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Opinion

Effects of Turmeric Powder (Curcuma Longa) in Laying Hens Nutrition: Table Eggs Production, Quality and Lipid Profile

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Opinion

Laying hens production has undergone a paradigm turnover in its primarily concept and operation from extensive backyard activity into a major commercial production. Antibiotics have been used as antimicrobial growth promoters in animal to improve food safety. However, in order to avoid the possible risk of developing resistant pathogens, as well as to meet the public pressure of antibiotic free animal products, the use of antibiotic in poultry diet was totally banned in European Community [1]. Various alternatives of phyto additives have been studied in order to maximize the growth performance of laying hens in the diets without antibiotics. Compared with synthetic antibiotics or inorganic chemicals, these plant derived products have proved to be less toxic, residue free and are thought to be ideal feed additives in food animal production [1]. Egg yolk colour is very important feature, which determines the acceptability of the product and depends on the presence and profile of carotenoids in feed. Laying hens have no ability to synthesise pigments by their own biochemical processes; thus the colour of egg yolk depends on the presence and utilisation of pigments present in the feed. In order to achieve appropriate colour of the yolks, hens diets should be supplemented with yellow or red pigments, natural or synthetic. Food producers pay much more attention towards colours of natural origin, since many synthetic pigments have been shown to impart negative health effects [2]. Synthetic pigments, canthaxanthin and apo-ester, are most commonly used as commercial sources of colours. However, some research data suggest that these substances can negatively affect human health. Canthaxanthin has been reported as a potential skin and eye irritant. Also, a high dietary intake level of canthaxanthin results in deposition of colour crystals in the retina. Therefore, dietary intake level of canthaxanthin is limited for humans to 0.03mg/kg body weight. The use of synthetic pigments in organic production is completely banned while in some countries, like Sweden, government regulation does not allow the use of synthetic pigments even in non-organic commercial production. Consequently, due to their harmfulness and increase of consumers' awareness, there is a growing interest in replacing synthetic pigments with natural [2]. Curcumin was effective in reducing both liver and serum cholesterol level [3]. Addition of 0.50 or 1.0% turmeric increased egg weight, egg mass, egg production significantly [4]. Researchs reported that 2g/kg of turmeric powder decreased the feed conversion ratio (FCR), increased yolk color, decreased serum triglycerides, total and LDL-cholesterol [5].

Effects of Tumeric Powder on Table Egg Production and Quality

Researchers had [6] reported that egg production, weight and mass increased significantly in laying hens fed turmeric powder at the level of 0.5% in the basal diet, while yolk weight and yolk index were significantly higher in the treatment fed with 1.0% turmeric powder addition in the feed. The same researchers [6] have suggested that tumeric powder can improve the environment in the uterus (specifically the site of calcium deposition) and consequently increase shell weight and thickness. Investigation in other research [7] found no significant effect of diet supplementig with 0.1%

tumeric powder on hen house egg production and percent hen day egg production of laying hens. Also reports [7] have showen that different levels (0.0, 0.5, 1.0, 1.5 and 2.0g/kg of feed) of turmeric powder in laying hens nutrition had no significant effect on specific gravity, egg shell thickness, egg shell weight and eggs shell weight to egg weight ratio. The addition of 0.5 or 1.0 % turmeric powder significantly increased the egg production. However, these levels numerically increased the body weight gain and feed intake as compared to hens fed basal diet [6]. Investigation showed that dietary supplementation of turmeric at 1.0 g/kg did not influence hen house egg production as well as hen day egg production [8]. Egg production was the highest in the laying hens fed diet with 0.5 % turmeric powder and the lowest in the laying hens fed the control diet [5]. Turmeric powder supplementation up to 4 % in the ration of laying hens showed a significant effect to improve egg production and the improved egg production performance which was apparently maintained by turmeric supplementation along the 3 periods of experiment [9].

Effects of Tumeric on Lipid Profile in Laying Hens

Turmeric powder at 1% level decreased total lipid, cholesterol, LDL-cholesterol and HDL-cholesterol without any statistically significant differences. The decrease of total lipid and cholesterol may be due to the effect of essential oil compounds present in the turmeric on lipid metabolism [6]. Reports showed that turmeric powder (0.05; 0.10 and 0.15%) had positive effect on lowering blood triglycerides, total cholesterol and LDL-cholesterol. Turmeric also improved HDL-cholesterol and might be used as an ingredient in laying hens diet for manipulating egg composition on fatty acids basis. Adding enzyme along with turmeric significantly decreased blood triglyceride, total and LDL-cholesterol [10]. Supplementation of 500 mg of tumeric per day for seven days significantly lowered lipid peroxidase, increased HDL-cholesterol, lowered total serum cholesterol. Tumeric lowered blood cholesterol concentrations through expression induction of CYP7A1 [11]. Tumeric powder lowered LDL-cholesterol and Apo B form complex lipoproteins with LDL-cholesterol. Lipoproteins were synthesized and released from the liver. Low levels of Apo B showed lower levels of LDL-cholesterol [10], stated that the laying hens fed with turmeric powder in concetration of 4.5 and 6.0g/kg of feed showed the maximum percentage reduction in blood glucose (6.75%) as compared to laying hens fed with 1.5 and 3g/kg of turmeric powder, respectively. Investigations have showed that adding turmeric powder at 3% level reduced AST and ALT concentrations [8] and demonstrate antioxidant, and hepatoprotective effects of ginger and turmeric powders [12]. Adding turmeric powder to older laying hen diets affected their serum triglyceride, total cholesterol, HDL and LDL-cholesterol, while the hens fed with standard feed had the higher triglyceride, total cholesterol, and LDL-cholesterol levels.

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