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Effect of Dried Tomato Meal (Solanum lycopersicum) in Diet on Performance and Egg Quality of Native Chickens

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INTRODUCTION

Native chickens contribute a lot to household nutrition and income in rural areas of the tropics (Norris et al. 2007). But, improving nutrition for increasing egg and meat production in native chickens in Indonesia is critical. It was hardier than imported breeds on free range when little or no food is supplied by the owner (Henuk and Bailey, 2014).

Productivity of native chicken breeds may be doubled with improved diets and management conditions (Chowdhury et al., 2006). But, the native chickens have not attained their full production potential due to exposure to risks that influence against their survival and productivity under extensive management conditions. (Faruque et al., 2013).

Tomato pomace was a good source of protein, vitamins and minerals but may be limited in energy due to the high non-starch polysaccharides content. The wet tomato pomace contains 33% seed, 27% skin and 40% pulp, while the dried pomace contains 44% seed and 56% pulp plus skin (Sogi and Bawa, 1998). Dried tomato pomace (DTP) contains 10% moisture, 20.77% crude protein, 1760 Kcal/kg ME, 39.8% crude fiber, 7.3% ether extract, 4.24% ash, 0.5% calcium and 0.45% phosphorus (Jafari et al., 2006). The limiting factors of DTP in poultry diets are low energy and high fiber contents (Squires, et al., 1992). DTP contain remarkable amounts of α -tocopherol (Bordowski and Geisman, 1980), lutein, β -carotene, and lycopene, which could contribute to a darker yolk color that is desirable for the consumers (Mlodowski and Kuchta, 1998).

Habanabashaka et al. (2014) reported that up to 6% tomato waste meal can be added in laying hen diets without any adverse effect on egg quality and compromising egg production rate. This inclusion level also showed to be beneficial via enhancing yolk colour score and lycopene concentration and reducing egg yolk cholesterol content. The degree of yolk color is an important criterion in table eggs for consumption as well as manufacturing of egg-containing market food products (De-Groote, 1970). The color of egg yolks is produced by oxycarotenoids, as xanthophylls pigments, derived from the feed ingredients (Zahroojian et al., 2011). Vasupen et al. (2013) reported that feeding laying hens diets containing tomato pomace at inclusion 10% did not affect egg production, egg weight, feed consumption and efficiency of the hens. There are limited studies on the effects of dried tomato meal supplementation in birds, especially native chickens. It is therefore, the experiment was conducted to evaluate the effect of dried tomato meal in diet on performance and egg quality of native chickens.

MATERIALS AND METHODS

One hundred of native chickens (36 weeks of age) were allocated into five experimental diets and each was divided into four replications using a completely randomized design. Based diet was formulated to contain 53% corn, 10% rice bran, 10% fish meal, 6% CaCO3, Top Mix 0.5%, NaCl 0.5% and 20% commercial diet. Tomato meal was included in four experimental diets at levels of 2, 4, 6, 8% to substitute based diet. Treatments were: R0 = 100% based diet (BD) + 0% tomato meal (TM); R1 = 98% BD + 2% TM; R2 = 96% BD + 4% TM; R3 = 94% BD + 6% TM; and R4 = 92% BD + 8% TM. Chemical composition of tomato meal were: 16.73% crude protein, 1.53% fat, 30.94% crude fiber, 0.98% Ca, 1.20% P, and 2416 Kcal/kg ME. Feed and water were provided *ad libitum*. Chemical composition of the diets were shown in Table 1.

The study was conducted over a period of 8 weeks. Data were collected on feed intake (FI), egg weight (EW), Hen-day egg production (HDP), egg mass (EM), FCR, egg shell weight ESW), egg shell thicknes (EST), egg yolk weight (EYW) and egg yolk color (EYC). Hen-day egg production was calculated as: (number of eggs-produced × 100) / (number of hens × number of hens in production). Yolk colour was determined using the yolk colour chart. Egg shell membrane was removed carefully and manually from the broken egg shell and the thickness of the shell measured using a micro-meter screw gauge (An et al. 2010). Data collected were subjected to one-way analysis of variance Treatment means were compared using Duncan's multiple range test (Snedecor and Cochran, 1967) using software IBM SPSS 22.