

Effect of Microbes on the Organoleptic Characteristics of Japanese Seattle Quail Eggs

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Abstract

One hundred twenty Japanese Seattle quails were subjected to a feeding experiment with different levels of microbes (NBM) in the diet to evaluate the effects of its varying concentration on Japanese Seattle Quail production in terms of organoleptic evaluation following the Completely Randomized Design (CRD). The quails were randomly distributed to four treatments with three replications. Treatments used were as follows: T1 (control): 0 percent NBM in the diet, T2: 0.2 percent NBM, T3: 0.3 percent, and T4: 0.4 percent NBM.

Different levels of effective microbes (NBM) in the diet of quails significantly affected yolk and albumen color and appearance, texture, taste and flavour, and general acceptability. The eggs from quails fed with diets containing different levels of effective microbes were rated acceptable by the panel of evaluators.

Keywords: Newly Blended Microbes (NBM), feed additive, organoleptic characteristics, treatment

Introduction

Livestock and poultry growers are continuously in search for production systems that eventually increase their profitability in their business. Most researches are focused in feeds and feeding since these constitute about 60 to 80 percent of their production costs (Neshein et.al, 2009). Any related aspect in this field that would lower production costs and increase profitability triggers the interest of farmers to venture and evaluate such production systems. One of these interesting trends in animal feeding is the use of probiotics like effective microbes (Hussain et.al, 2002).

The use of effective microbes as probiotics enhance livestock and poultry production (Chen et.al, 2005). These increase growth and lengthen duration of egg production in poultry with the incorporation of microbes in the diets. However, the use of microbes specifically on the organoleptic characteristics of quails has not yet been studied as insufficient of related literature in this field show.

The performance of layer quails is greatly affected by the feeding management during its starting and growing period. Supplementing microbes in the feeds of quails may be a contributory factor in enhancing the performance of quails in the starting, growing, and laying stages. Thus, affecting its organoleptic characteristics.

Quail farming has been increasing in popularity as this breed is also considered a possible solution for the growing demand in poultry products (Capitan, 2003). Quail egg production heavily relies on the hen's nutrition; thus, making the feeding management very important in quality egg production (Chen

et.al, 2005). Despite the increasing demand for quail meat and egg, less investors venture into quail production as very little is known about raising this breed. Unknown to many, quail is relatively easier to raise compared with chicken as they require less nurturing because they are not susceptible to common poultry diseases, their cages entail less space, and they could be fed with cheaper organic compounds.

Today, the popularity of the quail industry could be attributed to many factors. Quail eggs are good sources of protein to meet or supplement the nutritional requirements of the growing human population (Sreesujatha et.al, 2014). The demand for these quail products had increased tremendously in the past years. Presently, the demand trend is increasing due to the increasing consumption and low supply of quail products (Ratriyanto et.al, 2018). Buyers and retailers usually purchase quail eggs direct from the producers where they can avail at farm gate price. Others make orders and these are delivered at their doorsteps on a regular basis and selling the products is usually on cash basis.

Quail eggs can be used in culinary preparations like okay and leche flan. Boiled quail eggs are a must in a number of food preparations like pansit guisado, chopsuey, noodle soup, spaghetti, salad, macaroni soup, and others. Bakers use quail eggs in their products as décor or flavor enhancer. Scrambled quail eggs are also mixed with whiskey and served as a very popular aphrodisiac preparation.

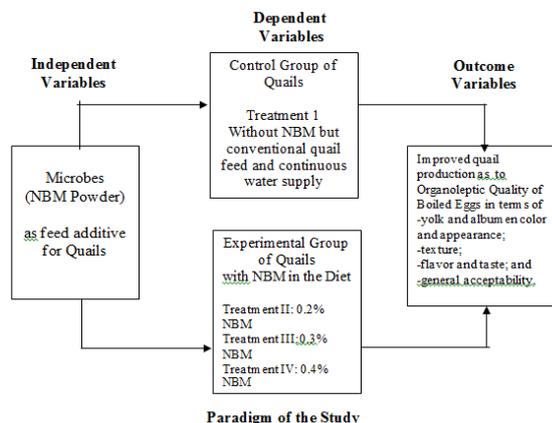
With this scenario, engaging in quail production offers good prospects. It has not only ensured food security, good nutrition, and profits but also partly solved unemployment problems in the countryside.

In this regard, there is a need to improve the management systems not only to enhance the production efficiencies to ensure food security, good nutrition, and profits but also the quality of the products derived from it. Production technologies, therefore, could only be improved by continuing researches in this field.

Furthermore, today, one of the interesting technologies in livestock and poultry production is the use of probiotics like effective microbes (Perdigon et.al, 2005). Probiotics are microorganisms such as yeast and lactobacilli, which change bacterial population in the digestive tract to a more desirable condition (Fuller, 2003). Many livestock and poultry raisers have utilized these in their feeding systems and found out that these have beneficial effects in the production performance fowl and animals (NBMROSA, 2003). However, few references about these could be found in the field of quail production. Therefore, there is a need to validate whether or not the beneficial effects of probiotics is consistent even in quail production, hence, this study.

Conceptual Framework

The study is an experimental research which followed the Completely Randomized Design (CRD) in three replicates. The design relies on randomization to control for the effects of extraneous variables (Hinkelmann et.al, 2005). Below is the diagrammatic presentation of the framework of the study.



Statement of the Problem

The study determined the effect of microbes (NBM Powder) as feed additive on the organoleptic characteristics of Japanese Seattle Quails (*Coturnix japonica*).

Specifically, this investigation sought answers to the following questions:

1. Is there a significant difference on the levels of microbes (NBM Powder) as feed additive on the organoleptic characteristics of Japanese Seattle Quails?
2. What are the organoleptic characteristics of quail eggs as to yolk and albumen color and appearance, texture, flavor and taste, and general acceptability with microbes (NBM powder) as feed additive?
3. Which among the treatments will produce the best organoleptic characteristics of quail eggs as to yolk

and albumen color and appearance, texture, flavor and taste, and general acceptability?

Scope and Delimitation of the Study

This study limits its scope on the effect of microbes (NBM Powder) on the organoleptic characteristics of Japanese Seattle quails as to yolk and albumen color and appearance, texture, flavor and taste, and general acceptability. The study data gathering was done specifically on the organoleptic evaluation on eggs produced in the study.

Methodology

The study made use of the experimental method to determine the effects of microbes (NBM) to Japanese Seattle Quail specifically the Complete Randomized Design (CRD) where the test birds particularly the Seattle Quails were studied only once but subsequent treatment is applied to determine the cause of change.

One hundred twenty-day-old Japanese Seattle quails were used as the experimental birds in this study.

The main data-gathering instrument utilized in the study was experimental using direct observation with the required recording procedures of the data in consonance with the details of the tasks.

Proper steps and procedures were undertaken to ensure that the study would be undertaken with the necessary direction and proper experimental procedures. After the approval of the title of the study by the committee, the proposal was prepared for presentation for the panel of evaluators. Critical evaluation was noted and the constructive comments were considered. The salient suggestions were incorporated in the proposal.

Cages, drinking, and feeding troughs were thoroughly cleaned and disinfected with Antec long-lasting disinfectant two weeks prior to the arrival of the birds. Uniform care and management were provided to the birds from the start to the termination of the experiment. Protection from any kind of stress and disturbance especially during times of uncomfortable environmental conditions were provided to the birds. Anti-stress and antibiotic medications were given to the birds during extremes of environmental temperatures. Strict sanitation was also observed. Adequate lighting was provided to the birds following a 17-hour light schedule (12 hours natural daylight and 5 hours artificial light at night time) (Rhodes et.al, 2008).

The microbes (NBM) was incorporated into the feeds according to the designated levels in each treatment manually. Newly Blended Microbes (NBM) is a biological preparation of various beneficial microorganisms and enzymes (Quidilla, 2001). It is non-toxic, non-chemical, powerful, and highly effective natural blend of rice bran and a colony of 21 beneficial and harmless bacteria, yeast, and molds (Jochen et.al, 2008). The composition of NBM includes Enzyme content like Amylase, Bhomelaine, Catalase, Cellulase, Cimase, Invertase, Lactase, Lipase, Maltase, Okishtase, Papain, Protease, Saccarase, Urease) and Beneficial Microbes

(Actinomycete, Aspergillus, Bacillus, Mucor, Nitrosomonas, Penicillium sp., Rhizopus, and Turulo, (Hader, 2000).

To ensure exact and proper mixing, the experimental additive was first mixed with small quantities of feeds in a suitable container and consequently mixing said mixture to the desired amounts of feeds in each treatment, respectively, Dela Mora et.al (2014). Treatments II, III, and IV were mixed with conventional quail feeds with the following proportions: 20 grams of NBM per 1 kilogram of feeds, 30 grams of NBM per 1 kilogram of feeds, and 40 grams of NBM per 1 kilogram of feeds respectively.

The representative eggs in each of the treatment were placed in mesh wire containers designed for the purpose. This was labeled or coded accordingly to avoid intermixing of the sample eggs. A boiler that can accommodate all the eggs was used. This was half-filled with water and boiled to 100 °C. No other cooking ingredient was added to the water. The eggs were dipped in the boiling water for 3 minutes and were cooled for 5 minutes before these were set for the organoleptic evaluation.

The organoleptic evaluation was conducted to determine whether or not the use of the effective microbes is contributory to the sensory characteristics of boiled quail eggs taken from the study (Chantsawang et.al, 2009). The panelists evaluated the organoleptic qualities of the boiled egg samples in terms of yolk and albumen color and appearance, texture, flavor and taste, and degree of acceptability using a scale of 7

to 1 with 7 as like very much and 1 as dislike very much. The Hedonic scale was used in evaluating the general acceptability of the samples. Copies of scorecards designed for the purpose was provided to the panelists to facilitate the evaluation. Each panelist evaluated 4 samples respectively for each treatment.

Sample eggs were taken from each of the experimental treatments. One hundred twenty (120) quail eggs were used in the study. Sixty eggs were used per study session.

Fifteen consumer panelists evaluated the boiled sample eggs in the organoleptic study. The panelists constituted of young and adults both male and female for better representation. To prevent biases in the evaluation, the selected panelists were not smokers or alcoholics.

The data was statistically analyzed using the two-way classification of the analysis of variance (ANOVA) for the Completely Randomized Design (CRD) experiments. Significant relationships among treatment means were analyzed using the Least Significant Difference (LSD) Test.

Findings of the study

Boiled eggs from Japanese Seattle Quails (*Coturnix japonica*) fed with effective microbes (NBM Powder) as feed additive in the diet were subjected to an organoleptic evaluation to determine the quality in terms of yolk and albumen color, texture, flavor, and taste, and general acceptability. The results are summarized on Table 1 and shown in Figure 1.

Table I. Summary of Results of the Organoleptic Evaluation of Boiled Eggs from Japanese Seattle Quails (*Coturnix japonica*) Fed with Effective Microbes (NBM Powder) as Feed Additive in the Diet.

Treatments	Mean Scores & Descriptive Interpretations							
	Yolk & Albumen Color and Appearance		Texture		Flavor & Taste		General Acceptability	
	Mean	Description	Mean	Description	Mean	Description	Mean	Description
I	5.67	Moderately Desirable	5.93	Moderately Desirable	6.07	Moderately Desirable	6.00	Moderately Desirable
II	6.07	Moderately Desirable	6.47	Very Desirable	6.27	Very Desirable	6.27	Very Desirable
III	5.80	Moderately Desirable	6.40	Very Desirable	6.40	Very Desirable	6.40	Very Desirable
IV	6.13	Moderately Desirable	6.20	Very Desirable	6.27	Very Desirable	6.47	Very Desirable

Scale descriptions: 6.16 – 7.00 (*very desirable*); 5.30 – 6.15 (*moderately desirable*); 4.44 – 5.29 (*slightly desirable*); 3.58 – 4.43 (*neither desirable nor undesirable*); 2.72 – 3.57 (*slightly undesirable*); 1.86 – 2.71 (*moderately undesirable*); and 1.0 – 1.85 (*very undesirable*).

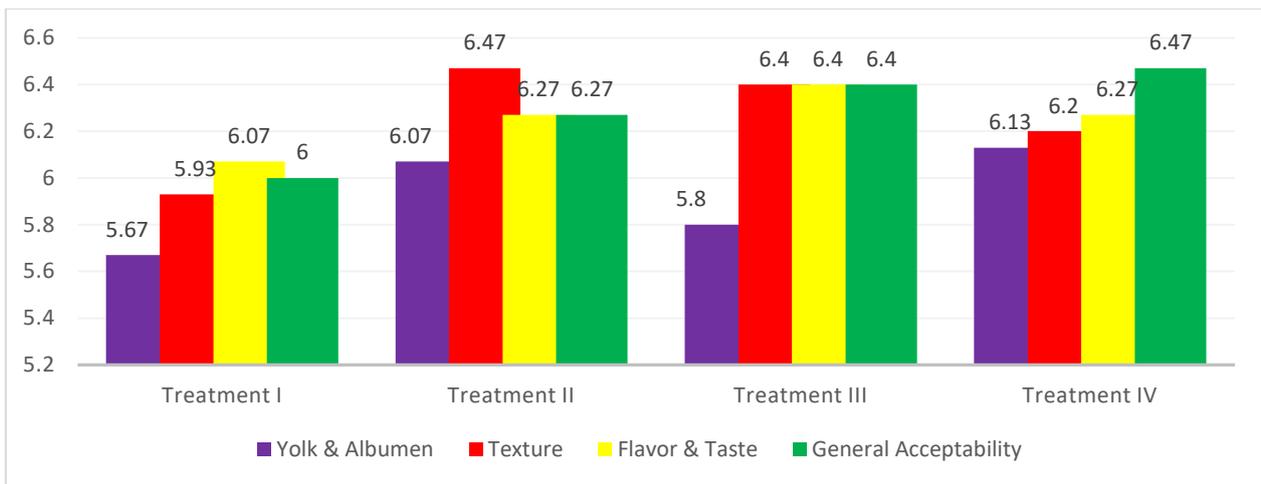


Figure 1. Summary of Results of the Organoleptic Evaluation of Boiled Eggs from Japanese Seattle Quails (*Coturnix japonica*) Fed with Effective Microbes (NBM Powder) as Feed Additive in the Diet

The average yolk and albumen color scores ranged from 5.67 to 6.13 scales, which is moderately desirable. In terms of texture, evaluation scores for texture ranged from 5.93 to 6.20 scales, which is moderately desirable to very desirable. In terms of flavor and taste, the evaluation scores for flavor and taste ranged from 6.07 to 6.40 scales, which is moderately desirable to very desirable. And in terms of general acceptability, the average scores ranged from 6.00 to 6.47, which is moderately desirable to very desirable.

Based on a computed $F = 7.37$ and a probability value of .0085, the result indicates that there is a significant difference in the organoleptic characteristics of quail eggs on account of the treatments. Moreover, a computed $F = 7.41$ with a probability of .0084 indicate that there are significant differences in the organoleptic characteristics of the quail eggs in the blocks. Post hoc analysis using the Tuckey method yielded a computed value of 3.92 between treatments I and II which suggests that treatment II can yield the best proportion of NBM that will produce the best organoleptic characteristics of the quail eggs in terms of Yolk and Albumen Color and Appearance, Flavor, Taste and General Acceptability. Second option may be treatment IV, while third option may be treatment III to yield the best organoleptic characteristics of the quail eggs.

The experimental birds were generally healthy during the entire duration of the study as indicated by absence of mortality among the birds. No symptoms of parasite infestation and occurrence of diseases were noted.

Flies and other insects were not observed on the manure voided by the experimental birds given the treated diets. Thus, eggs and that usually infest the manure were not observed. This finding confirms the citations of Quidilla (2001) regarding manure management. They said that one of the advantages of using NBM Powder is the elimination of foul odor in the farm up to 75 percent because of the actions of friendly bacteria. The elimination of foul odor may have been attributed to the antibiotic, bacteriostatic and enzymatic actions of the inoculants (Higa et.al, 2008).

Summary of Findings

The results of the study are summarized as follows:

1. The result indicates that there is a significant difference in the organoleptic characteristics of quail eggs on account of the treatments.
2. It reveals that at 0.2 percent of NBM Powder added in the diet of quails can yield the best proportion that will produce the best organoleptic characteristics of the quail eggs in terms of yolk and albumen color and appearance, flavor, taste, and general acceptability.
3. Furthermore, the study reveals that flies and other insects were not observed on the manure voided by the experimental birds given the treated diets. Thus, eggs and larva that usually infest the manure were not observed.

Conclusion

From the findings of the study, it was concluded that the organoleptic study revealed improvements in the parameters tested. Moreover, the inclusion of the experimental additive in the diet has not imparted any untoward tastes and flavor characteristics to the quail eggs. This suggests that the said additive could be safely included in the diet without altering the organoleptic characteristics of quail eggs.

Recommendations

In view of the aforesaid result, the following are the recommendations for a better understanding or insight of the effect of microbes as feed additive on Japanese seattle quail production:

1. One of the important researchable areas in this field that needs to be considered and undertaken is the reproductive performance of quails using the said experimental additive. This will shed light to more information on the reproductive performance of

quails using the experimental feed additive being studied;

2. Further studies on the effect of microbes as feed additive on starting, growing, and laying Japanese Seattle Quails should be undertaken;
3. The use of other kinds of probiotics or microbes aside from NBM should also be worked on; and
4. The elimination of foul odor observed in the manure of birds given the treated diets need further investigation to enlighten prospective benefits of would-be quail growers.

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