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Brief Review on Local Chicken Breeds in Korea with Respect to Growth Performance and Meat Quality

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Abstract: Local breeds are known to possess favorable characteristics such as resistance to some pathogens, superior meat flavor and taste and high dressing percentage. Due to these characteristics, higher consumption of meat product from local chickens has been on increase in countries such as East Asia and Europe and consumers are willing to pay premium price. There are four locally available chicken breeds bred for and consumed as a nutritive and medicine food in Korea. These are White-mini broilers, Hanhyup-3-ho, Woorimatdag and Silky fowl. Due to the increase in consumer preference on healthy foods, demand on meat products from local chicken breeds has been surged. The current review is aimed to briefly introduce the growth and meat characteristics of local chicken breeds in Korea.

Key words: Korean local chicken breed, Growth, Meat quality

INTRODUCTION

Poultry industry developed commercial chicken strains from a small number of breeds. To increase the productivity of native chickens, they were bred for economic traits. Although this process resulted in higher productivity, at the same time it decreased genetic diversity (Tadano *et al*., 2007). In recent years, it has become increasingly important to protect national endemic genetic resources and use local breeds to create commercial strains that can adapt to the changing environment. The report of the Korean Ministry of Agriculture and Forestry, per capita consumption of poultry meats has increased by approximately 3 kg over the past few decades, from 5.6 kg in 1998 to 8.6 kg in 2007 (Chae *et al*., 2002). Chicken meat consumption is expected to increase by 34% by the year 2018 with a concomitant fall in price of 15%, which means that chicken will continue as the cheapest commercially produced meat (Jung *et al*., 2011). Despite these recent increases in the preference for and consumption of chicken meat, Korean local chickens have not been produced in sufficient numbers, because large amounts of much cheaper foreign broilers have been imported under the FTA system (Choe *et al*., 2010). The present mini review will introduce the growth and meat characteristics of local chicken breeds in Korea.

Korean local chicken breeds: Currently, there are a couple of indigenous locally produced chickens in Korea which have been raised for meat consumption, i.e., Hanhyup-3-ho, white-mini broiler and Woorimatdag. They have different characteristics in appearance, size and plumage. In addition, silky fowls, originating from China, are an imported breed due to its special nutritive and medicinal values (Li *et al*., 2003). Around the world, many locally raised chickens are available and still marketed in countries such as China, France and Belgium with higher consumer preference on the meats. It is however well-known that the growth performance of native chickens is less efficient than that of commercially available meat-type chickens (i.e., broilers), but the quality of their meat is considered as premium chicken meat (Lewis *et al*., 1997).

Hanhyup-3-ho, white-mini broiler and Woorimatdag are representative local chicken breeds in Korea and they have different characteristics in appearance, size and plumage (Fig. 1). In Korean dishes, chicken is often roasted or braised with vegetables or in soups. Two of the most well-known cuisines are samgyetang and baeksuk that are traditionally prepared using white-mini broiler, braised in a soup with various Oriental medicinal plants and eaten especially during the summer time to overcome heat (Nam *et al*., 2010). Also, the Korean Native Chicken Association has been studying the process of indigenization of foreign breeds in to Korea and methods to restore Korean native chicken breeds. Korean native chickens as defined by Korean Native Chicken Association are chickens that have been bred true for at least 7 generations. The commercial Korean native chicken is called hanhyup-3-ho in Korea. Only a few farms in the remote areas of Korea raise local chicken breeds. In order to maintain this national resource, the National Institute of Animal Science, the Korean government organization, has conducted a local

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Fig. 1: Comparison of appearance characteristics of White-mini broiler (left), Woorimatdag, Silky fowl and Hanhyu-3-ho (right)

chicken breed restoration program. From this program, a commercial meat-type chicken line was developed called Woorimatdag, of which different quality characteristics were recently studied and compared with those of commercial broiler (Jeon *et al*., 2010). In addition, silky fowls, originating from Taihe country of Jiangxi province (China), are an imported breed due to its special nutritive and medicinal values (Li *et al*., 2003).

Growth performance of local breeds in Korea: It is well documented that locally produced chickens generally exhibit slower growth rate compared with modern commercial breeds (Moujahed and Haddad, 2013). Recently, Choo *et al*. (2014) conducted a comparison study with various local breeds available in Korea. They reported that three breeds, i.e., Hanhyup-3-ho, White-mini broiler and Woorimatdag grew faster than Silky fowl (Fig. 2). Authors postulated that the performance of 3 breeds over that of Silky fowl have greatly improved by crossbreeding with exotic breeds.

Meat qualities of local breeds in Korea: Until recently, little has been known about the meat characteristics of Korean local chicken breeds, such as Hanhyup-3-ho, white-mini broiler, Woorimatdag and Silky fowl. Their unique taste and texture in comparison with those of commercial broilers have yet to be clearly evaluated via scientific analyses and there has been increasing need to elucidate the physicochemical factors that influence the taste and texture of these chickens. Recently in Korea, there has been an increasing interest in consumers for Korean local chicken meat (Sang *et al*., 2006). The Korean local chicken meat contains less fat and higher protein than that from commercial broilers, which is attractive enough to consumers to pay 2 or 3

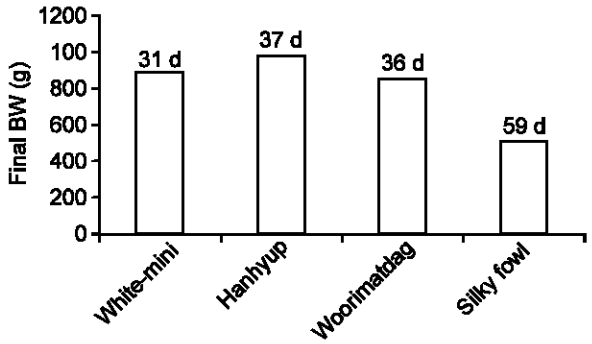

Fig. 2: Growth performance of 4 breeds of Korean local breeds. Chickens were fed an isoenergetic and isonitrogenous diet (21% CP, 3050 TME/kg of diet) and raised for 31 days (white-mini broilers), 37 days (Hanhyup-3-ho), 36 days (Woorimatdag) and 59 days (silky fowl). Data were reproduced from a study of Choo *et al*. (2014)

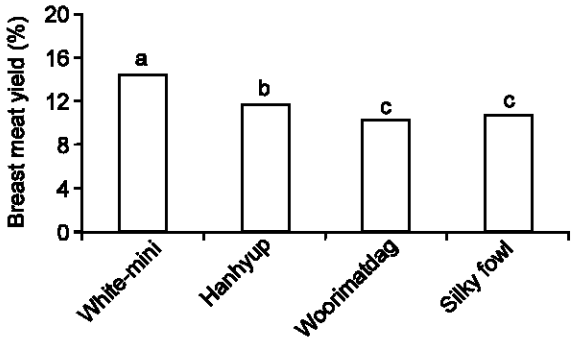

Fig. 3: Breast meat yield (%), expressed as relative to body weight, in 4 breeds of Korean local breeds. Data were reproduced from a study of Choo *et al*. (2014)

times higher price than the commercial broilers meat (Kong *et al*., 2006). Moreover, Korean local chicken meat has better taste, color and flavor compared to the commercial broilers meat. The Korean local chicken meat is usually darker and redder and contains more essential fatty acids, total collagen (Jeon *et al*., 2010) and better sensory characteristics than that of commercial broilers (Choe *et al*., 2010). Ahn and Park (2002) have reported that large quantities of desirable amino acids and nucleic acids were detected in Korean local chicken. Recently, Choo *et al*. (2014) reported that White-mini broiler produced higher breast meat yield, followed by Hanhyup-3-ho compared with those of Woorimatdag or Silky fowl (Fig. 3). Furthermore, the latter evaluated sensory characteristics of 4 local breeds and reported that chicken meat from Woorimatdag was scored with higher tenderness, but had lower flavor score compared with the rest 3 breeds.

Conclusion: The present review briefly over viewed the growth and meat characteristics of local chicken breeds in Korea which are widely used as a nutritive and medicinal food. The local breeds are known to possess desirable color and flavor properties which are positively perceived by consumers who are willing to pay more to buy these premium chicken meats.

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