The Effect of Growth Promoter Feed Additives on Performance of Broilers Challenged With *Escherichia coli*

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Received:22-10-2009  
Accepted:6-8-2011

Abstract

A total of 528 day-old Ross 308 male broilers were used to study the effect of antibiotic, probiotic, prebiotic and organic acid on performance, cecal *Coliform* load and internal organs’ weight. The chickens were placed into 6 groups with 4 replicates and 22 chickens per pen. Six dietary treatments included: 1) negative control as basal diet without any antibiotic growth promoter and coccidiostat (Control), 2) Diet 1+ 0.9 g/kg Primalac® (Primalac), 3) Diet 1+0.1 g/kg Bactocell® (Bactocell), 4) Diet 1+15ppm virginiamycin (Virginiamycin), 5) Diet 1+2 g/kg Fermacto® (Fermacto), and 6) Diet 1+2 g/kg Formycin Gold® (Formycin). At day 7 all chickens were orally gavaged with a 0.5 mL of 10⁷ cfu/mL of mixed culture of pathogenic *E. coli* (O2K12 and O78K80) verified for presence of genes including stx1, stx2, eaeA and hlyA. Eight chickens from each group were euthanized for detection of the challenged bacteria in liver, spleen and cecum content at days 14, 28 and 42. Overall weight gain (P<0.01) and feed conversion (P<0.05) were significantly improved in Virginiamycin and Primalac® groups. The challenged serotypes were recovered only from Control (46%) and Virginiamycin (25%) groups, but not the other groups. Feed supplementation with probiotic, prebiotic or organic acid, significantly decreased *Coliform* population at all intervals in comparison with control and antibiotic treatments (P<0.05). Feed additives supplementation did not influence on the internal organs’ weight at all intervals.

Keywords: Alternative, Antibiotic, *E.coli*, Broiler

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Effect of Enzyme Supplementation on Metabolisable Energy of Corn, Wheat and Triticale Grains in Broiler Chickens Using Total Excreta Collection or Marker Methods

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Received: 27-4-2010
Accepted: 20-2-2011

Abstract

One hundred twenty male broiler chickens of 20 d of age were used to study the effect of enzyme supplementation on the apparent metabolisable energy corrected for nitrogen in corn, wheat and triticale using total excreta collection or marker methods. The average apparent metabolisable energy corrected for nitrogen in corn, wheat and triticale on dry matter basis, were 3480 ±90, 3263 ±61 and 3260 ±54 kcal/kg, respectively. The metabolisable energy of wheat and triticale was significantly (P<0.05) influenced by enzyme supplementation. The addition of exogenous enzymes (cocktail of xylanase and β-glucanase) significantly (P<0.05) improved the apparent metabolisable energy of wheat and triticale by 4.82 and 4.78 percent, respectively. The metabolisable energy of these grains were significantly (P<0.05) affected by the method of determination. The results of this experiment showed that the triticale grain had similar metabolizable energy to that of wheat and the addition of enzyme increased the energy value of these grains in broiler chickens.

Keywords: Apparent metabolisable energy, Corn, Wheat, Triticale, Enzyme, Broiler chickens

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Effect of Different Levels of Zinc on the Performance and Humoral Immunity Response in Broiler Chicken

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Received: 17-6-2010
Accepted: 29-8-2011

Abstract
This experiment was conducted to evaluate the effects of different levels of zinc on the performance and humoral immunity response in broiler chickens with 250 Ross broiler chickens with five experimental treatments consisted of five replicates in a completely randomized design. Treatments were diets containing: basal diet (control) and basal diet plus 40, 80, 120 and 160 mg Zn/kg. Results of the experiment indicated that birds were fed on diets containing 120 mg Zn/kg and control showed the highest and the lowest weight gain, respectively (P<0.05) There were no significant differences between treatments for feed intake (P>0.05). In connection with feed conversion ratio, the highest and the lowest means belonged to the treatments containing 40 and 120 mg Zn/kg respectively (P<0.05). Results of Newcastle antibody titer indicated that there were no significant differences between treatments in 17 and 23th days of age (P>0.05). Regarding Bronchitis antibody titer in 13th and 19th days, the lowest titer belonged to the birds on the control and 40 mg Zn/kg and the highest titer belonged to the birds fed with 160 mg Zn/kg. The difference between this treatment and the others was significant (P<0.05). In primary SRBC antibody titer (24 and 30th days), no significant differences were observed between treatments (P>0.05). In secondary SRBC at 36 days of age the best and the lowest titer were shown by 40 mg Zn/kg and 160 mg Zn/kg of diet, respectively(P<0.05). at 42 days of age, no significant differences were shown between different treatments (P>0.05). Finally, the results indicated that addition of 120 mg Zn/kg, of diet improved weight gain and feed conversion ration. The levels of 40 and 160 mg Zn/kg of diet showed the highest immunity response against SRBC and Bronchitis respectively.

Keywords: Antibody titer, Broiler, Humoral immunity response, Performance, Zinc

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Effect of Different Levels of Extruded Soybean and Avizyme Enzyme on Broiler Performance

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Received:26-10-2010
Accepted:6-7-2011

Abstract

An experiment was conducted to examine the effect of different levels of extruded soybean and enzyme on broiler performance. In a completely randomized design with 2×3 factorial arrangement, 480 one day-old, Ross broiler chickens were divided into 40 groups, 12 chicks per pen. Treatments were consisting of combination of four levels of extruded soybean (0.0, 5.0, 10.0 and 15.0 %) and two levels of enzyme (0.0 and 500 g per ton). Different levels of extruded soybean and enzyme had no significant effect on blood factors such as cholesterol, triglyceride and the weight of liver and heart. The usage of extruded soybean and enzyme showed significantly higher weight gain and better feed conversion (p<0.05) and also caused to decrease the weight of pancreas in broiler (p<0.05).

Keywords: Extruded soybean, Avizyme enzyme, Broiler chicks

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Estimation of the Heterosis Effect and Comparison of Growth Curves for Body Weight Trait in Crosses between Two Selected Lines in Japanese Quail

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Received: 13-12-2010
Accepted: 16-8-2011

Abstract

In the current study, two line with short-term divergent selection for high weight (HW) and low weight (LW) at 4 wk of age after 7 generation were analyzed in Coturnix Japonica Quail. HW line was significantly higher than LW line at 28d of age (p<0.01). 21 females, and 11 male from the HW, 18 females plus 10 male from the LW lines were mated as reciprocal cross and within lines to produce HH, LL, HL, and LH groups. The mean of body weight in each group at first, second, third and forth wk of age and growth rate was compared to investigate the maternal and heterosis effects. There was significant differences between lines for these traits (P<0.01). However the effect of heterosis was not significant for all ages. Moreover the reciprocal effect (maternal effect) was significant for all BW measured except for 4 wk BW in males and for 3 and 4 wk BW in females and for growth rate in first week of age in both males and females. The curve growth for all groups (HH, LL, HL, and LH) was compared with three models (Gompertz, Logistic, Richard). The logistic model was fit and better than other models, on basis of coefficient of determination and error variance.

Keywords: Japonica quail, Reciprocal effect, Parameters of growth curve, Growth rate

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Effects of Alfalfa Particle Size and Soybean Oil on Digestibility, Chewing Activity, Milk Yield and Compositions of Early Lactating Holstein Cows

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Abstract

Eight Holstein cows in early lactating stage were used in a 4×4 change-over design within 4 periods of 21-d to determine the effects of alfalfa hay particle size and soybean oil supplementation on intake, digestibility, ruminal and blood metabolites, chewing activity, milk yield and compositions. Four total mixed rations containing 20, 20 and 60% corn silage, alfalfa hay and concentrate respectively were fed to cows twice daily at 0800 and 2000 h. The rations were prepared based on differences in percentage of soybean oil in the concentrate and particle size of alfalfa hay: 1) 0% soybean oil, long-cut alfalfa; 2) 4% soybean oil, long-cut alfalfa; 3) 4% soybean oil, alfalfa powder; 3) 4) 4% soybean, alfalfa powder. Soybean oil had no effect on DMI, but digestibility of NDF, ADF, EE and ash decreased and crude protein digestibility was increased. Reduction of hay particle size, increased DM, and OM intake but decreased the digestibility of DM, OM, NDF, ADF, EE and ash. Milk yield was increased, but milk fat and protein percentage decreased with addition of soybean oil. Reduction of particle size and addition of soybean oil, decreased time spent ruminating and total chewing activity. The addition of soybean oil to fine alfalfa had a synergism effect on decrease of intake time, rumination time and total chewing activity. Decreased particle size and addition of soybean oil declined rumen NH3-N concentration. Reduction of particle size significantly increased ruminal particulate passage rate, and decreased ruminal mean retention time, however, oil supplementation had no significant effect on passage rate, and ruminal mean retention time. Oil supplementation significantly increased milk yield, but decreased its fat and protein content. When particle size of hay decreased, with no effect on milk fat and protein content, milk yield significantly increased in treatments those contained oil supplementation. The oil supplementation in rations not only did not increase fat of milk, but also significantly decreased NDF digestion and consequently milk fat content.

Keywords: Particle size, Soybean oil, Chewing activity, Milk composition
Effects of Different Level and Source of Sulfur Supplement in Close-up diets of Dairy Cows on Blood Metabolites, Colostrums Composition and Liver Performance

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Received: 6-12-2010
Accepted: 20-7-2011

Abstract

The 24 multiparous Holstein dairy cows were allocated in a completely randomized design to study the effects of different level and source of sulfur supplement in close-up diets on blood metabolites, colostrums composition and liver performance. The mean body weight of the cows was 687.9 kg and the mean days until expected calving date was 21.8 d. The first treatment (T1) has contained 0.21% sulfur (DM basis), the second treatment (T2) has contained 0.41% sulfur which supplied entirely through magnesium sulfate and the third treatment (T3) has contained 0.41% sulfur which supplied through a combination of magnesium sulfate and an organic source of sulfur (Mepran). The DMI for pre-calving (P < 0.001) was affected by treatments and T2 showed the lowest DMI among treatments. Colostrums yield, protein, DM and ash significantly decreased in inorganic sulfur supplemented treatment (P < 0.05). Among the blood metabolites, calcium, copper and glucose were decreased in T2 compared with two other treatments (P < 0.05). However, BHBA, NEFA and urea were increased in T2 (P < 0.05). Urine pH was affected with different treatments (P < 0.0001). The both liver enzymes (i.e. AST and CPK) were increased supplementing inorganic sulfur showing that inorganic sulfur has potential to decrease liver performance in dairy cows. The results of the present study indicate that although magnesium sulfate (inorganic source) has negative effect on dairy cow health and performance, a combination of magnesium sulfate and organic source of sulfur could have positive effects on dry matter intake, blood metabolites and liver health in dairy cows.

Keywords: Sulfur, Transition period, Liver metabolism, Blood metabolites

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Chemical Composition, In situ Degradability and In vitro Gas Production of Winterfat Plant (Eurotia ceratoides)

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Received: 5-1-2011
Accepted: 6-8-2011

Abstract

Nutritive value of winterfat forage (Eurotia ceratoides) was evaluated through chemical composition, in situ degradability and in vitro gas production techniques using three permanently fistulated adult Baluchi sheep. The CP, NDF, ADF, Ash, EE and NFC contents of winterfat forage was 19.4, 54.5, 41.6, 9.0, 1.4 and 15.7%, respectively. The leaves had highest CP (27.9%DM) and lowest NDF (40.7%DM) levels among parts of the plant. Degradability characteristics of dry matter were measured at 0, 6, 12, 24, 48 and 96 hour incubation. The obtained results showed that DM fraction a (rapidly degradable), b (slowly degradable) and c (rate constant degradable) were 23.2, 30.5 and 8.0%, respectively. The rate of gas production of dry matter was measured at 2, 4, 6, 8, 12, 24, 36, 48, 72 and 96 hour after incubation. The obtained result showed that cumulative gas production sequentially of whole plant was 7.6, 15.8, 24.6, 31.6, 42.2, 62.09, 75.2, 83.6, 96.52 and 104.7 ml per each 1 g incubated samples. The measured data in this study suggest that winterfat with high content of CP and NDF with its lose structure could be a suitable forage source for grazing small ruminants in the dry nature rangelands in most parts of Iran.

Keywords: Eurotia ceratoides, Chemical composition, Degradability, Gas production

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Chemical Composition, *In situ* Degradability and *In vitro* Gas Production of Ephedra Plant (*Ephedra intermedia*)

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Received: 5-1-2011
Accepted: 6-8-2011

Abstract

Nutritive value of Ephedra (*Ephedra intermedia*) was evaluated through determination of chemical compositions, *in situ* degradability and *in vitro* gas production techniques using three permanently fistulated adult Baluchi sheep. The Samples were harvested during the late spring from rangeland in north of Khorasan Razavi province. The rate of gas production and degradability characteristics of dry matter were measured at 0, 2, 4, 6, 8, 12, 24, 36, 48, 72 and 96 hour. This forage contained 91.9, 9.2, 60.7, 30.8, 8.1, 3.3 and 18.6% of OM, CP, NDF, ADF, Ash, EE and NFC, respectively. The results obtained from degradability of dry matter showed that fraction a (rapidly degradable), b (slowly degradable) and c (rate constant degradable) were 20.16%, 42.06% and 0.07%/h, respectively. Also, in vitro gas production parameters (b and c), OMD and ME values of experimental sample were 65.22 ml/g, 0.043 ml/h, 27.42 g/100g DM and 4.18 MJ/kg DM, respectively. From the obtained results, it was concluded that palatability and degradability of this forage can be limited probably due to its high content of phenolic compounds (2.93%) and tannin (0.97%). This characteristic can be helpful for the local rangelands under deterioration.

**Keywords:** *Ephedra intermedia*, Chemical composition, Degradability, Gas production

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Estimation of Genetic Parameters for Production Traits in Holstein Cows of Khorasan Razavi Province

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Received: 5-1-2010
Accepted: 23-5-2010

Abstract

The milk and milk fat production records of 28 Holstein herds in Khorasan Razavi province were analyzed in this study. The records were based on 305 days of milking and were from the first to third milking periods and two times milking per day. The fixed effects of herd-year-season and age of dam at parturition as covariate were fitted in the models of analyses. The (co)variance components were estimated using REML procedure. The heritability values of the first to third lactation period of milk production were 0.27, 0.19 and 0.13; and for milk fat were 0.18, 0.15 and 0.14 respectively. The heritability values under repeatability models for milk production and milk fat were 0.21 and 0.15, respectively. The repeatability value for milk production was 0.46 and for milk fat was 0.35. Also, the genetic, phenotypic and environmental correlations between these traits were 0.84, 0.79, and 0.78, respectively.

Keywords: Genetic correlation, Heritability, Holstein, Milk production, Repeatability

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Estimation of Genetic Parameters of Holstein Dairy Cattle for Production Traits

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Received: 6-2-2010
Accepted: 20-9-2011

Abstract

The genetic parameters for milk production and milk fat traits for first to third parities were estimated using single, multi trait and repeatability models. The genetic parameters for test day milk records were also estimated using random regression model. The test day records and 305 day milk records of 17055 cows from 10 herds collected between years 1996-2007 in Khorasan Razavi province were used in the analyses. The highest heritability values for milk yield and milk fat were observed in the first parity. There were high genetic and phenotypic correlations between parities. The correlations were reduced by increasing the differences in parity numbers. Single-trait random regression model was applied to estimate variance components and genetic parameters for test-day records of milk yields in the first lactation. Phenotypic variance of milk yield trait was not constant during the lactation and it was higher at the beginning and at the end of lactation period. Residual variance for milk yield was maximum in early lactation. Minimum and maximum values for additive genetic variances for this trait were estimated at the beginning and 8th month of the lactation, respectively. Estimates of heritabilities were found to be lowest during early lactation (0.07) and were increased up to mid lactation and were maximized nearly at the 8th month of lactation (0.28).

Keywords: Genetic parameters, Random regression, Test day model, Heritability

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Genetic Variation of DGAT1 Gene and its Association with Milk Production in Iranian Holstein Cattle Breed Population

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Received: 31-10-2010
Accepted: 16-8-2011

Abstract

The results of multiple QTL mapping design in recent years indicated quantitative trait loci for milk fat percentage and milk yield traits identified in BTA14. DGAT1 gene coding diacylglycerol-acyltransferase enzyme, has a main role in the triglyceride synthesis and finally fat milk synthesis. A transition mutation in this gene results substitution of guanine by adenine in the gene causing substitution of lysine by alanine in diacylglycerol-acyltransferase enzyme. In this research, 398 blood samples were collected from the farms Tehran and Esfahan provinces. Using PCR reaction, 411 bp fragment of exon 8 DGAT1 gene was amplified. Finally, genotyping of the population was performed using RFLP-PCR technique. Three genotypes were detected. KK individuals with no mutant allele, AA individuals with two mutant alleles and KA individuals with one mutant allele. 36, 226 and 136 individuals had KK, KA and AA genotypes, respectively. Frequencies of DGAT1 alleles (K and A) were estimated 0.37 and 0.63, respectively. The effect of DGAT1 gene on milk305 trait was significant (P=0.001).

Keywords: DGAT1 gene, PCR- RFLP, Milk production, Holstein cattle

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5, 6- Assistant Professor and Lecture, Department of Genomics, Branch of North Region of Iran (Rasht), Agricultural Biotechnology Research Institute of Iran (ABRII)
Estimation of Genetic Parameters and Trend for Somatic Cell Score Trait in Iranian Holsteins Using a Random Regression Test Day Model

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Received: 12-12-2010
Accepted: 16-8-2011

Abstract

In this study, a total of 101,147 monthly test day records of somatic cell count collected from 13,977 first lactation Holstein cows (in 183 herds) calved between 2002 and 2006 were used. For the genetic analysis, a random regression test day model was utilized. Somatic cell score (SCS) was calculated based on natural logarithm of somatic cell count. In the model, fixed effect of contemporary group of province-herd-year-production season, as well as age at recording (as linear and quadratic covariables), Holstein gene percentage (as linear and quadratic covariables) were fitted. Orthogonal Legendre polynomial function with third order was applied to take into account of the stage of the lactation and genetic and permanent environmental variations of SCS. Genetic and environmental (co)variance components were estimated using restricted maximum likelihood method. In general, heritability of somatic cell score was found to be lower than 10% over the course of the lactation period. The lowest and highest heritability estimates were found for the second (0.03) and tenth (0.068) months of the lactation. Genetic and permanent correlations among the months of lactation decreased as the interval between them increased. Genetic trend was estimated based on linear regression of average breeding value on calving year. No statistical significant genetic trend was found for somatic cell score.

Keywords: Somatic cell score, Test day model, Holstein cow

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Effect of Age on Fiber Characteristics of one-humped Female Camels of Semnan Province (Short article)

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Received: 26-11-2010
Accepted: 26-8-2011

Abstract

The aim of this study was to determine the effect of age on fiber characteristics of one-humped female camels of Semnan province. 50 grams of wool samples from the left midside area were randomly collected from 28 camels of three different age groups: young, adult and old and fibre characteristics were measured. Statistical model used for this research was completely randomized design (CRD). Analysis of data and comparison of means were performed using Duncan's new multiple range test. The results showed that staple length and cashmere percent in young camels were significantly (P<0.05) higher than adult and old camels and no significant different was found between adult and old camels in this regard. Mean fibre diameter was significantly higher in old camels than adult and young camels but no significant difference was found between adult and young camels. Different ages had no effect on mean fibre diameter coefficient of variation, medulated and non modulated fiber percentage. The percent of hair in young camels was significantly lower than adult and old camels but no significant difference was found between adult and old camels. Fibre efficiency was significantly higher in old camels than young camels. In general results of this study indicated that as camels become older, fiber quality and quantity decreased because of relative increase in fibre diameter and decrease in cashmere percentage.

Keywords: Age, Fibers, Cashmere, One-humped female camel, Semnan

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