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The external and internal egg quality characteristics improved through the inclusion of *Moringa stenopetala* leaf meal in the diets of commercial layer hens

Kibru Beriso[1], Vera Sommerfeld[2], Markus Rodehutscord[2], Aberra Melesse[1]

[1] *Hawassa University, School of Animal and Range Sciences, Ethiopia*
[2] *University of Hohenheim, Dept. of Animal Nutrition, Germany*

Abstract

Moringa stenopetala tree is endemic to Ethiopia and Kenya and its leaf contains high crude protein and calcium making it suitable feed supplement for improved egg quality. The objective of this study was to assess the influence of *Moringa stenopetala* leaf meal (MSL) on external and internal egg qualities by partially replacing soybean meal (SMB). Forty pre-laying Lohmann-tradition layer hens were randomly distributed to four treatment diets replicated four times each. Hens in the control diet were fed a white maize-soybean meal-based diet (MSL0) and the rest were provided with MSL as a substitute of SBM with 3 % (MSL3), 8 % (MSL8), and 13 % (MSL13). Egg quality parameters were evaluated on 1621 eggs collected at 25, 29, and 33, 37 and 41-weeks of age. Data were recorded on egg weight, egg length and width, shell thickness, dry shell weight, albumen height, yolk height, yolk diameter, and yolk colour. Shape index, yolk index and Haugh unit (HU) were calculated. Hens fed MSL8 diet produced higher ($p < 0.05$) egg length than those of MSL0 and MSL3. The highest dry shell weight, shell thickness and shell ratio were obtained in hens fed various substitution levels than those fed MSL0 diet. Hens reared in the MSL8 diet produced heavier eggs ($p < 0.05$) than those fed MSL0 and MSL3 diets. Hens fed MSL3 and MSL8 diets produced higher ($p < 0.05$) albumen height and HU than those raised on MSL0 diet. The yolk height of hens fed MSL8 and MSL13 diets was higher ($p < 0.05$) compared to those fed MSL0 and MSL3 diets. Hens fed MSL13 diet had a higher yolk index ($p < 0.05$) than those fed other diets. Yolk colour was higher ($p < 0.001$) for hens fed MSL13 diet than other groups. Shell thickness, dry shell weight, albumen height, HU, yolk height, yolk index and yolk colour linearly increased with increased substitution levels. With increasing age, albumen height, HU, yolk height and yolk index were reduced ($p < 0.05$) while egg weight and yolk width increased ($p < 0.05$). In conclusion, the MSL can effectively replace the SBM up to 13 % without restriction, whereas the application of higher levels warrants further research.

Keywords: External egg quality, internal egg quality, *Moringa stenopetala* leaf, soybean meal, substitution

Contact Address: Aberra Melesse, Hawassa University, School of Animal and Range Sciences, Hawassa, Ethiopia, e-mail: a_melesse@uni-hohenheim.de