

Supplementation of Yeast Cell Wall on Growth Performance in Broiler Reared under High Ambient Temperature

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Abstract : Two major problems are facing generally by conventional poultry farming that is disease outbreaks and poor performance, which results due to improper management. To enhance the growth performance and efficiency of feed and reduce disease outbreaks, antibiotic growth promoters (AGPs) which are antibiotics at sub-therapeutic levels, are extensively used in the poultry industry. European Union has banned the use of antibiotics due to their presence in poultry products, development of antibiotic-resistant pathogens, and disturbance of normal gut microbial ecology. These residues cause serious health concerns and produce antibiotic resistance in pathogenic microbes in human beings. These issues strengthen the need for the withdrawal of AGPs from poultry feed. Nowadays, global warming is a major issue, and it is more critical in tropical areas like Pakistan, where heat stress is already a major problem. Heat stress leads to poor production performance, high mortality, immuno-suppression, and concomitant diseases outbreak. The poultry feed industry in Pakistan, like other countries of the world, has been facing shortages and high prices of local as well as imported feed ingredients. Prebiotics are potential replacer for AGP as prebiotics has properties to enhance the production potential and reduce the growth of harmful bacteria as well as stimulate the growth/activity of beneficial bacteria. The most commonly used prebiotics in poultry includes mannan oligosaccharide (MOS). MOS is an essential component of the yeast cell wall (YCW) (*Saccharomyces cerevisiae*); therefore, the YCW wall possesses prebiotic properties. The use of distillery yeast wall (YCW) has the potential to replace conventional AGPs and to reduce mortality due to heat stress as well as to bind toxins in the feed. The dietary addition of YCW has not only positive effects on production performance in poultry during normal conditions but during stressful conditions. A total of 168-day-old broilers were divided into 6 groups, each of which has 28 birds with 4 replicates (n=7). Yeast cell wall (YCW) supplementation @ 0%, 1%, 1.5%, 2%, 2.5%, 3% from day 0 to 35. Heat stress was exposed from day 21 to 35 at $30\pm 1.1^{\circ}\text{C}$ with relative humidity $65\pm 5\%$. Zootechnical parameters like body weight, FCR, Organ development, and histomorphometric parameters were studied. A significant weight gain was observed at group C supplemented @ 1.5% YCW during the fifth week. Significant organ weight gain of Gizzard, spleen, small intestine, and cecum was observed at group C supplemented @ 1.5% YCW. According to morphometric indices Duodenum, Jejunum, and Ileum has significant villus height, while Jejunum and Ileum have also significant villus surface area in the group supplemented with 1.5% YCW. IEL count was only decreased in 1.5% YCW-fed group in jejunum and ileum, not in duodenum, that was less in 2% YCW-supplemented group. Dietary yeast cell wall of *saccharomyces cerevisiae* partially reduced the effects of high ambient temperature in terms of better growth and modified gut histology and components of mucosal immune response to better withstand heat stress in broilers.

Keywords : antibiotics, AGPs, broilers, MOS, prebiotics, YCW

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