Assessment of Lauric Acid Content of VCO as a Part of Broiler Diet Using Radioisotope Method

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CONTENS

ORAL PRESENTATIONS
NON RUMINANT

flour which are sticky and viscous making birds difficult to eat or to take up the feed. Restricted feeding methods were applied due to the duck eating behavior to avoid over spillage. Birds had free access to drinking water during the experimental period. The diets were offered in a wet form. Spillage of the feed was calculated by weighing and drying the remaining feed on the feeder and drinking water to correct the feed intake.

To ascertain the nutrient content of the ingredient, proximate analysis was applied. Prior to the study, all feed ingredients were evaluated for the proximate composition according to the methods of the Association of Official Analytical Chemists (AOAC, 1995). The results of proximate analysis of the mould bread are shown in Table 2.

Table 1: Ingredient and calculated nutrient composition of experimenta diets.

Ingredient (g/kg)	Dietary treatment		
	T0	T1	T2
Yellow corn (YC)	330	279	206
Rice bran (RB)	470	157	154
Commercial layer concentrate (CLC)	200	0	0
Ground fresh water fish (GFWF)	0	302	325
Mould bread (MB)	0	262	297
Total	1,000	1,000	1,000
Calculated nutrient composition			
Metabolizable Energy (kcal/kg)	3,100	3,100	3,100
Crude Protein	170	195	185
Crude Fiber	80	83	80

*% of DM ; No vitamin and mineral added

Table 2. Proximate analysis of expired bread of bakery home industry used in this experiment (%)*

Variety	Moisture	Ash	Ether extract	Crude Fibre	Crude Protein	Carbohydrate
Chocolate bread	23.7	0.81	12.6	0.02	5.4	57.3
Cheese bread	34.3	0.51	7.9	0.14	7.0	49.8
Plain bread	30.6	1.21	9.2	0.08	6.9	51.7

*Analyzed values – 2017

Measurements

The data on feed consumption, egg production and egg weight were recorded daily from 24 to 34 weeks (for the 10- wk of the experimental period). FCR was calculated from the daily feed intake and the egg mass. Egg mass was also calculated from egg weight multiplied by daily egg production. Egg quality characteristics viz. egg weight, fresh yolk weight and yolk pigmentation were measured during the experimental production period. A total number of 150 eggs (5 eggs from each dietary treatment) per week collection were taken and broken out on a clean Petri dish and then yolk color was determined against the Roche Yolk Color Fan scale (RYCF) as a tool for a standard color.

Data Analysis

The data collected for 10 wk of the experimental study were subjected to the General Linear Model (GLM) procedure of SAS version 8 (SAS, 1999). To compare means, Duncan's multiple range test was applied at the level of $p < 0.05$.

RESULTS AND DISCUSSIONS

Body weight changes and laying performance

To the best our knowledge, this is the first study examining the potential expired bread (mould bread) in laying ducks. The author's belief that the ducks are capable of using the mould bread into the desirable production performance. As seen in Table 3 that the initial and final body weights as well as weight gain of the laying ducks fed mould loaves of bread were not significantly different ($p>0.05$) from the control diet although the T1 showed the heaviest birds (1569 g). The result therefore suggests that feeding to laying ducks with mould loaves of bread did not show any detrimental effects on bird's health and their palatability associated with the fungal contamination. This tendency has also been shown on the laying performance.

Feed intake and egg production were affected by dietary treatments ($p<0.05$) but there is no effect on feed conversion ratio attributable to the treatments. Reduced feed intake by 14.9 per cent and 18.6 per cent of the control respectively were observed when 262 and 297 g/kg mould bread were included in a conventional feeding system in small holder managements. Conversely, egg production of T1 and T2 diet fed birds increased by 32.4 per cent and 3.2 per cent of the control group respectively. Although the egg production curves (Figure 1) fluctuated in a similar manner for all groups, it is interesting to note that the

highest egg production was recorded in birds fed with T1 diet (40.9 per cent) and the lowest egg production birds fed with the control diet (30.9 per cent) and tended to increase after 10 wk of the experimental period. The improvement in egg production by birds fed with the mould bread diet could be attributed to enhancement of feed efficiency as a result of the effect of fermentation by gut microflora. There are two possible explanations for these improvements. The first is that fungus growing in the loaves of bread is favorable to the ducks and could work as a probiotic. As reported by previous studies that probiotics have several benefits if supplemented in poultry diets. Significant effects of probiotic were observed by Denev *et al*. (2006) and Boostani *et al*. (2013) on higher body weight in broilers, egg quality in chukar partridge by Hashemipour *et al*. (2011) and laying hens by Shalaei *et al*. (2014). In general, beneficial changes in gut microflora environment that improve host's performance are the main concern of applying probiotics. Another possibility is that mould bread could also take action as prebiotics. The proximate analysis of the loaves of chocolate bread showed that this bread contains 57.3 per cent carbohydrate and 0.02 per cent crude fiber (Table 2) and wheat itself as the major ingredient of bread making had a higher proportion of insoluble (87 g/kg) than soluble (28 g/kg) non-starch polysaccharides (NSP) (Amerah, 2015) as an energy source. Like other poultry, ducks as a monogastric animal cannot digest complex carbohydrate such as NSP (Nikam *et al.,* 2016) and high insoluble NSP is considered to modify the intestinal flora and reduce turnover rate of the intestinal mucosa and to change the immune system (Shalaei *et al.,* 2014). In addition, the use of coarse rice bran in present study may help to increase gut development and nutrient digestibility (Choct, 2015), thus improving feed efficiency. It has been claimed that the benefits of crude fiber affect the intestinal mucosa carbohydrase and binding effect (Hsu *et al*., 2000). In this case, ducks were apparently tolerant to the mould bread which was evident by no mortality was found during the experimental period and as mentioned earlier that body weight of the mould bread fed birds were also higher than the control diet although this is not significantly different. Slightly different from chickens, however, that body weight gain and hen day production were reduced when laying hens fed with mould-contaminated diet (Akande *et al.,* 2015). Sangsoponjit and Suphalucksana (2016) in their work with broilers fed the commercial ration and mixed with selected microorganisms (such as *Actinomysetes*, *Aspergillus niger*, *Rhizopus stolonifer sp, and Trichoderma sp*) reported that increased the nutritive value of the diet in terms of crude fibre, crude protein, and ether extract as a result of the ability of this microbes to produce enzyme cellulase, hemicellulase

and lignin. Thus, the improved performance of the T1 and T2 birds in the present study may be explained by the actions of both probiotics and prebiotics simultaneously. Mirana *et al*. (2016) found that *Aspergillus sp* were the dominant fungi in the expired breads. At this moment, we did not asses the microbiology aspect of which could clarify the microorganisms present in the loaves of bread with respect to types and their characteristics.

The relatively low egg production of all groups in this study was not expected and this could be due to an extreme weather recently. Heavy rain and strong wind blew in the time of the experiment, make birds experiencing environmental stress. Under normal condition, it is predicted that the production performance is better than this current condition.

Table 3. Performance of laying ducks fed different dietary levels of mould loaves of bread during 10 wk of the experiment

Parameters	Dietary treatments			SEM	p-value
	T0	T1	T2		
Initial body weight (g)	1400	1368	1426	33	0.3449
Final body weight (g)	1486	1569	1550	35	0.3638
Gain (g)	86	201	123	51	0.3024
Egg production (%)	30.9^{b}	40.9^{a}	31.9^{b}	3.0	0.0390
Feed consumption (g)	156.9^{a}	133.5^{b}	127.7^{b}	12.2	<.0001
FCR (g/g)	6.036	5.701	5.538	0.320	0.5370
Egg mass (g/bird/wk)	56.34	83.40	54.59	10.42	0.0967

$^{a-b}$ means in the same row with no common superscript differ significantly ($p<0.05$)
T0: commercial concentrate based diet; T1:262 g/kg mould loaves of bread diet; T2:297 g/kg mould loaves of bread diet. SEM –standard error of means

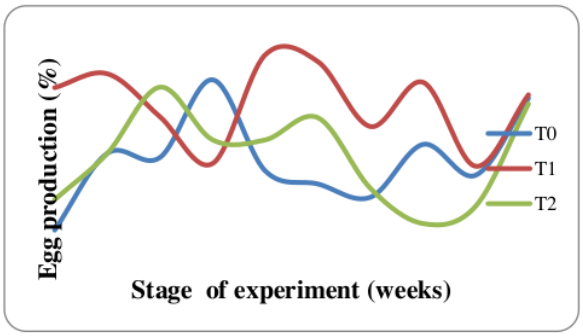

Figure 1. Egg production of different mould loaves of bread fed in laying ducks

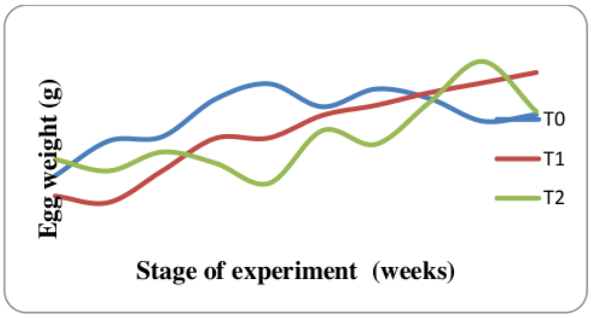

Figure 2. Egg weight of different mould loaves of bread fed in laying ducks

Egg quality characteristics

The results on selected characteristics of egg qualities are shown in Table 4. It appears that inclusion of mould loaves of bread in layer diet for ducks at 262 and 297 g/kg dietary levels had a substantial improvement of yolk color in the control diet. This is quite probable to be related to the higher level of yellow corn as a single source of *xantophyll* included than in the tested diets (400 g/kg versus 279 and 206 g/kg corns – Table 1). Corn has been long as the most common feed stuff used in poultry nutrition for egg yolk pigmentation (Blessinz *et al*., 1963). Although there is no statistically significant difference in egg weight and fresh egg yolk weight when layer ducks were fed diets with different levels of mould bread (Table 4), there was a marked tendency for heavier egg weight (Figure 2) and egg yolk with the dietary mould bread level was lower.

Table 4. Selected characteristics of egg qualities of laying ducks fed different dietary levels of mould loaves of bread.

Parameters	Dietary treatments			SEM	p-value
	T0	T1	T2		
Egg weight (g)	61.44	62.67	61.80	1.42	0.8233
Fresh yolk weight (g)	22.17	23.98	22.73	0.9634	0.4711
Yolk color (RYC)	12.7[a]	9.8[b]	9.8[b]	0.3284	0.0001

[a-b] means in the same row with no common superscript differ significantly ($p<0.01$)

T0: commercial concentrate based diet; T1:262 g/kg mould loaves of bread diet; T2:297 g/kg mould loaves of bread diet; SEM –standard error of means

Health records

As mentioned that there was no mortality found during the study. It means that the mould bread did not affect on the bird's health.

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