collection on growth and health.

**Data Analysis:**

In this study, quantitative data analysis will be employed to assess the impact of different proportions of Coconut Pulp and Malunggay Pellets on poultry growth performance and health metrics. This approach involves the collection of numerical data, which will be analyzed statistically to draw conclusions about the effectiveness of the alternative feed formulations.

**Ethical considerations:**

Ethical considerations are important in this study on using coconut pulp (*Cocos nucifera L.*) and malunggay pellets (*Moringa oleifera*) as alternative poultry feed. The research will follow guidelines to ensure the humane treatment and care of the chickens, including proper handling and living conditions. Additionally, this research will be

**Preparation:**

Before beginning this study, it’s important to complete several key steps to ensure everything is properly organized. The first step is to finalize and submit a research proposal that clearly outlines the objectives, methods, and budget. Since the study involves animals, ethical clearance from the appropriate authorities is essential to ensure responsible research practices.

The next step is gathering all the materials and equipment needed. This includes sourcing coconut pulp, either from local suppliers or by extracting it personally, and collecting fresh malunggay leaves to process into pellets. Commercial poultry feed will also be purchased for the control group. Essential equipment like a digital weighing scale, feed containers, and cleaning supplies will be prepared. Nutritional testing for the coconut pulp and malunggay pellets will be arranged through a laboratory if necessary.

The experimental setup must be carefully prepared. The poultry pens will be cleaned and disinfected, ensuring proper ventilation and spacing for the chickens. Each group will be clearly labeled to avoid confusion during the study. The alternative feed will then be prepared by grinding and forming the coconut pulp and malunggay into pellets, followed by lab analysis to confirm their nutritional value.

To ensure smooth data collection, I’ll establish a clear schedule for feeding, cleaning, and monitoring the chickens. If others are assisting, I’ll train them to follow consistent procedures. Additionally, contingency plans will be made to address potential issues, such as supply shortages or health problems among the chickens. A short trial run will also be conducted to test the setup and identify any adjustments needed.

These preparation steps are vital for a successful study, as they ensure everything is ready for accurate and meaningful data collection. While time-consuming, careful planning and organization will make the research process more efficient and reliable.

**Collection of materials:**

For the study, several key materials are required. The primary feed ingredients include coconut pulp (sourced from local supermarkets or manually extracted) and malunggay leaves (harvested and dried before being ground into pellets). Commercial poultry feed will also be purchased to serve as the control.

Essential equipment includes a digital weighing scale for us to track the chicken growth, a pelletizing machine or tools for forming the feed, feed containers, and water dispensers. Housing materials such as bedding, disinfectants, and lighting will ensure proper conditions for the chickens.

Data collection tools like notebooks and measuring cups will be used to record weight, feed intake, and health observations. If needed, lab testing materials will be used for nutritional analysis of the feed, while protective gear and cleaning supplies will maintain hygiene throughout the study. These materials will ensure the study is conducted effectively and yields reliable results.

**Names of Materials:**

* **Feed Ingredients**
  + Coconut pulp (*Cocos nucifera L.*)
  + Malunggay leaves *(Moringa oleifera*)
* **Equipment**
  + Digital weighing scale
  + Pelletizing machine (or manual pellet forming tools)
  + Feed containers
  + Water dispensers
* **Data Collection Tools**
  + Notebooks or data sheets
  + Measuring cups
* **Lab Testing Materials** (if applicable)
  + Nutritional testing kits (for protein, fat, and fiber content)
* **Various Supplies**
  + Protective gear (gloves, masks, boots)
  + Cleaning supplies (soap, disinfectants, brushes

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.

**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.

**III. RESULTS AND DISCUSSION**

**IV. CONCLUSION**

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