



Animal Production and Technology

INCLUSION OF WATER HYACINTH (*Eichhornia crassipes*) AS A PREBIOTIC ON YEAST (*Saccharomyces cerevisiae*) BASED FEED FOR GUPPY (*Poecilia reticulata*) JUVENILES

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The use of probiotic and prebiotics in aquaculture has been less investigated. This experiment focused on determining the growth performance and stress tolerance of guppy juveniles (*Poecilia reticulata*) by inclusion of water hyacinth (*Eichhornia crassipes*) as a prebiotic on baker's yeast (*Saccharomyces cerevisiae*) based feed. Six diets (crude protein $47 \pm 0.27\%$) were used as treatments with three replicates. Treatment C1 and C2 were considered as controls while T1, T2, T3 and T4 had a paste of water hyacinth 0.5%, 1.0%, 1.5% and 2.0% levels, respectively. A percentage of 1.5% yeast was used in treatments, except C1. Three weeks old fishes with an average body weight (BW) (0.10 ± 0.02 g) and an average standard body length (SL) (1.46 ± 0.03 cm) were randomly distributed at a stocking rate of 1 fish per liter. Fishes were fed twice a day for 10 weeks. Temperature ($25 - 28^\circ\text{C}$), nitrite nitrogen (0 mgL^{-1}), pH (6.5 - 8) and volume of water (40 L) were maintained in aquarium condition. The average (BW) of the fish was measured weekly and the average (SL) was measured at the beginning and end of the experiment. At the end of the experiment, osmotic stress resistance and color differences of fish were analyzed. Specific growth rate (SGR), length gain (LG), weight gain (WG) and condition factor (K) were calculated. Treatment T3 exhibited a significantly higher ($p < 0.05$) BW (0.44 ± 0.01 g), SL (3.07 ± 0.02 cm), LG ($94.19 \pm 5.59\%$), WG ($299.39 \pm 11.51\%$) and SGR ($1.98 \pm 0.04\% \text{ day}^{-1}$). Further, the guppies in T3 had a significantly higher ($p < 0.05$) stress resistance than C1 within an hour. Fish color and K were not influenced ($p > 0.05$) by the treatments. Hence, inclusion of 1.5% of water hyacinth on yeast based feed enhances the growth performance and stress resistance in guppy juveniles.

Keywords: *Eichhornia crassipes*, Prebiotic, Growth performance, Stress tolerance

EFFECT OF DIETARY PROBIOTIC, PREBIOTIC AND SYNBIOTIC SUPPLEMENTATION ON PERFORMANCE, CARCASS TRAITS AND BLOOD SERUM PARAMETERS IN BROILER CHICKEN

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Excessive fat deposition in the broiler carcass considered to be a waste of dietary energy, is an unfavorable trait for both producers and consumers. Therefore, the present study was conducted to evaluate the effect of dietary probiotic, prebiotic and synbiotic supplementation on growth performances, carcass traits and blood serum parameters in broiler chicken. Two hundred (200) day-old broiler chicks were randomly assigned into four treatments in a completely randomized design with four replicates for each treatment. Basal feed (Control), basal feed with prebiotic, basal feed with probiotic and basal feed with synbiotic were used as treatments. Growth parameters were measured weekly. Blood serum parameters, meat quality characteristics, and abdominal fat were measured at slaughtering on d 42. Data were analyzed using the Mixed Analysis of Variance in SAS. Feed conversion ratio, total feed intake, dressing percentage, the weight of carcass parts and internal organs, total cholesterol, low-density lipoproteins, high-density lipoproteins, triglycerides, and very low-density lipoproteins were not differed significantly ($p>0.05$) among the treatments. The abdominal fat content was significantly lower ($p<0.05$) in the probiotic-fed group and carcass weight also showed a significant difference ($p<0.05$) among the treatments. Water holding capacity, pH and meat color, were not significantly different ($p>0.05$). *Lactobacilli* and *Coliform* population in the cecum content were not differed significantly ($p>0.05$). However, the synbiotic-fed group showed a significantly higher ($p<0.05$) feed intake during the age of 2nd week. Average body weight gain of the synbiotic fed group was significantly higher ($p<0.05$) during the age of 2nd and 3rd weeks. This study revealed that supplementation of probiotic, prebiotic and synbiotic to broiler diet did not cause any significant change in broiler performance, meat quality, and blood serum parameters. However, probiotic incorporated basal feed seems to be a better solution for the reduction of excessive fat deposition in the abdomen.

Keywords: Abdominal fat, Broilers, Prebiotic, Probiotic, Synbiotic

THE EFFECTS OF A NEW TOTAL MIXED RATION ON THE PRODUCTION PERFORMANCES OF MILKING COWS

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A lactation trial was conducted to determine the effect of total mixed rations (TMRs) on production performances of lactating dairy cows reared under intermediate zone. Eighteen Holstein Frisian crossbred cows were blocked according to the body weight into Randomized Complete Block Design and randomly assigned into two treatments: new total mixed ration (Treatment 1) and existing total mixed ration (control) having three cows per block and three blocks per treatment. Milk yield and feed intake were measured daily and milk composition, body weight and body condition score were measured fortnightly. Nutrient composition of TMRs were evaluated. Economic efficiency was calculated by a cost benefit analysis. Gross energy content of new TMR and existing TMR were 4304.35 and 4216.91 kcal/kg respectively. Crude protein content of new TMR and existing TMR were 8.17 ± 0.19 % and 7.46 ± 0.192 % respectively. Body weight, body condition score and body weight gain were not significantly different ($p > 0.05$) between the two treatment groups. However, milk yield was significantly higher ($p < 0.05$) in animals fed with new TMR (12.01 ± 0.24 L) than those fed with the existing TMR (10.15 ± 0.24 L). Milk fat, protein and solid non-fat content (SNF) were significantly higher ($p < 0.05$) in new TMR fed group. Higher profit (Rs 419.60/cow/day) was recorded for the new TMR fed group compared to the control group (Rs 197.30/cow/day). The results revealed that, new TMR (Treatment 1) showed a significant impact on milk yield, milk fat, protein and SNF which contributed to the profit. Thus, it can be concluded that the farm can maximize the profit by replacing existing TMR with the new TMR.

Keywords: Dairy cows, Milk composition, Milk yield, New Total Mixed Ration

PROBIOTIC VIABILITY IN YOGHURT PRODUCED USING COW MILK FROM DIFFERENT CATTLE BREEDS

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Declining of probiotic viability in dairy products with storage period is one of the problems which hinder possible health benefits for the consumers. Thus, the objective of this study was to evaluate the viability of *Bifidobacterium animalis* subsp. *lactis* (BB-12), *Streptococcus thermophilus* (ST) and *Lactobacillus bulgaricus* (LB) in set type yoghurts produced using cow milk of three cattle breeds namely *Thamankaduwa* white (TW), Local “*battu*” cattle and *Sahiwal* which are commonly found in dry zone, Sri Lanka. Yoghurt samples were prepared using thirty milk samples from each breed and tested for physicochemical properties including pH, titratable acidity, syneresis and water holding capacity. Sensory evaluation was undertaken to evaluate the organoleptic properties with 30 untrained panelists. Parametric and nonparametric data were analyzed by one-way ANOVA using a completely randomized design and Friedman test respectively. The lowest syneresis and the highest water holding capacity was recorded in yoghurts produced from TW breed. As well as, the highest viability of LB, ST and BB 12 was observed in yoghurts produced from TW breed. However, BB 12 and LB viability were significantly higher in set yoghurts produced from TW breed at the last 14 days of the storage period and average counts of BB-12 and LB were 8.32 log cfu/mL and 8.30 log cfu/mL respectively. It exceeds the expected probiotic viability for set yoghurt by Sri Lankan standards institute. The pH and titratable acidity were not significantly different ($p>0.05$) among the treatments. Sensory evaluation results revealed that yoghurts produced from TW breed had the highest ($p<0.05$) sums of rank for mouth feel and overall acceptability. Hence, it can be concluded that milk of TW cattle has superior characteristics for set yoghurt production in terms of probiotic viability as well as consumer acceptance.

Keywords: Probiotic viability, Set yoghurt, Shelf life, *Thamankaduwa* white

**EFFECT OF PROTEASE SUPPLEMENTATION ON GROWTH
PERFORMANCES, CARCASS AND MEAT QUALITY
CHARACTERISTICS OF BROILER CHICKENS FED WITH LOW
PROTEIN DIETS**

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Feeding low dietary crude protein (CP) with different levels of supplemental protease enzyme on growth performances, carcass and meat quality characteristics of commercial broilers were investigated. Three-hundred, day-old Cobb 500 broiler chicks were randomly divided into five dietary treatments expanded with six replicates containing 10 chicks per each in completely randomized block design. The experimental diets were based on basal diet supplemented with protease enzyme which were, positive control (contain recommended CP levels, T₁), negative control (level of CP reduced by 5%, T₂), negative control + 300 gt⁻¹ protease (T₃), negative control + 400 gt⁻¹ protease (T₄) and negative control + 500 gt⁻¹ protease (T₅). Growth performances were observed during the study period. Carcass quality parameters and serum lipid profile were measured at slaughtering on day 42. Data were analysed using one-way Analysis of Variance in Statistical Analysis System. The highest and the lowest feed intakes were reported in birds fed with T₃ (5113 ± 61 g), and T₁ (4677 ± 61 g), respectively. The highest live weight (2.86 ± 0.07 kg), weight gain (2663 ± 54 g) and the lowest feed conversion ratio (1.84 ± 0.06) were observed in birds fed with T₅. The significantly ($p < 0.05$) highest breast (45.49 ± 1.70%) and thigh (37.05 ± 2.28%) percentages were recorded in birds fed with T₁ and T₃, respectively. There was no influence ($p > 0.05$) of treatments on NH₃ emission of litter, dressing percentage, meat quality and blood serum parameters. The feed cost spent to produce 1 kg of live weight and sellable carcass weight was significantly less ($p < 0.05$) in T₅. Thus, it can be concluded that low protein diets supplemented with protease enzyme at 500 gt⁻¹ support better growth performances in broiler chicken with lower cost of production.

Keywords: Broilers, Low protein diets, Performances, Protease enzyme