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# UNCONVENTIONAL FEEDSTOCK SUPPLEMENTED WITH ORANGE-PEELS ENHANCED BROILER CHICKEN PERFORMANCE, DIGESTIBILITY AND FLESH DEPOSIT

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## ABSTRACT
This study was conducted to evaluate the potential of orange peels as growth promoter additives in broiler diet. 150 finisher broilers were used for the experiment. They were allotted to 5 treatments of 3 replicates each and 10 birds per replicate. Unconventional feedstuffs such as sweet potato chips, BDG, plantain peels, duck weed and shea butter caterpillar were used along with maize to formulate feed (3016 kcal/kgME and 25% CP). Growth performance was monitored during the experiment, digestibility was done at the last 7 days while carcass yield was evaluated at the last day of the experiment. Data collected were subjected to ANOVA and the significant means was separated using Tukey's HSD. The results showed that Birds on T4 (5% fresh) had the highest final weight (3.27kg), daily weight gain (0.05kg/day), the best FCR (0.74), slaughter weight (3.14kg), carcass weight dressing percentage and most of the cut parts. Inclusion level at 10% of fresh orange peels enhanced the digestibility of crude protein, ash and NFE. It can be concluded from this experiment that inclusion level of fresh orange peels at 5% enhanced growth performance, flesh deposit, digested crude fat better than other treatments, while inclusion level of fresh orange peel at 10% enhanced digestibility of crude protein, ash and NFE.

**Keywords:** orange peels, unconventional feedstuff, broiler chicken, feed additives

## DESCRIPTION OF PROBLEM
Unconventional ingredients are becoming more popular in livestock nutrition for quite number of the advantages that cut across the economic, environmental, value addition among others. These unconventional feedstuffs pose challenges in utilization by livestock especially the non-ruminant animals. Potential solution to these challenges can be agriculture byproducts, namely orange peels and plantain peels (1). These by-products are discarded as waste, but these by products are full of the valuable nutrients and phytochemicals which can be used for poultry growth and productivity. Phytochemicals, nutrients and mineral composition produces definite physiological action in the body systems thereby promoting growth; enhance reproductive performance (2), increases body immunity and general well-being of the animals (3). Supplementing these unconventional feedstuffs with these additives are even of more advantage in poultry as it improves digestibility and performance of poultry birds (4).

Orange peels is an example of these waste that are neglected and under-explore. It contains fiber, vitamins and bioactive compounds with antioxidant properties, to improve broiler health and immune response (5). Orange-peels are available at no cost and has high energy content, it has antioxidant compounds and also high in nutrition (6). Using organic feed additives as growth promoter has been shown to enhance feed utilization (7). It is on this note that this research is aimed at assessing orange peels as an additive in broilers ration.

### Materials and Methods
The research work was conducted at the poultry unit of the Teaching and Research Farm, Osun State University, Ejigbo Campus, Faculty of Agricultural Production and Management. It is located between longitude 7°52'19.8"N and latitude 4°18'22"E.

The unconventional feedstuff used includes sweet potato chips and brewers dried grains (energy source); shea butter caterpillar and duck weed (protein source) and plain peels (fibre and mineral source). These were mixed with some of conventional feedstuff to compound ration for broiler finisher (3016 kcal/kgME and 25% CP). The dry orange peel (DOP) and fresh orange peel (FOP) were added as growth additive at 5 and 10% each. Experimental birds were reared for eight weeks on deep litter system and the experimental diets were administered at 4 weeks

(finisher phase). The treatments comprise of T1 = 0% OP, T2 = 5%DOP, T3 = 10%DOP. T4 = 5%FOP and T5 = 10%FOP

Table 1: Gross composition of the Experimental diet

| Ingredients | % |
|---|---|
| Maize | 27.57 |
| Potato | 27.57 |
| Brewers dried grain | 11.45 |
| Plantain peel | 8.00 |
| Duck weed | 15.21 |
| Shea butter Caterpillar | 6.00 |
| Bone meal | 4.00 |
| Salt | 0.05 |
| Vit/Min premix | 0.05 |
| Lysine | 0.05 |
| Methionine | 0.05 |
| Total | 100 |

## RESULTS AND DISCUSSION

Birds on T4 (5% fresh) had the highest final weight (3.27kg) and highest daily weight gain (0.05kg/day). T3 (10% dried) also performed well with 1kg total gain and 0.04kg/day. T4 has the best FCR (0.74), showing highly efficient conversion of feed into weights. This indicates that orange peels supplementation improved feed utilization. Higher weight gain with lower feed intake, especially in T4, suggests better nutrient digestibility. The improved growth performance indicates enhanced flesh deposition in broilers. This observation could be result from better gut health or improved digestion associated with phytochemicals in fresh orange-peels, such as flavonoids, known to improve nutrient adsorption and gut microbial balance (8).

Figure 1 illustrate the results of the carcass yield across the treatments. T4 recorded the highest slaughter weight (3.14kg) which is significantly higher than other treatment. This treatment also recorded the highest weight of carcass, this significantly higher than T5 but not significantly higher than other treatments. This is an indication that fresh orange peels, especially at 5% inclusion, enhanced carcass yield of experimental birds. This agrees with the report of (9) that usage of phytochemicals as growth promoter increases the yield of prime cuts.

Figure 2 shows the graphical representation of the dressing percentage and the cut parts of the experimental birds. The cut parts were expressed as the percentage of the carcass weight. Dressing percentage was enhanced by inclusion level of fresh orange peels at 5% inclusion. This could be that the fresh orange peels at this level of inclusion contains amount of phytochemicals that can not be detrimental to the growth of the animals, therefore, encourage feed utilization that resulted in more flesh deposition. Also, at this level of inclusion, most of the cut parts were enhanced. This results also buttress the findings of (9).

Figure 3 revealed the results of the nutrient digestibility by the experimental birds. The birds digested the control diet better than the treatment. Among the treatments, dried orange peels at 10% inclusion were able to digest most of the nutrients better than other treatments. This observation could not be easily explained as the result did not transiend to higher groth weight and flesh deposit.

Table 2: Growth Performance characteristics of Broiler finisher fed unconventional feedstock supplemented with orange peels

| Parameters (kg) | | Dried orange-peels | | Fresh orange-peels | |
|---|---|---|---|---|---|
| | | **5%** | **10%** | **5%** | **10%** |
| | **T1** | **T2** | **T3** | **T4** | **T5** |
| Initial weights | 2.22 | 2.23 | 2.20 | 2.21 | 1.83 |
| Final weights | $2.90^{b}$ | $3.10^{a}$ | $3.20^{a}$ | $3.27^{a}$ | $2.83^{b}$ |
| Weight gain | $0.68^{d}$ | $0.87^{cd}$ | $1.00^{bc}$ | $1.06^{a}$ | $1.00^{bc}$ |
| Daily weight gain | 0.03 | 0.03 | 0.04 | 0.05 | 0.04 |
| Feed intake | 0.04 | 0.04 | 0.04 | 0.03 | 0.03 |
| FCR | $1.11^{b}$ | $1.26^{a}$ | $1.02^{bc}$ | $0.74^{d}$ | $0.91^{c}$ |

[abcd] means on the same row with different superscript are significantly different (P<0.05)

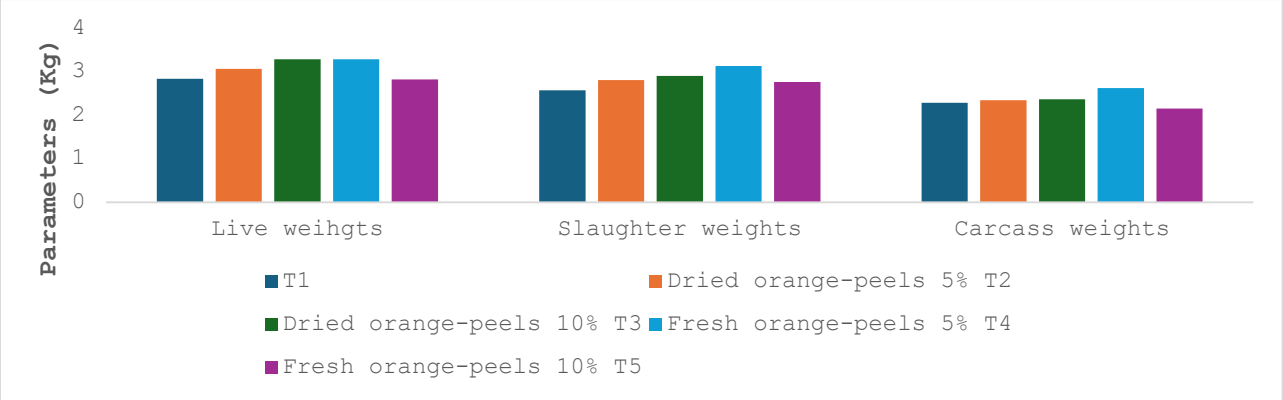


Fig 1: Carcass yield by the experimental birds

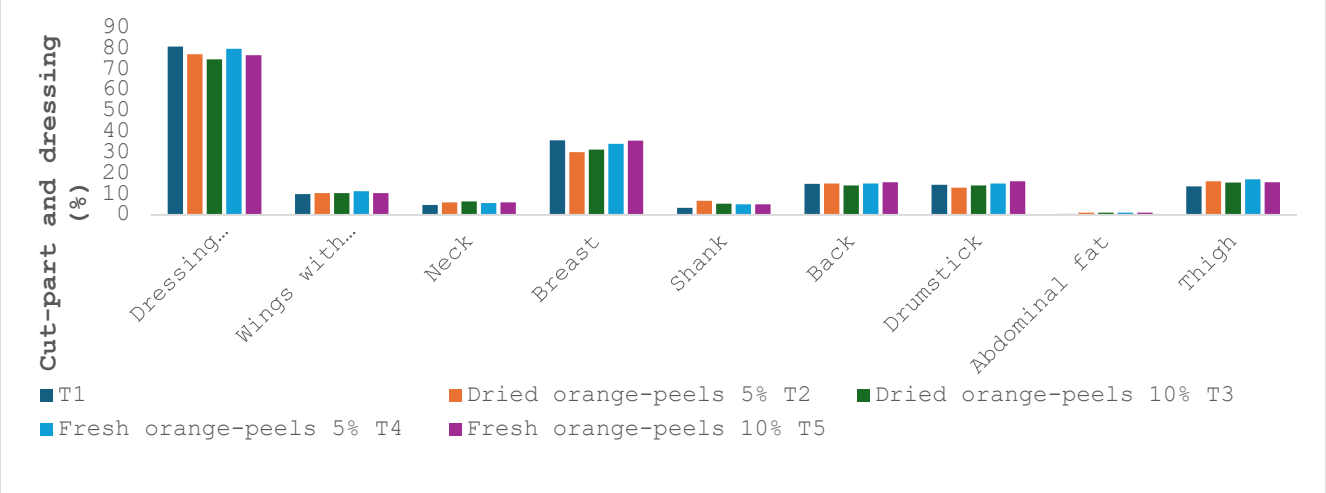


Fig 2: cut-parts of the carcass yield by the experimental birds

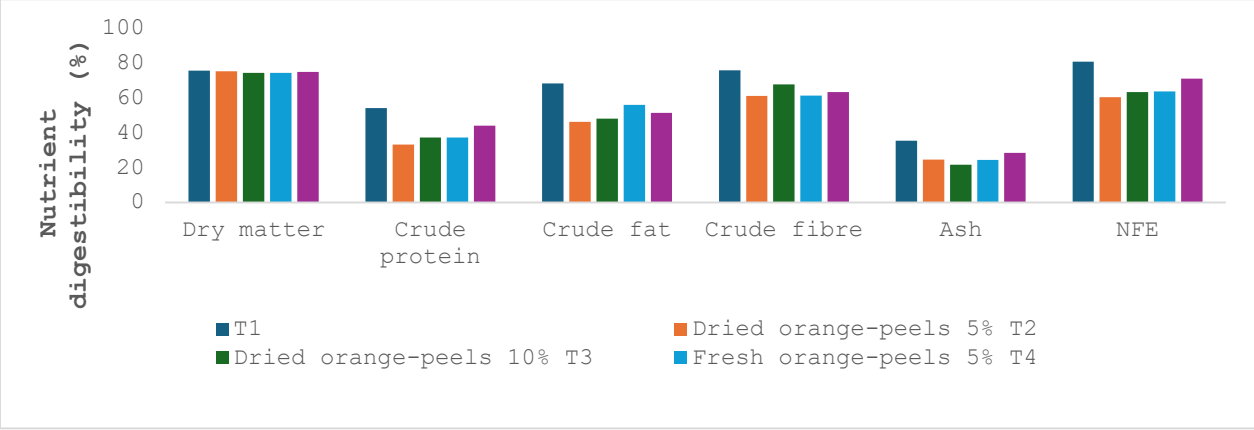


Fig 3: Nutrient digestibility by the experimental birds

## CONCLUSION AND APPLICATION

It can be concluded from this experiment that inclusion level of fresh orange peels at 5% enhanced growth performance, flesh deposit, digested crude fat better than other treatments. Meanwhile, inclusion level of fresh orange peel at 10% enhanced digestibility of crude protein, ash and NFE.

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