Dressed yield and edible parts of crossbred village (kampung) chickens as affected by restrictions in feed

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Abstract

A study was carried out to determine the effect of feed restriction on carcass yields of crossbred kampung chickens at a slaughter age of 12 weeks. The two feed-restricted feeding regimes studied were provisions of commercial feeds amounting to 80% and 50%, respectively, of *ad libitum* feeding. The birds restricted to 50% of *ad libitum* feeding were reared in a fenced-in open area with surrounding oil palms and other vegetation, while the 80% feed restricted birds and the *ad libitum*-fed control group were housed in open sheds. Carcass yield and the yields of breast, thigh and drumstick parts as percentages of live weights were significantly higher in the control than in the feed-restricted groups. Between the two feed-restricted groups, differences in all carcass yield parameters were not significant. It is concluded that restricted feeding regimes at levels of 50 - 80% of *ad libitum* intake adversely affected the development of edible carcass parts of crossbred kampung chickens as a consequence of insufficient supply of nutrients.

Key words: Feed restriction, carcass, edible parts, crossbred kampung chickens

Introduction

Crossbred kampung (village) chickens represent the majority of coloured meat birds consumed by Malaysians, the others being the brown broiler, the silkie and the original kampung chicken. Despite being superior to the original kampung chickens in terms of growth performance, these crossbreds retain much of the phenotypic characteristics of the original kampung chicken. Purchasing of crossbred kampung chickens by Malaysians is mainly carried out by consideration of body weight of live birds, unlike the trading normally practiced for commercial white broilers where eviscerated dressed carcasses and cut-up parts rather than fully feathered live birds are sold to consumers. Consumers of kampung chickens need to be assured that the birds they are purchasing are real kampung chickens and not spent layer hens or small-size broilers; hence the necessity for the live sale of kampung chickens whereby the consumer could scrutinize the bird, in particular the plumage, which is the main physical characteristic that differentiates the kampung from other commercial chickens.

While *ad libitum* feeding on commercial or self-mixed complete feeds is the norm for the modern commercial broiler, the feeding systems practiced for kampung chickens vary widely, ranging from full feeding on complete commercial broiler feeds to the more popularly practiced feeding restrictions of commercial broiler feeds with or without supplementations. With such a varied nutritional regime, variation in live performance as reported by Noraziah and Engku Azahan (2010), and possibly carcass characteristics as well, would be expected to occur between different feeding regimes. In the past, numerous studies have been carried out on growth responses and carcass yield of broilers fed restrictively. These included work on early restriction during the starter phase (Saleh *et al*., 2005; Mohebodini *et al*., 2009;

Azarnik *et al*., 2010), restriction during the grower-finisher phase (Boostani *et al*., 2010), as well as restrictions during the starter and finisher phases (Urdaneta-Rincorn and Leeson, 2002). Benefits, detrimental effects as well as lack of response to such treatments have been recorded. With indigenous chickens such as the crossbred kampung, apparently no such work has been reported.

While consumers apparently may not lose out on any variation in growth as a result of nutrition since body weight is the sole criterion in the purchase of kampung chickens, decline in percentage yield of the edible portions relative to body weight would represent a real loss to the consumer. Birds of similar body weights but with higher percentages of carcass yield would obviously represent a better economic proposition than those of lower dressed yields. This study attempted to examine variation, if any, in the yield of the edible portions of a popular strain of commercial crossbred kampung chickens subjected to feeding restrictions.

Materials and Methods

Carcass yields of a commercial strain of female crossbred kampung chickens raised under three different feeding regimes were compiled and collated. While fresh drinking water was made available to all birds at all times, the feeding regimes, which comprised two restricted feeding schedules and an *ad libitum* feeding program, were as follows:

1. *Ad libitum* feeding - three weeks on 22% crude protein (CP) starter and nine weeks on 19% CP finisher feeds.
2. Mild feed restriction – 80% of calculated *ad libitum* consumption for each of the above starter (three weeks) and finisher (final nine weeks) feeds.
3. Severe feed restriction – 50% of calculated *ad libitum* consumption for each of the above starter (three weeks) and finisher (final nine weeks) feeds. These birds also received unknown amounts of supplementary nutrients from the surrounding.

The *ad libitum*-fed and the mild feed-restricted birds were housed in litter-floor open sheds with ample floor space allocation (8 birds per square meter) while the severe feed-restricted birds were allowed to roam freely within a fenced-in oil palm plantation area. All experimental birds were weighed and slaughtered at the age of 12 weeks. After the defeathering and evisceration processes, the empty carcasses were weighed and subsequently portioned into edible components. Data on dressed edible yield and the yields of the three most desirable portions, namely the breast, thigh and drumstick as percentages of live weights were statistically evaluated for differences between feeding regimes.

Results and Discussion

Under *ad libitum* feeding on commercial feed, some 72% of live weight of the crossbred female kampung chickens was recovered as whole dressed eviscerated carcass (Table 1), similar to the results reported earlier (Azlina Azma *et al*., 2010; Loi *et al*., 2010). On the other hand, birds on both feed-restricted regimes yielded significantly less ($p<0.05$) dressed carcass of under 60% of live weight, compared to the *ad libitum*-fed chickens. Between the two restricted feeding regimes however, the difference in dressed yield was not significant.

The recorded mean percentage yields for the breast, thigh and drumstick of the *ad libitum*-fed birds were 19.5, 11.1 and 10.7%, respectively. These values were statistically higher ($p<0.05$) than those of the restricted birds from both feeding regimes. The adverse effects of feed restriction on dressed and breast yields observed in this study were consistent with the findings of Boostani *et al*. (2010) with broilers feed-restricted during the growing-finishing period (21-42 days) but not with birds feed-restricted only during the brooding phase (7-21 days). Probably the early restricted birds of Boostani *et al*. (2010) were able to compensate for any adverse effects when normal feeding was resumed after 21 days as similarly observed by Saleh *et*

al. (2005), Mohebodini *et al*. (2009) and Azarnik *et al*. (2010). Between the two feed-restricted treatments, differences in the three edible components were again small and not significant.

Table 1. Yields of edible parts (as percentage of live weight) of crossbred kampung chickens reared under restricted or *ad libitum* feeding regimes (means ± std. deviation)

Feeding regime	Dressed yield %	Breast %	Thigh %	Drumstick %
No restriction (*ad libitum)*	71.9 ± 1.5[a]	19.5 ± 2.3[a]	11.1 ± 0.6[a]	10.7 ± 0.4[a]
Mild restriction (80% *ad libitum*)	58.5 ± 1.5[b]	15.3 ± 1.3[b]	9.5 ± 0.8[b]	9.0 ± 0.7[b]
Severe restriction (50% *ad libitum*)	57.0 ± 2.1[b]	15.5 ± 0.9[b]	9.5 ± 0.2[b]	9.3 ± 0.3[b]

[ab]Means within column with different superscripts differed at $p<0.05$.

Superiority in carcass yields of the *ad libitum*-fed birds over those from the feed-restricted groups ranged between 18.6 and 20.7% for whole dressed carcass, while for breast, thigh and drumstick the mean superiority values were 21.0, 14.4 and 14.5%, respectively. A more severe reduction of 26.6% for breast meat was observed in fast-growing commercial broilers feed-restricted to 85% of *ad libitum* feeding (Urdaneta-Rincorn and Leeson, 2002). The observation that of the three edible components the breast was the most affected was consistent with the findings of Khantaprab *et al*. (1997) who suggested that feed restriction specifically reduced breast muscle growth. Feed restriction apparently resulted in undersupply of protein and other essential nutrients to the birds which subsequently reduced muscle development. The probable lack of sufficient nutrients in the feed restricted birds could have resulted in the diversion of relatively more nutrients to non-edible parts such as feathers, legs and bones rather than to the edible components.

The failure of the two differing feed-restricted groups to show significant differences in carcass yields despite differing in amounts of commercial feed could probably be explained by the fact that the severely feed-restricted birds undoubtedly obtained some unquantifiable amounts of nutrient from the surrounding vegetation and environment. The availability of these natural supplements from both floral and fauna sources probably compensated, to some extent, the undersupply of nutrients provided by the commercial feeds.

It is concluded that restricting feeds throughout the rearing period adversely affected the development of edible parts of the crossbred kampung chicken in relation to the overall growth of the bird as a consequence of the insufficient supply of nutrients. This applied to dressed yield as well as yields of breast, thigh and drumstick. Farmers who practice restricted feeding for their kampung birds could probably alleviate the adverse effects of restriction on carcass yields by returning their birds to full feeding towards the later parts of the finishing period to allow for possible compensatory growth as observed by Boostani *et al*. (2010). As for the consumer who purchases kampung chickens reared on restricted feeding regimes which expose them to situations of under-nutrition, he or she may not obtain similar amounts of edible portions from these birds as from birds of similar body weights but reared on full *ad libitum* feeding.

References

Azarnik, A., Bojarpour, M., Eslami, M., Ghorbani, M.R. and Mirzadeh, K. 2010. The effect of different levels of diet protein on broiler performance in ad libitum and feed restriction methods. J. Anim. Vet. Adv. 9(3): 631-634.

Azlina Azma, I.A., E.A. Engku Azahan, I. Muhammad Nazri and Noraziah, M. 2010. Carcass yield of kampung chicken strains. Proc. 31st MSAP Ann. Conf. pp. 209-210.

Boostani, A., Ashayerizadeh, A., Mahmoodian Fard, H.R. and Kamalzadeh, A. 2010. Comparison of the effects of several feed restriction periods to control acsites on performance, carcass characteristics and hematological indices of broiler chickens. Bra. J. Poult. Sci. 12: 171-177.

Khantaprab, S., Takahiro, N. and Nobukuni, K. 1997. Effect of restricted feed intake on the growth of muscle and the fat deposition in broiler chickens. Jap. Poult. Sci. 34: 363-372.

Loi, C.F., Engku Azahan, E.A. and Shanmugavelu, S. 2010. Carcass characteristics and meat quality of phase-fed kampung chickens. Proc. 31st MSAP Ann. Conf. pp. 211-212.

Mohebodini, H., Dastar, B., Sharma Sharg, M. and Zerehdaran, S. 2009. The comparison of early feed restriction and meal feeding on performance, carcass characteristics and blood constituents of broiler chickens. J. Anim. Vet. Adv. 8(10): 2069-2074.

Noraziah, M. and Engku Azahan, E.A. 2010. Growth and carcass yield of commercial kampung chickens under two rearing systems. Proc. 31st MSAP Ann. Conf. pp. 151-152.

Saleh, E.A., Watkins, S.E., Waldroup, A.L. and Waldroup, P.W. 2005. Effects of early quantitative feed restriction on live performance and carcass composition of male broilers grown for further processing. J. Appl. Poult. Res. 14: 87-93.

Urdaneta-Rincorn, M. and Leeson, S. 2002. Quantitative and qualitative feed restriction on growth characteristics of male broiler chickens. Poult. Sci. 81: 679-688.