**A**

**RESEARCH PROPOSAL**

**ON THE TOPIC:**

**COMPARATIVE EVALUATION OF TUMERIC *(Curcuma longa)* AND *Jathropha tanjorensis*** **LEAF MEAL AS SUPPLEMENTS ON THE PERFORMANCE OF GROWING PIGS**

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**CHAPTER ONE**

**INTRODUCTION**

**1.1 Background of the Study**

There is growing interest in the developing countries of the world to promote the production of fast-growing animals such as pigs, as a result of increasing demand for animal protein (Obinne and Okorie, 2008). Nigeria is reported to rank second in pig population in Africa and pig meats contribute about 4.5% of meat consumption in Nigeria (Adinya *et al.,* 2012). The abundance of feed resources, especially farm residues and agro industrial by-products, therefore gives the country a comparative advantage for pig production. In recent years, considerable attention has been given to the improvement of meat quality (Swigert *et al.,* 2004). Pigs have shown great potential in contributing to the nation’s economic gains because they have a short gestation period, high fecundity and farrow between 6-15 piglets depending on breed (Lekule and kyysgaard 2003). The search for least cost rations due to the increasing competition between man and animals for available grains has led to the replacement of expensive feedstuff with cheaper alternative in monogastric nutrition. Some of these are obtained from industrial by-products and agricultural wastes like maize offal, soya beans hull, cowpea hull etc. The realization that feeding alone currently account for over 75% of intensive non-ruminant (poultry and pig) production in the third world countries, including Nigeria had stimulated research interest aimed at exploiting different locally available alternative feed resources (Agbede and Aletor, 2003). Plants usefulness to man is not only as sources of raw materials for industries, but also as source of food and medication. From earliest times, plants have provided man with diverse means of healing. Two of such plants suspected to have therapeutic as well as nutritional values are *Jatthropha tanjorensis* and Turmeric (*Curcuma longa*). *Jathropha tanjorensis* is a plant that originated in Mexico and spread widely in tropical and subtropical areas including Africa (Dias *et al.,* 2012). The seeds of the plant generally contain toxic components but produce 24 - 40 % oil, rich in palmitic acid (16:0,13.4 - 15.3 %), Oleic acid (18:1, 34.3 - 45.8 %), and linoleic acid (18:2, 29.0 - 44.2 %) (Meher *et al.,* 2013). *Jatropha tanjorensis* is a perennial herb that belongs to the family *Euphorbiaceae* whose common name includes: catholic vegetables, *Jatropha*, ‘*Hospital too fa*r’, *lapalapa* and *Iyana ipaja* in Yoruba language (Uroko *et al.,* 2015). The leaves are employed traditionally in the treatment of anaemia, diabetes and cardiovascular diseases. It is a traditionally used medicinal plant in South-Eastern Nigeria with many claims from local consumers that it possesses blood replenishing properties (Oyewole *et al.,* 2012). It has been reported that Jatropha leaves are rich in beta blockers, anti-cancer agents, anti-anaemic, anti-microbial activities, anti-plasmodial and anti-oxidant effects against oxidative stress induced by malaria parasite (Omoregie *et al*., 2011). Although, studies have been carried out on *J. tanjorensis,* none of such researches have addressed the antioxidant potentials of lyophilized aqueous extract of *Jatropha tanjorensis* leaves. Most local consumers consume the aqueous extract of *J. tanjorensis* for its health benefits while researchers have provided scientific data from either methanol or ethanol extracts to support or counter claims from local consumers (Uroko *et al.,* 2015). A number of studies have shown that the plant extracts having antioxidant activities protect against induced oxidative stress and hepatotoxicity by inhibiting lipid peroxidation and enhancing antioxidant enzymes activities (Oyewole *et al.,* 2012). Turmeric (*Curcuma longa*) plant is widely known for its edible roots, all parts of the plant including the leaves and flowers are very useful and can be consumed. Report by Okwu and Josiah (2006) revealed the nutritional profile of turmeric to be 8.92% moisture, 4.60% crude fibre, 2.85% ash, 6.85% fat, 9.40% Crude protein and 67.38% Carbohydrate. Turmeric contains minerals such as Calcium, Magnesium, Potassium, Iron, Manganese and Zinc, which are required by both plants and animals to function well (Eruvbetine, 2003). Vorlaphin *et al.*, (2011), suggested that the feeding of turmeric leaf meal to ruminants can potentially disturb the fermentation of fibre by bacteria and or the synthesis of microbial protein in the rumen, because of the antibacterial property it contains. However, the positive effects of turmeric leaf meal have been found to increase weekly weight gain in rabbit does when dried powder (5g and 20g kg) was added to rabbit feed (Vorlaphin *et al.,* 2011), weight gain in broiler birds (Al-sultan, 2003) and improved feed intake, physiology and body weight gain in kids (growing goats) (Habeeband and Tarabany, 2012). To mitigate the effect of feed cost, it is imperative to utilize these therapeutic plants as supplement to increase pigs’ production.

**1.2 Problem Statement**

The increasing need for animal protein is a raising concerns among animal producers including: pig production. This concerns anchors most, on the need for feeding alternatives because feed is a challenging aspect of animal production in developing country; Nigeria inclusive. The challenge of feed arises due to feedstuff limitation caused by human competition of these feedstuff; maize and soybeans which are essentially used as food and field cultivation. These feedstuffs are limited in supply and insufficient for the human population and not sufficient for animal feed production. To this menace, pig producers utilizes processing waste such as; palm kernel cake, rice bran, wheat offal, among others, whose nutritional value is insufficient for animal growth and development. These factors are the major challenges which this work aims to resolve.

**1.3 Justification of the Study**

To meet the increasing demand for pig meat (pork) in developing countries, mitigating feed challenge is essential and to this, enhancing feed efficiency is innovation and paramount by testing and utilization of feed additives or supplement in form of herbal mix which has the capability to sustain growth and balance it health parameters. *Jatropha tanjorensis* and turmeric (*Curcuma Longa*) leaves are reported to contain components which promote or have positive impact on Animal production (Okwu and Josiah, 2006; Vorlaphin *et al.*, 2011; Ekpo and Okon, 2022). Although, to validate these claims, more researches is relevant to enhance adoption in pig production which will invariably enhance improved productivity.

**1.4 Objectives of the Study**

The objective of this study will be to;

* evaluate the growth performance of pigs fed diets supplemented with turmeric (*Curcuma longa)* leaf meal
* evaluate the growth performance of pigs fed diets supplemented with *Jathropha tanjorensis* leaf meal

**CHAPTER THREE**

**MATERIALS AND METHODS**

**3.1 Experimental Site**

The experiment will be conducted at the piggery Research unit of the Department of Animal Science, Akwa Ibom State University, Obio Akpa Campus, Oruk Anam Local Government Area, Akwa Ibom State. The area lies between latitude 4030’N and 50 00’N and longitudes 700 30’E and 800 00’E. The climate of the experimental site is a tropical rain forest characterized with high temperature (average of 300C), high rainfall (about 1500mm) and relative humidity of 70% on average (SLUS-AK, 1989).

**3.2 Experimental materials sourcing and processing**

Leaves of *Jathropha tanjorensis* (commonly known as hospital is too far) and *Curmuma longa* (turmeric) will be sourced from farms in Abak Local Government Area of Akwa Ibom State, Nigeria. The leaves will be air dried for 24 hours before being chopped into smaller sizes and mixed as supplement in the diet. Quantity of the chopped leaves in diet will be 5 % of the animal’s body weight.

**3.3 Experimental diet**

Four experimental diets will be formulated such that treatment one (CTL) with no test material served as control, diet 2 and 3 which will be contain *Jathropha tanjorensis* leaf meal (JTLM) and *Curmuma longa* (turmeric) leaf meal (TLM) respectively at 4 % of the pig’s body weight will serve as JM4 and TM4. Treatment 4 (JM2TM2) contained 2% each of JTLM and TLM. Feed and clean water will be given ad libitum twice a day (8am and 4pm) to the animals. The two leaf meals will be added as an inclusive part of the calculated experimental diets according to NRC (1998) as shown in Table 1.

**Table 1: Gross Composition of the experiment diets**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Ingredient** | **CTL** | **JM4** | **TM4** | **JM2TM2** |
| Maize | 45.00 | 45.00 | 45.00 | 45.00 |
| Soybeans | 16.00 | 16.00 | 16.00 | 16.00 |
| PKC | 16.60 | 16.60 | 16.60 | 16.60 |
| Wheat offal | 19.40 | 18.90 | 18.90 | 18.90 |
| Bone meal | 2.25 | 2.25 | 2.25 | 2.25 |
| Vitamin premix | 0.25 | 0.25 | 0.25 | 0.25 |
| Salt | 0.50 | 0.50 | 0.50 | 0.50 |
| Total | 100 | 100 | 100 | 100 |
| **Calculated Composition** |  |  |  |  |
| Crude protein (%) | 21.48 | 21.48 | 21.48 | 21.48 |
| Crude fiber (%) | 1.01 | 1.01 | 1.01 | 1.01 |
| Crude fat (%) | 5.34 | 5.34 | 5.34 | 5.34 |
| Ash (%) | 4.70 | 4.70 | 4.70 | 4.70 |
| Gross Energy (Kcal/kg) | 2901 | 2901 | 2901 | 2901 |

**3.4 Experimental animals, management and design**

Twelve (12) large white growing pigs will be acquired from the Piggery unit of the Department of Animal Science, Akwa Ibom state University, Obio Akpa Campus and used for the experiment. The pigs will be weighed at the start of the trial and their weights equalized before being allotted to different treatment groups. Initial body weight and weekly body weights will also be taken subsequently until the end of the experiment. Routine cleaning of the pens will be observed throughout the period of the experiment. The experiment will be laid in completely randomized design.

**3.5 Proximate analysis of test materials**

Sample of the leaf meals will be taken to the laboratory for proximate analysis according to methods described by AOAC (2003).

**3.6 Growth performance**

The initial weight of the pig will be taken at the beginning of the experiment and subsequently on weekly basis using a weighing balance. The live weight gain will be calculated as the difference between previous weight and weights recorded in the following week. This will be taken at an interval of seven days for the period of 56 days. The feed intake per pig per day will be calculated as the difference between feed offered and spilled/left over feed (after 24 hours of feeding). The feed conversion ratio will be calculated as ratio of feed intake to weight gain using the formula:

Feed conversion ratio = Feed intake

Weight gain

**3.7 Data analysis**

All data collected will be subjected to Analysis of Variance (ANOVA) procedure of Statistical Package for Social Sciences (SPSS 2007). Significant differences will be separated using Duncan’s Multiple Range test (Duncan 1955).

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