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Kerson Fruit Muntingia calabura linn and Golden Apple Snail Pomacea canaliculata (KFGAS) as Food Pellet Additives for the Growth Performance of Chicken Broiler *Gallus gallus domesticus*

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ABSTRACTS

This study investigates the Kerson fruit and golden apple snail (KFGAS) as food pellets additives for the growth performance of chicken broilers. It was conducted for 5 weeks on 48 mature chicken broilers placed in the 12-room coop in the vicinity of one of our backyards. The tests exposed to indicative mixture treatments of Kerson fruits and golden apple snail as food pellets additives in specific feeds needed for each stage of chicken broiler. Results showed significant growth of broiler chickens under treatment 4, a mixture of 70% of KFGAS as food pellets additives with 30% of commercial feeds under treatment 4 got the highest mean weight. Furthermore, KFGAS food pellets additives affect the maturity of the broilers in their weight and height. The survival rate of broilers revealed that there are more possibilities for their survival among treatments 1, 4, and 2. Thus, it implies that Kerson fruit and golden apple snail are applicable to mix with commercial feeds. It is recommended that other poultry animals will also be tested to ensure the efficiency of these additives mixed with other feed grain sources.

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1. INTRODUCTION

The poultry farm has become the source of food for everyone, from the chicken itself to their eggs, and these products are usually consumed by people almost every day (De Vries *et al*.,2006; Bernard *et al*., 2002). It is also the most progressive animal enterprise and one of the world's major and fastest producers of meat worldwide. In the Philippines, poultry has been a significant contributor to the country's agriculture sector. However, the industry faced several problems and obstacles such as high importation of poultry meat, disease incursion, shortage of supply, and high prices of raw feed ingredients. Those problems create a significant impact on the production of chicken, the high price rate of chicken meats, and any products from it.

Good nutrition is reflected in the performance of the bird and the items it consumes, and it accounts for the majority of production costs. If you're going to mix your diet, it could take a lot of work to create well-balanced meals, especially diets that are certified organic. Whether the chickens are kept indoors or permitted to go outside, the most practical approach to feeding them is with a balanced pelleted diet.

The majority of diets include vitamin and mineral supplements as well as corn for energy and soybean meal for protein (Zanella *et al*.,1999). Some sort of feed additives may also be added but with the approval of the government anchored to poultry production. According to European Commission "Feed additives helps to improve the quality of feed and the quality of food from animal origin, or to improve the animals' performance and health, for example providing enhanced digestibility of the feed materials".

Moreover, The Kerson fruit or Kerson (*Muntingia calabura linn*) cherries are known in the Philippines as 'Aratiles'. Nutritionists have identified a group of foods that provide amazing health benefits. Kerson fruit or aratiles has natural antibacterial properties that help fight against harmful bacteria. These berries are rich in Vitamin C which helps prevent flu and colds. It also contains antioxidants and other elements that improve cardiovascular resistance. These small fruits are rich in fiber, carbs, protein, calcium, phosphorous, iron, and B-vitamins (Sibi *et al*., 2012).

On the other hand, the golden apple snail (*Pomacea canaliculata*) is a freshwater snail, and it was introduced in the Philippines between 1982 and 1984 to supplement sources of food protein for low-income Filipino farmers. However, in 1986, it began to damage heavily rice farms in northwestern Luzon. Its rapid multiplication and wide distribution threaten rice production and food security in the country (Joshi *et al*., 2008). According to Healthy Eating (2018) "Snails are low-fat, protein-rich and a good source of a variety of essential vitamins and minerals, including magnesium, selenium, vitamin E and phosphorus.

There are no studies determined about the Kerson fruit and golden apple snail (KFGAS) as an additional ingredient from the raw foods that are normally eaten by the chickens— food pellets additives. This study aims to compare and evaluate the growth performance of the chicken broilers when expose to different treatments and indicative mixtures of Kerson fruit and golden apple snail in varied feeds needed for each stage. Thus, this study is formulated.

2. METHODS

This study was experimental research that follows a Complete Randomize Design (CDR) which is composed of four (4) treatments and replicated 3 times. The tests were exposed to indicate a mixture of Kerson Fruits (Muntingia Calabura) and Golden Apple Snail (Pomacea

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canaliculata) as food additives pellets in specific feeds needed for each stage of the chicken broiler.

The study was conducted for thirty-five (35) days duration. Broiler chickens used as test organisms were reared growing 2 weeks old or 14 days unit, they reached their maturity stage to be exposed to the treatments for 45 days. Every week, all chicken samples were tested or observed and these observations were recorded.

The study involved four treatments, to wit: treatment 1 (control 100% commercial feeds), treatment 2 (30% KFGAS and 70% commercial feeds), treatment 3 (50% KFGAS and 50% commercial feeds), treatment 4 (70% KFGAS and 30% commercial feeds). Four chicken broilers were assigned in each specific room of chicken coops for three replications; both chickens in separate cages were subjected to equal conditions except for the type of food they eat or feed themselves. All the data were recorded and subjected to statistical analysis.

3. RESULTS AND DISCUSSION

Tables 1, 2 and **3** shows the result of this study. The results revealed that among the four treatments, the mixture composition of 70% of the mixture of KFGAS additives with 30% of commercial feeds which is under treatment 4 has the highest mean height gain with a mean value of 12.84 followed by treatment 3(control) which is 50% KFGAS and 50% commercial feeds that obtained the mean value of 11.98, treatment 2 which is composed of 30% of the mixture of KFGAS and 70% commercial feeds gained of mean height, and the lowest mean height gain which was 7.65 grams under treatment 1 composed of 0% mixture of KFGAS and 100% commercial feeds gained an equivalent mean of grams 5.65.

It signifies those treatments under the different mixtures of KFGAS as pellet additive with commercial feed had significant effects on the broiler growth in terms of their height gain. The application of 70% mixture KFGAS as pellet additive with 30% commercial feeds has a significant difference compared to 100% application of commercial feeds under the treatment 1. The results were due to the different compositions of the mixture of materials used. Furthermore, it indicates that the lower concentration of the mixture of KFGAS as pellets additives in commercial feed, the higher to increase the growth weight of broiler chickens to increase their height gain.

The results revealed that among the four treatments, the mixture composition of 70% of the mixture of KFGAS additives with 30% of commercial feeds which is under treatment 4 has the highest height gain with the mean value of 455.15 followed by treatment 3(control) which is 50% KFGAS and 50% commercial feeds that obtained the mean value of 440.82, treatment 2 which is composed of 30% of the mixture of KFGAS and 70% commercial feeds gained of mean height, and the lowest height gain which was 262.90 grams under treatment 1 composed of 0% mixture of KFGAS and 100% commercial feeds gained an equivalent mean of grams 360.43.

It signifies those treatments under the different mixtures of KFGAS as pellet additive with commercial feed had significant effects on the broiler has a big impact forwards the performance in terms of weight gain. The application of a 70% mixture of KFGAS as pellet additives with 30% commercial feeds.

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Table 1. Weekly mean difference growth performance of chicken broilers (*gallus gallus domesticus*) exposed with varied treatments of KFGAS Pellets in terms of Height (cm).

	W1-W2	W2-W3	W3-W4	W4-W5	Mean
T1	3.67	10.05	1.88	7.00	5.65
T2	13.63	8.90	0.06	8.00	7.65
T3	14.47	7.28	2.50	23.67	11.98
T4	7.69	15.43	6.22	22.00	12.84
Total	**39.46**	**41.66**	**10.66**	**60.67**	**38.12**

Table 2. Weekly mean difference growth performance of chicken broilers (*gallus gallus domesticus*) exposed with varied treatments of kfgas pellets in terms of weight (g).

	W1-W2	W2-W3	W3-W4	W4-W5	Mean
T1	190.33	274.28	407.95	569.17	360.43
T2	176.21	256.89	423.89	594.59	362.90
T3	171.51	308.76	542.59	740.42	440.82
T4	178.72	323.67	553.61	764.59	455.15
Total	**716.77**	**1163.6**	**1928.04**	**2668.77**	**1619.3**

Table 3. Weekly survival rate counts of chicken broilers (*gallus gallus domesticus*) exposed in different treatment of KFGAS.

	W1-W2	W2-W3	W3-W4	W4-W5	Mean
T1	3.67	10.05	1.88	7.00	5.65
T2	13.63	8.90	0.06	8.00	7.65
T3	14.47	7.28	2.50	23.67	11.98
T4	7.69	15.43	6.22	22.00	12.84
Total	**39.46**	**41.66**	**10.66**	**60.67**	**38.12**

The results revealed that in every treatment there are counts of mortality rate, the varied KFGAS treatment did not affect the cause of death per chicken. Week 1 has a total survival chicken of 48, week 2 got a total survival chicken of 34, and the third week got 30 left chickens, however, weeks 4 and 5 have the same number of chickens left which is 24. The reason the chicken leads to death is the lack of ventilation, cold temperature, and lack of equipment as well. From the table, the food of the chicks does not affect the mortality counts of the chicken in the different cages and exposed to different treatments also.

The results revealed that the post-test is greater than the pre-test. The total pre-test got 191.2 with a mean of 15.93 which is lower than the post-test with a total of 409 and with a mean of 34.08 (see **Table 4**). The total difference between the pre-test and the post-test is 217.18 and with a mean difference of 18.15, which means that the chicken broiler increases its heights from the pre-test and post-test. The KFGAS treatments have a great impact on the growth performance of the chicken broilers.

The results revealed that the post-test is greater than the pre-test (See **Table 5**). The total pre-test weight of the chicken broiler got 1677.75 with a mean of 139.81 which is lower than the post-test with an average weight of 8846.5 and with a mean of 737.2. The total difference between the pre-test and the post-test is 7141.25 and with a mean difference of 595.10, which means that the chicken broiler increases their weights from the pre-test and post-test. The KFGAS treatments have a great impact on the growth performance of the chicken

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broilers. In addition, KFGAS treatments have contributed to the immediate elevation of their weights.

Table 4. The mean difference growth performance in pre-test and post-test of chicken broilers (*gallus gallus domesticus*) exposed with varied treatments of KFGAS pellets in terms of heights.

No.	Pre-test	Post Test
1	16.5	30.5
2	16.25	31
3	15.25	31
4	14.75	31.5
5	16.5	33.5
6	16.7	31.5
7	14	33.5
8	16.75	35.5
9	15.75	39
10	17	38.5
11	15.5	37.5
12	16.25	36
Total	191.2	409
Mean	15.93	34.08

Table 5. The mean difference growth performance in pre-test and post-test of chicken broilers (*gallus gallus domesticus*) exposed with varied treatments of KFGAS pellets in terms of weight (g).

No.	Pre-test	Post Test
1	141.75	667.5
2	140.75	612.5
3	133.5	641
4	142.25	495
5	147.25	630
6	144.75	817.5
7	150.25	817.5
8	130.75	757.5
9	142	867.5
10	134.5	865
11	145.5	970
12	124.5	705
Total	1677.75	8846.5
Mean	139.81	737.2

The t-computed value of 20.39 is beyond the t-critical value of 1.782 at a 0.05 level of significance with 3 degrees of freedom, the null hypothesis is rejected in favour of the research hypothesis (see **Table 6**). This means that the KFGAS food pellets additives can affect the maturity of the chicken broiler in terms of height. It implies that the Kerson Fruit and Golden Apple Snail are applicable to mix with commercial feeds.

The t-computed value of 6.32 is greater than the t-tabular value of 1.782 at a 0.05 level of significance with 11 degrees of freedom, the null hypothesis is rejected in favour of the research hypothesis (see **Table 7**). This means that the KFGAS food pellets additives can affect the maturity of the chicken broiler in terms of weight. It implies that the Kerson Fruit and Golden Apple Snail are applicable to mix with commercial feeds.

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Table 6. Significant difference in the growth performance of chicken broilers (*gallus gallus domesticus*) between treatments of KFGAS pellets in terms of height (cm).

Treatments	Mean	df	t-computed	t-tabular	Remarks
T1	14.83	11	20.39	1.782	Reject Ho
T2	16.17				
T3	20.50				
T4	21.08				

Table 7. Significant difference in the growth performance of chicken broilers (*gallus gallus domesticus*) between treatments of KFGAS pellets in terms of weight (g).

Treatments	Mean	df	t-computed	t-tabular	Remarks
T1	492.67	11	6.32	1.782	Reject Ho
T2	502.75				
T3	673.17				
T4	711.83				

Figure 1 revealed the height and weight gain among chicken broilers exposed to four treatments of KFGAS from week 1 to week 5. Treatment 4 which is a mixture of 70% of KFGAS as food pellets additives with 30% of commercial feeds got a height of 37.37 and a weight of 846.67 which is the highest among the other treatments. This implies that KFGAS is very effective in treating chickens and influencing them with innovative food pellets. The mixture of KFGAS food pellets additives to commercial feeds has increased the height and the weight of the chicken broiler. Thus, KFGAS treatment is effective to influence the growth production of chicken broilers.

The **Figure 2** shows the survival rate in different mixtures of KFGAS food additive pellets under the treatments. It shows that Treatment 1 and 4 have the same percentage of 84.5, followed by Treatment 2 with 84.25 percent, however, Treatment 3 got the lowest percentage of 83.88. This means that there are a lot of possibilities that the chicken lives under Treatment 1 and 2, and they are comfortable with their specific mixture of the KFGAS, followed by Treatment 2. The fewer possibilities for the chicken to live is in Treatment 3, in which they are not much comfortable with their respective mixture of KFGAS. Any factors like ventilation, weather conditions et cetera are also can be considered.

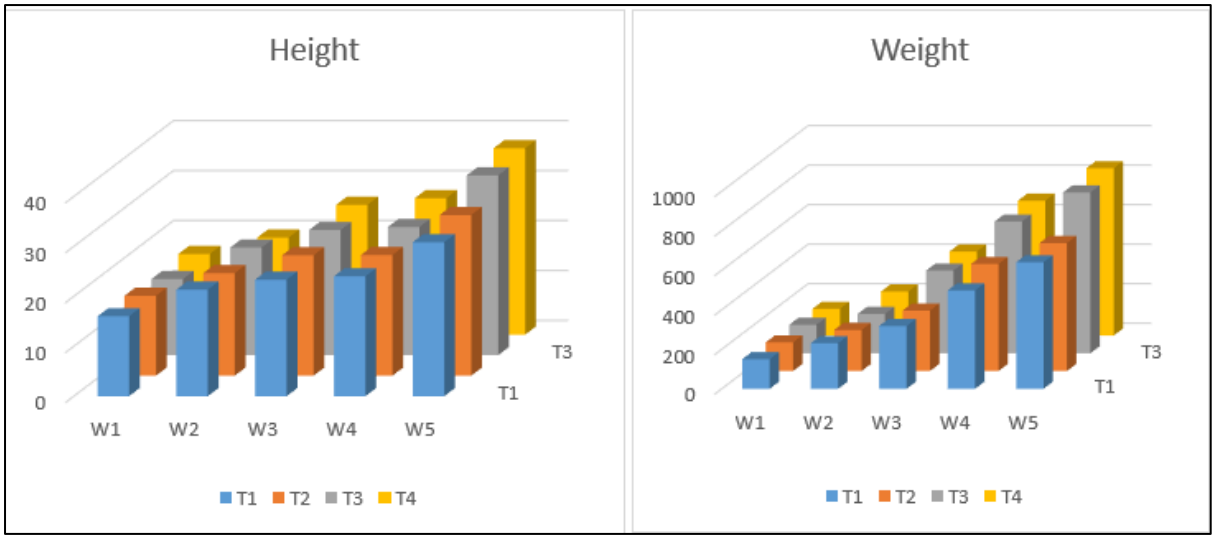

Figure 1. Effectiveness of KFGAS pellets to the different treatments (height and weight).

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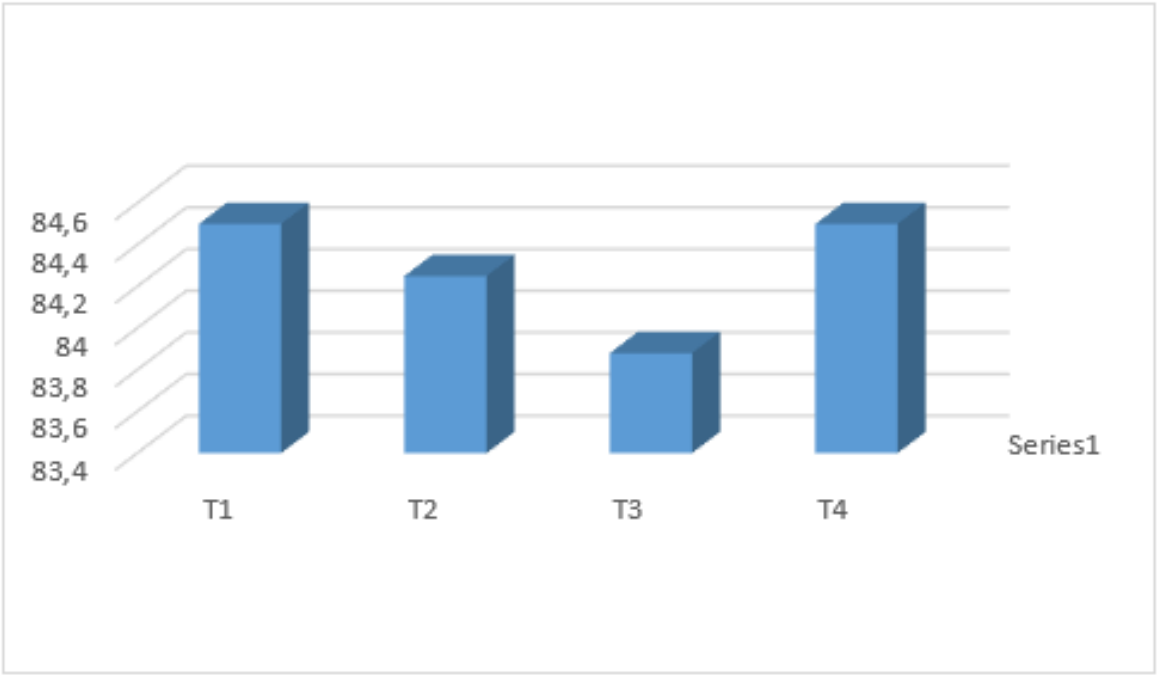

Figure 2. Effectiveness of KFGAS pellets to the different treatments (survival rate).

4. CONCLUSION

According to European Commission "Feed additives helps to improve the quality of feed and the quality of food from animal origin, or to improve the animals' performance and health, example providing enhanced digestibility of the feed materials". Treatment 4 which is a mixture of 70% of KFGAS as food pellets additives with 30% of commercial feeds which is under the treatment 4 has the highest mean weight among other treatments which means that it is the most effective mixture of KFGAS as food pellets additives to commercial feeds in increasing the weight and height of chicken broiler. The KFGAS food pellets additives can affect the maturity of the chicken broiler in terms of weight and height. It implies that the Kerson Fruit and Golden Apple Snail are applicable to mix with commercial feeds. There is a significant difference between KFGAS as food pellets additives in the growth performance of chicken broiler in terms of height and weight. There is a lot of possibilities to chicken, to live in Treatment 1 and 4, and they are comfortable with their specific mixture of the KFGAS, followed by Treatment 2. The less possibilities for the chicken to live is in the Treatment 3, which they are much comfortable with their respective mixture of KFGAS.

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6. AUTHORS' NOTE

The authors declare that there is no conflict of interest regarding the publication of this article. The authors confirmed that the paper was free of plagiarism.

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