

Effects of dietary calcium level and *Rhizopus* fermentation extract supplementation on semen traits of Muscovy drake ⁽¹⁾

Liang-Yuan Wei ⁽²⁾ Xiao-Heng Xu ⁽⁴⁾ Wei-Beng Chang ⁽²⁾ Jih-Yih Chen ⁽³⁾ Chin-Hui Su ⁽²⁾
Yi-Ying Chang ⁽²⁾ Mei-Fong Lin ⁽⁴⁾⁽⁵⁾ and Hsiu-Chou Liu ⁽²⁾

Received: Aug. 31, 2021; Accepted: Mar. 17, 2022

Abstract

Due to the small population of Muscovy drake breeders, complete commercial feed for drake breeders is not available and infeasible for farm owners to formulate the optimal feeds independently. As a result, the most of drakes are fed with egg-laying duck feed in Kaiya duck farms, which may exert a negative effect on spermatogenesis. The *Rhizopus* fermentation extract (RE) benefits spermatogenesis and reproductive function in some avian species. This study aimed to investigate the effect of dietary calcium level and RE supplementation on semen traits of Muscovy drake breeders. The 27 Muscovy drakes at 29 weeks of age after semen collection training were divided randomly into three groups, with 9 animals of each treatment including 3.03% Ca (T1), 1.03% Ca (T2) and 1.03% Ca + 0.2% RE (T3). Animals were fed with 180 g of fixed ration every day. Semen was collected twice a week from 33 to 56 weeks of age while the semen volume, sperm concentration and total spermatozoa number were measured. Animals were weighed every 4 weeks, and the live sperms rate and normal morphology sperms rate were assessed. The results showed a decline of body weight by about 3.3% - 6.0% from 30 to 54 weeks of age without any differences among the 3 groups. The semen volume of the T1, T2, and T3 were 1.34 ± 0.11 , 1.32 ± 0.10 and 1.50 ± 0.13 mL respectively and the T3 group was significantly greater than that of the other two groups ($P < 0.05$). The sperm concentration was 2.36 ± 0.16 , 2.66 ± 0.23 and $2.53 \pm 0.27 \times 10^9$ spz/mL, and total sperm number was 3.15 ± 0.33 , 3.55 ± 0.41 and $3.73 \pm 0.48 \times 10^9$ spz, respectively, in which T1 and T3 group had significantly higher sperm concentration and number than those of T2 ($P < 0.05$). There was no differences in the live sperms rate and normal morphology sperms rate among the groups. The semen volume in the T3 group was significantly ($P < 0.05$) higher than that of the T2. In summary, feeding Muscovy breeders drakes with egg-laying diets lowered sperm concentration and total sperm number. Dietary supplementation of adding *Rhizopus* fermentation extract can increase the semen volume of Muscovy drakes after sexual maturity without affecting their semen concentration, total sperm count, live sperms rate and normal morphology sperms rate.

Key words: Muscovy drakes, Calcium, *Rhizopus* fermentation extracts, Semen traits.

(1) Contribution No. 2697 from Livestock Research Institute, Council of Agriculture, Executive Yuan.

(2) Ilan Branch, COA-LRI, Ilan 26846, Taiwan, R. O. C.

(3) Hsinchu Branch, COA-LRI, Miaoli 36841, Taiwan, R. O. C.

(4) Department of Animal Science and Technology, National Taiwan University, Taipei 10617, Taiwan, R. O. C.

(5) Corresponding author, E-mail: mflin@ntu.edu.tw.