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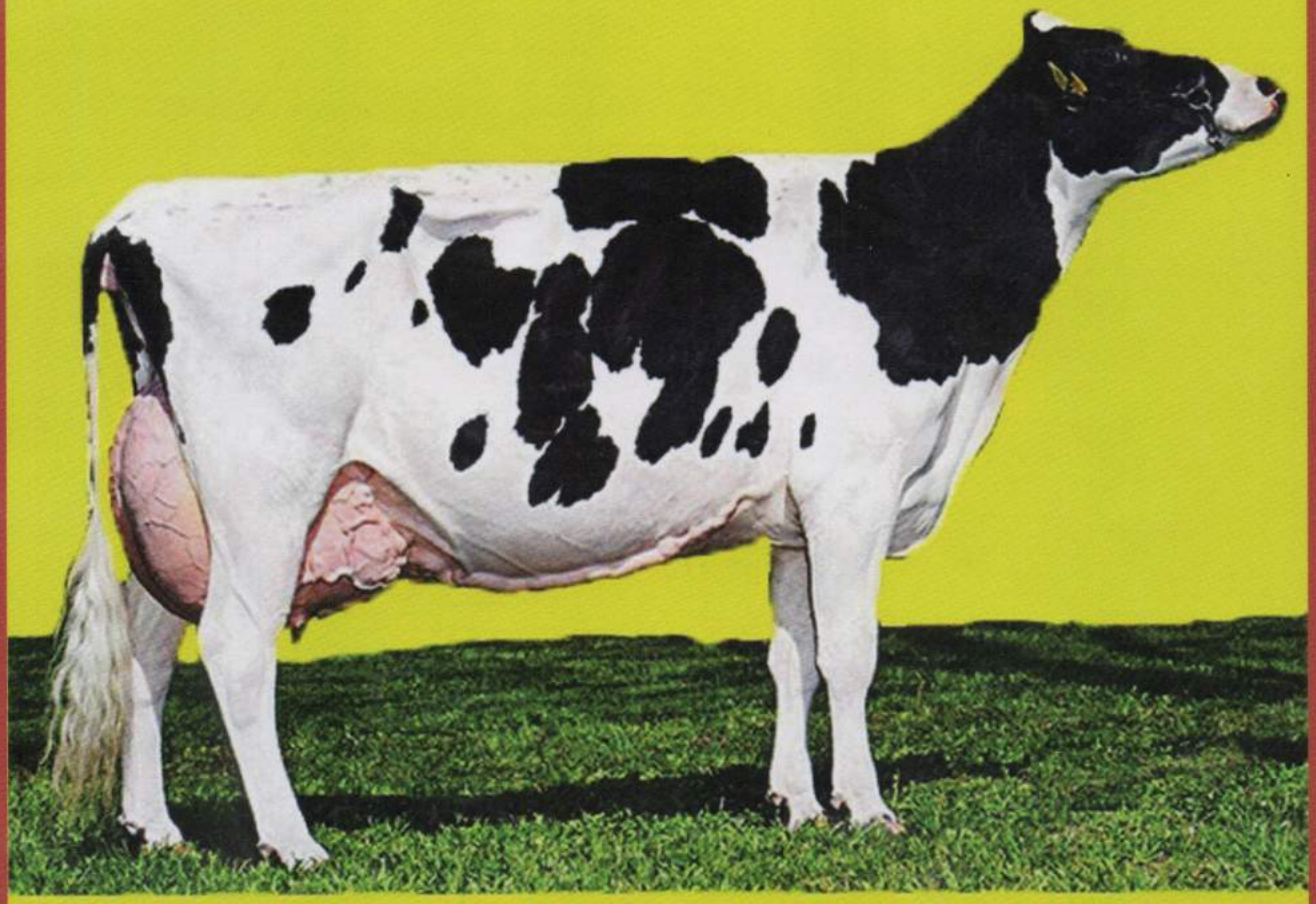

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Alamat : Kampus C Universitas Airlangga Mulyorejo, Surabaya 60115
Telp. (031)5992785, 5993016 Fax. (031) 5993015
e-mail : agroveteriner@yahoo.com

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## DAFTAR ISI

# EFFECT OF TURMERIC (*Curcuma domestica*) AND PAPAYA LEAF (*Carica papaya*) AS FEED ADDITIVES ON TOTAL FAT OF QUAIL EGG LAYER (*Cortunix-cortunix japonica*)

**Reni Nanda Rizkika [1], Romziah Sidik [2], Rimayanti [3],**
1) Student, 2) Department of Animal Husbandry, 3) Department of Veterinary Reproduction
Faculty of Veterinary Medicine Universitas Airlangga
Kampus C Jl. Mulyorejo Surabaya reninanda@yahoo.com

ABSTRACT

The aim of this research was to examine the effect of turmeric (*Curcuma domestica*) and papaya leaf *(Carica papaya*) on decreasing total fat content of quail egg layer (*Coturnix-coturnix japonica*). Twenty four quails layer 16 weeks old were divided into four groups. First without turmeric and papaya leaf powder (P0), second with turmeric powder 0.6% (P1), third with papaya leaf powder 0.25% (P2), and fourth combination between turmeric powder 0.6% and papaya leaf powder 0.25% (P3). It used completely randomized design with four treatments and six replications. Collection of eggs was done every day in one week and at the end of week the egg were examined for total fat by using *soxhlet* method and data analized with Analysis of Variant (ANOVA) and then continued with Duncan's multiple range test. In conclusion, adding of turmeric powder 0.6% (P1) and papaya leaf powder 0.25% (P2) showed significant difference ($p<0.05$) on decreasing total fat content of quail egg.

**Key words** : Quail Egg, Turmeric, Papaya Leaf, Total Fat

## Introduction

Food requirements are likely to increase over time due to the population growth, economic development, changes in lifestyle and increasing of nutrition awareness, thus increasing demand for food of animal origin one of them is egg (Yogaswara and Setia, 2005). Some animals can produce egg, but only certain egg that commonly traded and consumed by humans these are chicken egg, duck egg, quail egg and fish egg. Chicken egg and duck egg are the most popular egg among consumers (Rachmawan, 2001).

Eggs are a product of animal origin that have a complete nutritional content such as carbohydrates, fats, proteins, vitamins, and minerals (Sitepoe, 1993; Harjani, 2012), but egg also products of animal origin are grouped as source of fat. Fat have a role as source of energy, raw materials hormone, transport vitamins A, D , E, K and protective

organs of the body (Murray *et al.*, 1999; Harjani, 2012).

Quail has a good potential to be developed, because the maintenance of quail does not require a large area, the maintenance cost is not expensive and relatively fast payback due quail reach sexual maturity around 41 days with egg production between 250 to 300 eggs per year (Listiyowati and Roospitasari, 2005; Randall and Bolla, 2008). In Indonesia quail egg has use as foodstuff long time ago. Not only use as main foodstuff but also secondary foodstuff. Quail egg have flavor which delicious and contain a lot of nutrition so it can replace chicken egg and duck egg in dish (Sang, 2012)

Today concerns about high levels of fat in foodstuffs of animal origin greatly affect the level of consumption of products of animal origin and cause people to limit themselves to consume excessive amounts of egg (Sitepoe, 1993; Harjani, 2012). The quail eggs had low trans fatty acid which was bad for human health. Consuming trans fat will increases low-density lipoprotein (LDL) or bad cholesterol. (Tunsaringkarn *et al.*, 2013)

Fat metabolisms were used as energy reserves so the presence of abdominal and egg fat can be evaluated with decreasing fat source in the ration. Excess levels of fat in the egg can be lower by provide a feed additive to reduce fat (Sestilawarti, 2011).

The use of herbs in the diet may be one of the alternative feed additives to reduce fat content in egg. One of them that have done by a lot of parties by manipulating ration through the gastrointestinal system which is excrete undigested fat through feces by the mechanism of increased excretion of bile acids (Puastuti, 2001).

Rukmana (2004) suggested that turmeric efficacious as stimulus secretion bile liquid (kalagoga), antidote (antidota), reinforcing the stomach and appetite enhancer. Curcumin also has a good effect on the intestinal organs which can increase the activity of the enzyme lipase, sucrose and maltase. Rosalyn (2005) cited by Muhammad (2008) stated that the use of turmeric in chicken feed as much as 0.6% during the six weeks of maintenance result in abdominal fat percentage decreased by 45.6% when compared with the control.

According Citrawidi *et al.* (2012), papaya leaf contain lipase enzyme moreover it contain lysine and arginine that can lower fat of meat. Kiha *et al.* (2012) stated that papain and kimopapain papaya leaf contain proteolytic enzyme that help increase digestibility and absorption of protein and lipase enzyme that hydrolyze fat to fatty acid and

glycerol so increasing digestibility of protein and fat so it will give effect to increasing metabolize energy. Duck ration contain 0.25% papaya leaf supplemented by *Lactobacillus sp*, bacteria, *Acsomycies* and yeast given to Bali ducks culled females (2 years old) for 60 days compared to the control (without papaya leaf). The results obtained indicate that treatment of papaya leaf supplementation can increase carcass weight, carcass percentage, and lower percentage of fat including skin duck carcasses of culled females until 27.38% (Yadnya, 2004).

Research using turmeric and papaya leaf singly to reduce fat levels have been performed. However, studies using a combination of the two materials to lower the fat content have not been reported. So based on the above explanation, the authors are interested in examine the effects of turmeric (*Curcuma domestica*) and papaya leaf (*Carica papaya*) as feed additives on total fat of quail egg layer (*Coturnix-coturnix japonica*).

**Materials and Methods**

Research was held in Dusun Plosowesi, Desa Plosogeneng, Kecamatan Jombang, Kabupaten Jombang. Examination of proximate analysis and total fat of egg were held in Animal Nutrition Laboratory Animal Husbandry Department Faculty of Veterinary Medicine Airlangga University Surabaya. Research was done in December 2013 until January 2014.

**Materials and Tools**

Researches animal that use were 24 female quails layer phase 16 weeks old with average body weight about 120-150 grams.The substances were turmeric (*Curcuma domestica*) and papaya leaf (*Carica papaya)* in powder form. Feed that use was PP3 from PT. Wonokoyo Jaya Corporindo. Other substances that use to this research were water, vitamin, and disinfectant that was Rodalon.The equipment that used to mix the materials of feed consisted of plastic sack, rubber, container (can), and digital scale.Examination total fat of egg used equipment among flask, *Soxhlet* flask, analytic scale, *reflux* cooler, *exicator,* oven, cruss pliers, spatula, Bunsen burner, stative, measurement cup, filter paper, thread, and scissors.

**Research Methods**

This research used 24 quails layer that divided into four groups of treatments. These were $P_0$,$P_1$,$P_2$,$P_3$ with each six replication by the way quails were taken random by lottery then coded. Quails adapted for one week in battery cages with the aim that quail can adapt with the treatment feed. Battery cages be equipped with food container and water also lamp. Before quails come, cage and equipment cleaned by disinfectant Rodalon.

Turmeric powder that used was come from CV Sehati Jaya while papaya leaf that used was papaya leaf that had color old green. To made papaya leaf powder, first washed papaya leaf then sliced them and put them on container and dried them under sunlight for four days. After it were crunchy, then milled it until be mash form, then mixed it with ration.

Quails that had been adopt for one week given feed for one week. Treatment feed and water gave to the quail ad libitum. Each treatment as follows asFeed without turmeric powder and papaya leaf powder (PO), feed with turmeric powder 0.6% (P1),feed with papaya leaf powder 0.25% (P2), feed with turmeric powder 0.6% and papaya leaf powder 0.25% (P3).

Collections of egg were done every day for one week. Total fat of egg analyzed used all egg that collected for one week, then boiled it and took for egg yolk only and mixed it until homogenous, for total fat of egg analyzed used eight grams for each trial.

Collection data of total fat of egg were tested by Analysis of Variant (ANOVA) on levels of significances 5%. If there any significant differences that real among treatment, it continued to Duncan Multiple Range Test (Kusriningrum, 2008). It was facilitated by SPSS (Statistical Program for Solution Service) version 20 for window.

**Result and Discussion**

Total fat content of quail egg layer which received turmeric and papaya leaf powder in feed was showed on table 4.1.

Table 4.1. Total Fat Content of Quail Egg Layer

| Treatment | Total Fat of Egg (%) |
|---|---|
| P0 | $22.79^{a} \pm 2.12$ |
| P1 | $20.67^{b} \pm 1.23$ |
| P2 | $20.38^{b} \pm 1.44$ |
| P3 | $21.62^{ab} \pm 1.43$ |

a and b Different superscript on column showed significant differences ($p<0.05$)

Based on statistical analysis with F test (ANOVA) showed that there was no significant differences ($p>0.05$) among treatment groups PO, P1, P2 and P3. However by Duncan Multiple Range Test the lowest ($p<0.05$) total fat content of egg was on P2 which was fed papaya leaf powder 0.25% and total fat content about 20.38 %. The highest ($p<0.05$) total fat content of egg was P0 which was fed without turmeric and papaya leaf powder with total fat content about 22.79%. The fat content of quail egg on P3 was in the range P0 and P1 or P2, it was 21.62%.

Quail feed which added by papaya leaf powder about 0.25% in this research showed it was influenced on decreasing of total fat of quail egg. It was suitable with theory according Sakti (2007) that papaya leaf stimulated bile to secrete bile liquid which used for fat digestion. Bile liquid was something like salt liquid with yellow greenish color and contained cholesterol, phospholipid, lecithin and bile pigment. Salt content in bile was result from mixing between sodium and potassium with bile acid. That salt mixed with fat in small intestine made micelles. The made of micelles decreased surface of fat and mixed movement on gastrointestinal tract divided fat globules become small particles so fat can digested easily and undigested fat were excreted through feces (Putri *et al,*. 2012). It causes fat in the body and in the egg decreased because fat in the egg fat

Feed which added turmeric powder 0.6% in this research showed that there was influenced on decreasing total fat of quail egg. These results suitable with teory according Asai and Miyazawa (2001), that dietary curcuminoids had lipid-lowering potency in vivo, probably due to alterations in fatty acid metabolism. It is likely that curcumin may decreased the activity of the enzymes acting as rate limiting enzymes in lipogenesis such as acetyl-CoA carboxylase, which was the rate-limiting enzyme in fatty acids synthesis (Nouzarian *et al.*, 2011).

The synthesis of most types of lipids, including non-essential fatty acids and steroids, begins with acetyl-CoA. Lipogenesis can use almost any organic substrate, because lipids, amino acids, and carbohydrates can be converted to acetyl-CoA. Fatty acid synthesis involves a reaction sequence quite distinct from that of beta-oxidation. As a result, body cells cannot build every fatty acids they can break down. For example, cells lack the enzymes to insert double bonds in the proper locations to synthesize two 18-carbon fatty acids synthesized by plants: linoleic acid (an omega-3 fatty acid) or linoleic acid (an omega-6 fatty acid). All of other structural and functional lipids can be synthesized from fatty acids. (Nouzarian *et al.*, 2011).

Rukmana (2004) suggested that turmeric efficacious as stimulus secretion bile liquid (kalagoga), antidote (antidota), reinforced the stomach and appetite enhancer. Beside that Mangisah (2003) cited by Harlin (2012), stated that bioactive substance of curcumin in herb increased production and secretion of bile. Increasing of bile secretion in duodenum to excrete bile acid helped fat digestion to feces caused body fat decreased (Mide, 2012). Bintang and Natamijaya (2006) stated that curcumin stimulated

secretion of bile liquid faster, so bile liquid increased caused fat content decreased because it was changed become ATP, $CO_2$ and $H_2O$ with energy released.

Feed which added combination of turmeric powder 0.6% and papaya leaf powder 0.25% showed that there was no effect on decreasing total fat of egg. Fat content on feed with combination of turmeric and papaya leaf powder (P3) were higher than control feed (P0). Fat content of feed with combination of turmeric and papaya leaf powder (P3) was 5.24 while fat content of feed without turmeric and papaya leaf powder (P0) was 5.17.

Fat content of quail egg which fed added combination of turmeric powder 0.6% and papaya leaf powder 0.25% (P3) lower than fat content of quail egg fed without turmeric and papaya leaf powder (P0). It means that feed with combination of turmeric powder 0.6% and papaya leaf powder 0.25% (P3) had tendency to decreasing total fat content of egg but not significantly. It was probably due to bioactive substance in turmeric and papaya leaf that influence decreasing total fat content of quail egg. Those bioactive substances were unknown because in this research didn't use pure extract one of certain bioactive substance. This research used powder that have some bioactive substance were probably influence on decreasing total fat of quail egg but not significantly.

**Conclusion**

Based on the research result, it can be concluded that feed which added turmeric powder 0,6% can make total fat content of quail egg decrease, feed which added papaya leaf powder 0,25% can make total fat content of quail egg decrease, and feed which added combination of turmeric powder 0,6% and papaya leaf powder 0,25% can make total fat content of quail egg decrease but not significant.

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