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## Research Article

### SUSTAINABLE USE OF FRUIT PEEL POWDERS IN QUAIL DIETS: EFFECTS ON FEED INTAKE

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#### Abstract

The research was conducted to determine the effects of feeding *Coturnix japonica* (a species of guinea pig) a diet containing Orange Peel Powder (OPP) and Pomegranate Peel Powder (PPP) as a feed supplement. Three treatment groups, one control group, and six sets of fifteen birds in each treatment group were randomly assigned one-day-old *C. japonica* birds. Powdered orange peel, pomegranate peel, and a combination of the two were employed in the therapy. Birds of the *C. japonica* species were fed either a corn-based diet or the same diet with group added to it. Four groups were given the same basic diet for five weeks: group A plus 5g/kg OPP (5%), group B plus 2.5g/kg PPP (2.5%), group C plus 5 g/kg OPP+PPP (5%), and group D with the basic diet alone (Control group). So, the experimental group consumed 10%, 5%, and 5% (2.5% + 2.5%), whereas the control group consumed simply the baseline diet. At the conclusion of the experiment, we randomly selected 5 birds from each repetition to collect blood samples. In order to conduct the analysis, a one-way analysis of variance was performed. Significant changes (P 0.05) were seen between OPP and PPP supplemented nutrients with baseline diet, leading us to believe that using OPP and PPP may be beneficial for the health of Japanese quail breeders.

**Keywords:** Growth performance, rules for killing animals, *Coturnix japonica*.

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## 1. INTRODUCTION

The Japanese quail is bred for both its eggs and meat. It's a great option for animal agricultural diversification since it matures rapidly, lays many eggs, has a narrow generational gap, and hatches swiftly. They don't become ill as frequently, so you may forego routine immunisations. Farming quails for their eggs and meat requires significantly less capital than raising chickens or ducks, but the profit margin is about the same because of the birds' tiny size, light weight, and minimal dietary and housing requirements. Since it takes less time

to reproduce and can be sold at a younger age, it generates a steady stream of income and ultimately higher profits. Genetic selection has facilitated increased meat production in Japanese quails in recent years.

The need for protein among humans has greatly benefited from the expansion of the modern poultry industry. Cow, goat, sheep, salmon, and rooster meat are just a few examples of the many sources of animal protein. These protein sources, which are both more expensive and more likely to make people unwell due to their high fat content



(Memon, 2012), are widespread outside poultry.

Protein, as we can all see, is the most crucial food group for humans throughout the planet. White meat production from roosters was also thought to have played a significant role in satisfying Pakistan's nutritional requirements for decades. All of Pakistan relies heavily on chickens for its egg and meat needs. On the other hand, there is a shortage of high-quality beef in Pakistan (Hussain *et al.*, 2013).

High-quality animal protein, such that found in chicken meat and eggs, is essential for people all over the world to get the nourishment they need from the food they consume. Since China is a major producer of chicken eggs, it exported many of these eggs to nations in Europe and Asia. This trade contributes to the spread of dangerous poultry illnesses including bird flu and avian flu, which in turn lowers meat and egg production (Ahmad *et al.*, 2016). In addition, it caused a serious economic problem for the poultry producers in the area. After suffering significant financial losses and being forced to sell their crop at rock-bottom prices, some local breeders culled and buried the chickens in an effort to contain the disease (Hussein *et al.*, 2019).

The rooster business contributes positively to the economy and has several benefits, such as the production of a high volume of meat and eggs. As well as being a source of income, it also meets the need for protein-rich foods (Memon, 2012). Raising hens for profit is on the rise in Pakistan. From 8–9 weeks for broilers to 20–22 weeks for layers, there is an increasing profit curve as more meat and eggs are produced. Classes like this expand rapidly in response to consumer demand. The diet and attention it receives will determine its development. Broilers reach market weight in 8 weeks, at around 2 to 2.5 kg. Feeding a grill till it is ready to sale requires roughly 5 kg and 5 to 8 weeks. When there is a high

demand for protein, many farmers rear grill chickens for decades or even centuries (Hussain *et al.*, 2013).

## **2. MATERIALS AND METHODS**

### **Collection of Orange Peel and Pomegranate Peel Powder**

The orange and pomegranate peels used in the experiments were purchased from vendors in the chock qureshi neighbourhood of the Tehsil and district of Muzaffargarh. When the peels were completely dry, they were ground into a fine powder. There is a significant loss of nutrients and an increase in waste when orange and pomegranate peels are discarded after consumption.

### **Processing of Food Additives (orange peel and pomegranate peel)**

The orange peel and pomegranate peel used in the experimental diet were cleaned to remove any clay, grit, or dust that would be harmful to the Japanese quail's digestive tract. To be specific, the Japanese Coturnix (*Coturnix japonica*).

### **Sundry of the Food Additive**

The sun dried these two feed components after they were rinsed. For 7 days, I dried the orange peel and 10 days, I dried the pomegranate peel to remove all moisture.

### **Grinding and Packing of the Food Additives**

At the Chock Qureshi local market, they dried these two seasonings and ground them into a fine powder. After that, the powder was kept in a flour bag until the experiments were ready to go.

### **Research Trails Site**

This research aimed to determine whether or not including orange peel powder and pomegranate peel powder into the diet of captive Japanese quails influenced their renal function and ease of slaughter.

### **Feeding and Diets**

The birds used in this experiment were Japanese Quails (*Coturnix japonica*), and they were given a corn-based meal produced by Hi-Tech feed businesses (Pvt.), Lahore,

Pakistan. The birds were fed a diet based on recipes developed in accordance with NRC recommendations from 1995. Metabolic energy is 2900 kcal/kg, total protein is 22%, calcium is 3%, and phosphorus is 0.5%. Powdered orange peel and pomegranate peel were added to the basic feed to increase its nutritional value. Birds in groups A (basal feed plus orange peel powder), B (basal feed plus pomegranate peel powder), and C (mixing OPP and PPP) fared better than those in group D (reference group, which received just basic feed).

Nipple drinkers provided the animals with water, while portable dish feeders accommodated their dietary needs. The birds were fed twice a day, first at 7:00 AM and again at 5:00 PM, by the feeders. Neither coccidiostats nor antibiotics were included in our staple diet. The birds had free access to food and water during the whole experiment.

### **3. RESULTS AND DISCUSSION**

#### **Weekly Feed Consumption (g)**

All groups consumed noticeably ( $p>0.05$ ) different quantities of food during the course of the first week. Various concentrations of powdered orange peel and pomegranate peel were fed to separate groups of Japanese quails. More feed was consumed by the A and B treatment groups than by any other addition group (225,7143, 29.02028 and 222,857, 20.91902). Feed intake was greatest in treatment D (305.714 53.56825), followed by treatments C (282.5714 52.96533), and then treatments A and B, where it was lowest. The treatment B group consumed the fewest calories from feed.

There was no discernible change in feed intake between the two groups in the second week when treatment started. In other words, something of importance happened. Different supplement doses were given to the research groups. There was no statistically significant difference ( $p>0.05$ ) in food intake between groups in week two of the trial, as shown by the mean table. Compared to Treatments B

and D, where feed consumption was both 221.4286 and 14.86904 grammes, Treatment A had a greater intake of food (235.7145 17.97580).

There was no significant difference in feed intake between the behavior collections and the control group during the third week ( $p>0.05$ ). One group, out of all the treatment groups, consumed 328.571428.57143 more calories. Groups B, C, and D ate the same amount of feed (321.4286 30.58398), as did group A (321.4286 30.58398), and so did group C (321.4286 30.58398).

The fourth week showed a statistically significant ( $p<0.05$ ) difference in food intake between the two groups of Japanese quail fed varying doses of orange peel powder and pomegranate peel powder as nutrients. More feed from the C group (407.1429 7.14286) was consumed than from the A, B, and D groups (400.0000 0.00000), respectively.

No significant differences ( $p>0.05$ ) in feed consumption were seen in the fifth week of treatment with orange peel powder or pomegranate peel powder. As can be seen in the median table for the fifth week, the feed that each group consumed was located in various regions. Each group was also unique. Feed consumption is as follows: Group A, 478.5714 24.0464; Group B, 464.2857 23.69018; Group C, 464.2857 26.08203; Group D, 457.1429 22.96107.

Because of the negative impact antibiotic growth boosters have on the environment and human health, many herbal plants have been used into broiler diets. The therapeutic and growth-promoting properties of these herbal inserts have a favorable effect on grill chicken. The purpose of this research was to determine the impact of adding orange and pomegranate peel powder in a grill diet on the productivity of the birds and their weekly feed intake. The feed used in my research did not hinder the growth performance of *Coturnix japonica*. In general, the protein

content of the birds fed orange peel powder and pomegranate peel powder was higher.

### Growth Performance

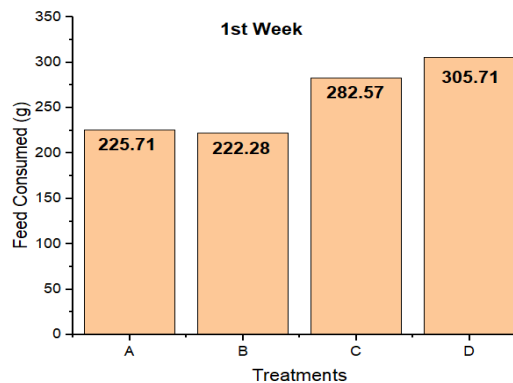
The feed intake ratio (FI), the quantity of feed eaten (FC), the repulsion rate (FR), and the mortality rate were monitored daily to assess the growth performance of the grill chickens. Broiler chicken growth performance includes the feed conversion ratio (FCR). Supplemental forms of Orange peel powder and Pomegranate peel powder used in varying concentrations. Following a five-week acclimation period during which the chicks' growth performance showed no discernible trends, the animals were randomly divided into four groups of fifteen (A, B, C, and D) and given either basic feed plus 5% PPP, 2.5% OPP plus 2.5% PPP, or 5% PPP plus 2.5% PPP. Group D served as a control. The growth performance of grill chickens improved significantly.

### Feed Intake and Body Weight (Gm)

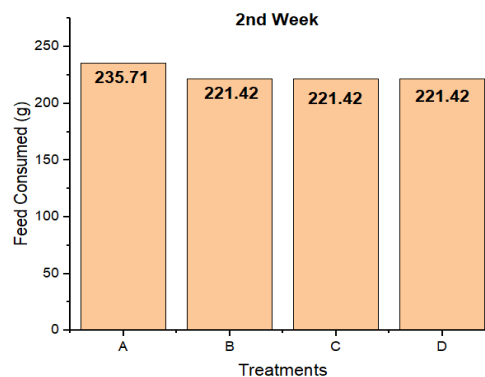
No statistically significant changes ( $P > 0.05$ ) were found in the current investigation of 35 days of trials on *Coturnix coturnix japonica*. Feed intake (in grammes) per day was measured in the morning and evening for groups of Japanese quail fed either orange peel powder or pomegranate peel powder at varying dietary levels. Similar to the present study, earlier research using palm date seed to feed *Coturnix coturnix japonica* revealed no statistically significant variations in feed consumption (Genchev *et al.*, 2008). Similarly, birds raised on palm date seed diet showed no discernible variations in feed intake or meat quality (Clar *et al.*, 2007). Banana peel and baseline feed with glycerin levels both increased feed intake in Japanese quail (*Coturnix coturnix japonica*) (Yalcin *et al.*, 2010). This study's findings are consistent with previous research indicating that substituting banana peels for orange peels in grill meals had no significant influence on the animals' body weight (Pond *et al.*, 2005). Similarly, there were variations

in growth rates between banana peel-fed Japanese quail and standard Japanese quail used for broiling (Babatunde *et al.*, 2012).

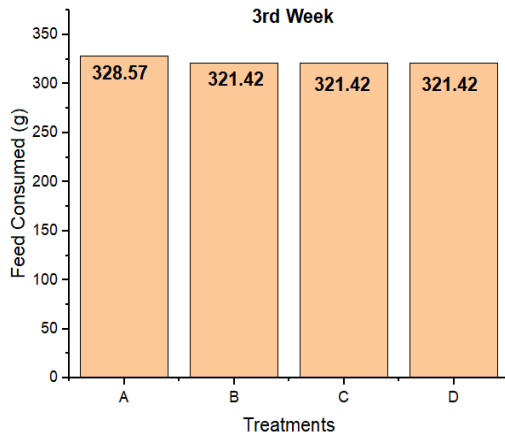
Therefore, natural compounds have received considerable research as potential antibiotic substitutes in chicken production. Essential oils are one option for using all-natural products. Flowers, buds, seeds, leaves, and fruits are only some of the plant parts from which they may be extracted (Brenes and Roura, 2010). The purpose of this research was to assess OPO's potential as a growth promoter and health booster for quails. OPO is derived from waste products in the fruit juice industry. The benefits of citrus peel essential oil on quail development performance under stressful situations were investigated in prior research (Ciftci *et al.*, 2013).



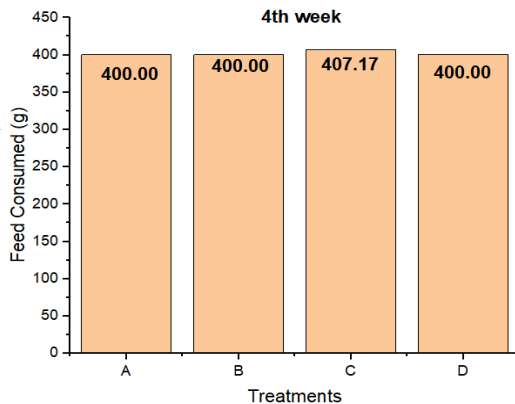
**Fig.1** Representing Mean Comparison for Feed Consumption by the Supplementation of orange peel pomegranate peel powder.



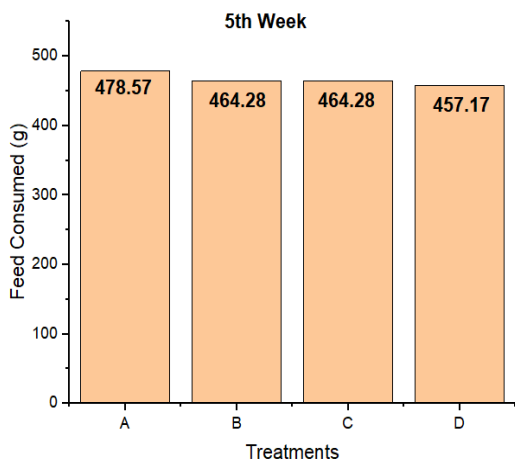
**Fig.2** Representing Mean Comparison for Feed Consumption by the Supplementation of orange peel powder and pomegranate peel powder



**Fig.3** Representing Mean Comparison for Feed Consumption by the Supplementation of orange peel powder and pomegranate peel powder



**Fig.4** Representing Mean Comparison for Feed Consumption by the Supplementation of orange peel powder and pomegranate peel powder



**Fig.5** Representing Mean Comparison for Feed Consumption (g) by the Supplementation of orange peel powder and pomegranate peel powder.

## CONCLUSION

Given what we know now, it's not surprising that feeding young *Coturnix japonica* a diet that included orange peel powder and pomegranate peel had no negative impact on either their capacity to produce or their initial body weight. Time of day, whether day or night.

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