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Short Communication

Alternative Feeding Strategy for Broiler Production: No Competition Between Food and Feed

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In animal agriculture, broiler farming emerges as a lucrative agri-business and major sector contributing to the global economic development and nutrition security due mostly to its quick monetary turnover as well as minimal land and feed requirements for meat production. In addition, broiler chicken meat is "lean" and "white" meat which is considered healthy, versatile, and acceptable to most people irrespective of age, culture, region and religion [1]. As the world's human population is forecast to reach 9.8 billion by the year 2050 [2] and the consumers' preference for broiler meat continues to rise, global broiler chicken production would need to double to meet the growing demand of broiler meat. For efficient meat production, broilers are fed *ad libitum* on a quality diet, which is mainly composed of corn and soybean. In the United States, large amounts of agricultural land are devoted to the cultivation of corn and soybean for its poultry industry that emerges as the world's largest producer and second-largest exporter of poultry meat. However, in developing and less developed countries, agricultural lands are mainly used to grow cereal crops for human consumption, and poultry is considered a competitor of human beings for grain consumption. Therefore, people in developing and less developed countries should either shift their dietary habit from consuming high carbohydrate and low animal protein-based diets toward low carbohydrate and high animal protein-based diets. The production of vegetable protein would, at least in part, be used for feeding broilers to produce animal protein for human consumption. If the populations are unwilling to make this diet change, cereal crop by-products and unconventional feeds that humans cannot eat may be exploited as broiler feed for meat production. However, feeding broilers diets containing cereal crop by-products and unconventional feed ingredients would be an attractive and alternative strategy for broiler production that avoids competition between human food and broiler feed.

Rice is the staple food in most countries of Asia. Parboiled rice polish (PRP) is a paddy by-product which constitutes about 10% of paddy [3]. Among grain by-products, PRP is a very promising alternative to corn or wheat. It has been reported that carbohydrase and phytase treated PRP can be used as partial replacement of grains up to 35% in a broiler diet [4]. Wheat is the world's second most important grain produced for human consumption. The milling of wheat into flour results in 25% - 30% by-product, more commonly known as wheat middlings, which serves as a viable substitute for grains used in the formulation of broiler diet [5-6]. The potential by-products of wheat- or corn-derived ethanol are corn dried distillers grains with solubles (DDGS) and wheat DDGS. Wheat or corn used in broiler feed formulation can be replaced with DDGS up to 25% level [7]. After rice and wheat, potato is extensively cultivated in the developing countries. Sometimes over-production and low demand for direct consumption leads to a huge wastage of potatoes. Recent studies have shown that 30% of corn used in broiler diet can be replaced with potato meal [8]. The poultry processing plants generate hundreds of thousands of tons of inedible by-products in the form of blood, feathers and offal annually which could be recycled into poultry feed. Better utilization of broiler offal or viscera will substantially reduce feed costs that would be an attractive larger savings for poultry farmers. Broiler offal is used to replace costly fish meal up to 8% level in the diet of commercial broilers [9]. In addition to reducing feed cost and expensive external inputs, recycling broiler offal is an environmentally friendly solution. Duckweed (DW) is an invasive plant that grows rapidly throughout bodies of water. Therefore, the use of duckweed as a partial feed replacement also contributes to the overall health of the world's ecosystems. It has been reported that costly sesame oil cake (SOC) can be partially (3% SOC + 6% DW) replaced by unconventional duck weed meal at 9% level in broiler diet [10]. Thus, the alternative feeding strategy for broiler production will not create pressure on agricultural land. Rather, crop production for human consumption can provide the by-products to be used as broiler feed.

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