

Influence of Fermented Organic Concoction as Nutrient Supplements in the Performance of Brooding Native Chicken

Jonnie F. Huervana

Abstract

The study determined the alternatives of producing brooder chicks without antibiotics by utilizing organic concoctions as nutrient supplements and as preventive measures against diseases. The experimental study assigned in Randomized Complete Block Design with 100 chicks as the subject of the experiment. Each treatment has 20 birds with five birds per replicate. The five treatments were: Treatment A- water only, Treatment B- antibiotics with vitamins, Treatment C- fermented banana fruit juice, Treatment D- fermented pineapple fruit juice, and Treatment E- fermented banana plant juice. Fermented concoctions were added and mixed to the daily water requirement of birds. The result of the study revealed significant differences among the treatments regarding feed consumption. Least Significant Differences (LSD) indicates that birds given with fermented pineapple juice through the drinking water significantly consumed lesser feeds compared to other treatments. Other parameters such as survival rate, feed conversion ratio (FCR), final live weight, the gain in weight, and water consumption were not significant. The results imply that drinking water of birds using organically fermented concoction as nutrient supplements, or pure water or with vitamins and antibiotics were all comparable regarding gain in weight, final live weight, feed conversion ratio, and survival rate of chicks during the brooding period of 21 days.

Keywords: native chicken, nutrient supplements, organic fermented concoction

Population growth is rapidly increasing through the years. As of 2016, there were 100 million Filipinos who need food for nutrition and health. Native Chicken production is one the fields in poultry industry which need to improve supplying foods specifically meat and eggs to Filipino consumers. The native Chicken is considered organically grown birds, and the demand for organic products is great nowadays because of health concern and food safety. Organic products contain less chemical that promotes good health.

Republic Act 10068, known as “Organic Agriculture Act of 2010” gives us guidelines which strengthen and encourage farmers to produce more organic products. These organic products are possible to produce from the fermentation of organic concoctions that will produce the so-called “probiotics” which are being considered organic nutrition of chicken in the production of organic chicken.

Probiotics can be defined (*Kalantzpoulos, 1997*) as fermented food containing specific live microorganisms or a live microbial food or feed supplement, which beneficially affects the human or the host animal by improving its intestinal microbial balance. For several centuries, fermented products derived from plant or animal materials have been an acceptable and essential part of the diet in most parts of the world.

Fermentation is an ancient form of food preservation that improves the nutritional content of foods. In many regions of the world, fermented beverages have become known for health promoting attributes. In addition to harnessing traditional beverages for commercial use, there have been innovative efforts to develop non-dairy probiotic fermented beverages from a variety of substrates, including soy milk, whey, cereals and vegetable and fruit juices, (*Marsh, Hill, Ross and Cotter, 2014*). Among probiotic microorganisms, (*Martin, 2013*) those of the *Lactobacillus* genus are the most commonly used by the food industry. Thus, the development of non-dairy probiotic products, including food matrices based on fruit, vegetables, and cereals, has been widely studied.

Fermented cassava peel was used to prepare a starter diet for young poults. After 20 days, the average body weight increased from 40 g to 134 g, but that of the birds fed on the control diet containing unfermented peel was only 47 g. Mortality rate was extremely low (12.5%), whereas it was very high (100%) with the unfermented peel (*Ofuya, 1993*). Findings suggest

(Jung, 2010) that Probiotic Fermented Herb enhances immune activity in broiler chicks and increases survivability against *Salmonella gallinarum* in experimentally infected broiler chicks; this happens because of potent stimulation of non-specific immune responses. Probiotics are being considered to fill this gap and some farmers are already using them in preference to antibiotics (Kabir, 2009).

The ban on nutritive antibiotic use in Europe and the increased awareness of the consumers triggered a need for natural and safe feed additives to achieve better production results of farm animals. As colorants and antioxidants, plant extracts are used in animal nutrition as appetite and digestion stimulants, stimulants of physiological functions in order to prevent and treat certain pathological conditions. (Frankie, 2009)

The study was conducted to find out other alternatives of producing an organic chicken with zero antibiotics, by utilizing only fermented organic concoctions in the diet of birds as nutrient supplements mix in the daily water requirement of chicks. Furthermore, it would like to find out the growth performance regarding gain in weight, feed conversion ratio, and final live weight, and survival rate of chicks for 21 days of brooding.

The production and utilization of fermented products from banana and pineapple as nutrient supplements in the brooding native chicken may promote the production of organic foods for safe human consumptions.

Materials and Methods

The study was conducted at WVSU-CC, Calinog, Iloilo in March to April 2015. The materials were as follows: 100 native chicks, brooder cages, electric bulbs, feeders, drinking jars, cleaning tools, feeds, organic concoctions, waters, measuring cups, digital weighing scale, record book, ball pen, and laptop computer.

The experimental method of research utilized the Randomized Complete Block Design. The 100 chicks were assigned randomly in the experimental cages constructed for the purpose. Each treatment has 20 birds with five birds per replicate. The experimental layout and treatments are reflected in Figure 1.

Experimental Layout and Treatments

Block I	Block II	Block III	Block IV
A	E	D	B
B	A	C	A
C	B	A	C
D	D	B	E
E	C	E	D

Figure 1. The experimental layout and treatments in RCBD. A = water only (control); B = water with commercial antibiotics and vitamins; C = fermented fruit juice (banana); D = fermented fruit juice (pineapple); E = fermented plant juice (banana).

Data Gathering Procedures

The initial weight was determined after 12 hours of hatching. The gain in weight was determined weekly for three weeks of brooding while the final live weight was at 21 days old. The feed consumption was recorded daily until 21 days of brooding. The cumulative feeds consumption was recorded for three weeks of brooding as the total feed consumption of birds. The feed conversion ratio (FCR) was determined by dividing the feed consumption over the gain in weight. The water consumption was determined by adding all water consumption from day 1 until 21 days of brooding period. The water consumption was measured in a milliliter. The survival rate was determined by counting the live chicks after 21 days of the brooding period.

Management Procedures

Preparing the organically fermented concoctions. Fermentation is a process of producing useful substances (alcohol, amino acids, organic acids, and antioxidant substances) for human, animals, and plants through the metabolism of the microorganism. In this study, fruit juices were extracted and allowed to ferment for seven days period with an addition of molasses or brown sugar with a ratio of 1:1. The two tablespoon of fermented concoction is dissolved in 1 liter of water and was given as drinking water of birds.

Preparing fermented plant juices. The following ingredients are 1 kg banana stalk/bamboo shoots/green plants and one-half kg crude sugar or 0.5 li molasses. The preferred ingredients were chopped and mixed with crude sugar or molasses, then covered with a clean sheet of paper when materials settled down, placed in a cool and shaded place and ferment for 7-10 days. The juice was extracted and applied as probiotics/liquid concoctions in the drinking water of birds. It promotes the growth of plants and animals. In this study, banana plants were used as fermented plant juice.

Preparing fermented fruit juices. The ingredients are 1 kg ripe fruit (pineapple, banana, avocado) and 1 kg crude sugar or 0.5 li of molasses. Ripe fruits were chopped excluding the peel and mixed with sugar and molasses, placed in a jar and covered with a clean sheet of paper and fermented for 7-10 days, strained and used as probiotic/liquid concoctions in drinking water of chicken. In this study, pineapple fruit was used as fermented fruit juice.

The experimental animals. The 100 day-old chicks came from the native Chicken Research Project of WVSU-Calinog Campus. Upon arrival, they were given anti-stress drinks (multi vitamins with electrolytes) on the first day of age. Treatments started on the second day until 21 days of brooding. The fermented organic concoctions (FOC) was added to water with a ratio of 10 ml FOC in every 1 liter of water, given daily to chicks during 21 days of brooding.

Feeding of the birds. Feeding was given spontaneously for the entire three weeks of the experiment. The feeding was done twice a day, that is, one feeding in the morning and one in the afternoon, synchronized with the giving of waters to birds. Commercial feeds were used for the entire 21 days of experimental study.

Statistical Analysis

Data gathered were recorded, tabulated and analyzed using the Analysis of Variances generated from the Statistical Tool for Agricultural Research (STAR) software. Any significant differences were analyzed further using Least Significant Differences (LSD) test.

Results and Discussion

The data in Table I shows the mean of the average live weight of brooder chicks, which ranges from 96.35 g to 121.80 g. The numerical data did not reach a significant level of differences after three weeks of brooding. It implies that giving organically fermented concoctions were comparable to other treatments regarding the live weight performance of chicks during the 21 days brooding period.

The highest average gain weight was 98.30 g obtained by antibiotics and vitamins (treatment B). However, the differences in treatment Means did not show significant differences among the five treatments. It implies that the effect of the different treatments given to brooder chicks was comparable regarding their gain in weight for three weeks of study.

The average cumulative feed consumption of brooder chicks revealed significant differences because of the computed F value (4, 12) = 27.55 is higher than tabulated F value = 5.41 at 1% level of significance. Further analysis was done using the Least Significant Difference (LSD) test and it revealed that Treatment C (200.46 g) supplemented with banana fruit juice were comparable in Treatment B (199.70 g) supplemented with antibiotics and vitamins. Control treatment (196.0 g) given with pure water likewise comparable to Treatments B and C. This findings tells that water or water with antibiotics and vitamins, or fermented banana fruit juice were all comparable in terms of feed consumption in the brooding of native chicken for 21 days period.

Birds consumed less feeds when supplemented with pineapple fruit juices (148.07 g) in the daily water requirement of brooder chicks. Fermented fruits and vegetables not only serve as food supplements but also factors attributed to good health (Swain, 1993). The present study supports the statement of Swain that fermented fruits and vegetables serve as food supplements that enhance nutritional requirement of birds. Juice data shows less consumption of feeds when fermented pineapple juice is added in the drinking water of chicks. Kalantzopoulos (1997), stated that fermented food containing specific live microorganisms or a live microbial food or feed supplement, which beneficially affects the human or the host animal by improving its intestinal microbial balance. The present study also agrees with the statement of Kalantzopoulos, that fermented food containing specific live microorganism of a live microbial food or feed supplement results to the less consumption of feeds.

The efficient feed conversion ratio of birds was 2.02 obtained by treatment B. The birds were given antibiotics and vitamins for three weeks of experiments. However, the differences in the treatment Means of the feed conversion ratio of chicks did not show significant differences among the five treatments. It implies that the effect of treatments was comparable regarding their feed conversion ratio for three weeks of study.

The highest cumulative water consumption was 786.90 ml obtained by control treatments, given with water only (treatment A) for three weeks of experiments. However, the differences in treatment means did not show significant differences among the five treatments. It implies that the effect of different treatments was comparable as regards water consumption of chicks for three weeks of brooding.

The survival rate of chicks is 100% (5 birds alive), in treatment E. The chicks were given fermented banana plant juice. However, the numerical data did not reach a significant level of differences. It revealed that all treatments were comparable regarding survival rate. The result might be due to the inherent natural immunity of chick from the mother hen which is still active during the brooding stage of chicks. Then, water alone with commercial feeds are just enough to raise brooder chicks with the good survival rate for three weeks of the brooding period.

According to Jung (2010), that Probiotic fermented herb enhances immune activity in broiler chicks and increases survivability against *Salmonella gallinarum* in experimentally infected broiler chicks. This is because of potent stimulation of non-specific immune responses. However, according to Kabir (2009), a strikingly crucial event in the development of probiotics is knowing that newly hatched chickens could be protected from colonization of *Salmonella enteritidis* by introducing a suspension of gut contents derived from healthy adult chickens. The present study, supports the statement of Kabir, that newly hatched chicks have an inherent parental natural immunity against disease infections that make the chicks survive, without antibiotics but by just pure and clean water during brooding of native chicken for 21 days period.

Table 1

Summary of Results of Giving Fermented Concoctions as Nutrient Supplements to Native Chicken during the Three Weeks of Brooding

Treatments	Treatment Means of Gathered Data					
	Final LW (g)	Gain in WT (g)	Cumulative Feed Consumption	FCR (g)	Cumulative Water Consumption	Survival Rate
A	113.65	89.45	196.00 ^{ab}	2.20	786.90	4.75
B	121.80	98.30	199.70 ^a	2.02	763.54	4.75
C	104.30	79.05	200.46 ^a	2.92	763.63	4.75
D	96.35	65.80	148.07 ^c	2.33	702.60	4.75
E	114.14	88.70	185.66 ^b	2.15	757.78	5.00
ANOVA	Not Significant	Not Significant	Significant	Not Significant	Not Significant	Not Significant
C.V. %	16.62	17.84	4.51	19.07	6.25	9.22

Note: Mean with the same letter is not significantly different

Conclusions

The fermented organic concoctions such as banana and pineapple fruit juices did not significantly influence the performance of native chicken regarding gain in weight, final live weight and feed conversion ratio of brooder chicks. Antibiotics with vitamins mixed to the daily water requirements of chicks significantly increase the feed consumptions of chicks, comparable to banana fruit juice. Chicks consumed less feeds when pineapple fruit juices were supplemented to the daily water requirement of brooder chicks. Fermented fruits and vegetables serve as food supplements, resulted in the less consumption of feeds when added in the drinking water of chicks.

The survival rate in all treatments was not significant. The result indicates that pure and clean water is enough for good survivability of chicks during 21 days of brooding. Fermented herb enhances immune activity in broiler chicks and increases survivability against *Salmonella gallinarum*. The newly hatched chicks have an inherent parental natural immunity against disease infections that make them survive even when there were no antibiotics added but just by pure and clean water during the 21 days brooding of native chickens.

Recommendation

The researcher recommends that fermented organic concoction specifically, the pineapple fruit juice can be added to drinking water of native chicken during brooding period. More antibiotic and vitamin supplementation during the brooding period of native chicken may be dispensed. The chicken can survive with pure and clean water during the three weeks of brooding. Further study is recommended to validate the present findings.

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