

## ABSTRACT

Rice bran (RB) is a valuable feed resource for livestock feeding. Rancidity during storage and the presence of phytate at a higher level have been identified as major reasons for giving inferior performance and mineral status in broilers fed diets containing high levels of RB. Three experiments were conducted to explore the possibilities of increasing nutritive value and inclusion level of rice bran in broiler diets using citric acid (CA) as a dietary supplement. The first experiment evaluated whether rancidity of RB could be curtailed by storing RB with CA (2 or 4%) and Butylated hydroxytoluene (200 or 400ppm) alone or in combination. Treated RB was analyzed for peroxide value (PV) and pH on 7, 25, 55, 82 days. When BHT or CA was not used, a significant ( $p < 0.05$ ) negative correlation was found between PV and pH [ $PV = (7.329 - pH)/-0.112$ ;  $R^2 = 0.901$ ]. Use of BHT significantly reduced the PV during 25 days of storage time, but not thereafter. The use of CA significantly ( $p < 0.05$ ) reduced the PV up to day 82. The second experiment determined whether adverse effects of high dietary RB levels on growth performance and mineral status of broilers could be mitigated by supplementing the diets with CA. Treatment factors were three dietary RB (20, 30 or 40%) and three CA (0, 2 or 4%) levels. High dietary RB levels (30% or 40%) had significant ( $p < 0.05$ ) adverse effects on feed intake, weight gain, feed conversion ratio (FCR) and tibia ash content. Dietary CA significantly reduced the feed intake and weight gain but had no significant ( $p > 0.05$ ) effect on FCR and tibia ash content. The third experiment was conducted to evaluate the effects of CA on growth performance and nutrient retention of broilers fed diets containing two dietary RB (20% or 30%) and non-phytate phosphorus (0.25% or 0.35%) levels. Growth performance, feed intake and organ weights were not significantly ( $p > 0.05$ ) affected by dietary RB, CA, or non-phytate phosphorus (NPP) levels. Use of 2% CA improved the retention of ash with 30% RB compared to diets with 20% of RB. There was no significant difference ( $p > 0.05$ ) in tibia ash when diet contained 20% or 30% RB. A significantly ( $p < 0.05$ ) higher tibia ash content was observed when diets had 2% of CA with 0.35% of NPP. The results of these experiments indicate that CA controls both lipolytic and oxidative rancidity for about three months. Adverse effects of high dietary RB levels on growth performance and mineral status of broiler chicken cannot be mitigated by supplemental CA. Two percent CA added to broiler finisher (from 21 to 42 days) diets containing 20 or 30% RB produced no beneficial effects, while 30% RB had no adverse effects on growth performance of broiler finisher chickens.