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## Comparison of genomic evaluation methods in complex traits with different genetic architecture

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### Abstract

The objective of this study was to compare six statistical methods for prediction of genomic breeding values for traits with different genetic architecture in term of gene effects distributions and number of Quantitative Traits Loci (QTLs). A genome consisted of 500 bi-allelic single nucleotide polymorphism (SNP) markers distributed over a chromosomes with 100 cm length was simulated. Three different gene effects distributions (uniform, normal and gamma) were considered. Number of QTLs varied from 50 to 200. Finally, nine quantitative traits with different genetic architecture were generated. The performance of six statistical methods of genomic prediction that differ with respect to assumptions regarding distribution of marker effects, including i) Genomic Best Linear Unbiased Prediction (GBLUP), ii) Ridge Regression Best Linear Unbiased Prediction (RRBLUP), iii) Bayes A, iv) Bayes B, v) Bayes C, and vi) Bayesian least absolute shrinkage and selection operator (Bayes L) are presented. The accuracy of prediction declined significantly over generations ( $P < 0.05$ ) but Bayesian methods outperformed GBLUP and RRBLUP in persistence of accuracy of genomic estimated breeding values over generations. Bayesian methods were superior to GBLUP and RRBLUP when the gene effects distribution generated from gamma distribution. The highest accuracy of genomic breeding values was observed when the gene effects come from normal distribution. In all statistical evaluation methods with increasing the number of QTLs towards 200, the accuracy of predicted genomic values has been decreased. In general, Bayesian and GBLUP methods performed better in prediction than RRBLUP method. These results gave some evidences that when the genetic architecture of quantitative traits deviated from infinitesimal model assumptions, Bayesian methods usually perform better than GBLUP and RR-BLUP.

**Keywords:** breeding value, bayesian methods, genetic architecture, genome.



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## Determination of standardized ileal digestible lysine requirement in growing turkey poults by different statistical methods

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### Abstract

In order to determine the appropriate standardized ileal digestible (SID) lysine requirement in growing male turkey poults (28-49 day of olds), one hundred sixty birds were used in a completely randomized design with eight treatments (8 levels of SID lysine: 1.15 (basal diet), 1.225, 1.3, 1.375, 1.45, 1.525, 1.6, 1.675 percent) in 4 replicates of 5 birds. Increasing of SID lysine levels increased body weight gain and decreased feed conversion ratio. Dietary treatment of 1.6 percent SID lysine had the highest body weight gain and the lowest FCR compared to the basal diet ( $P < 0.05$ ). By using of broken line-linear ascending, quadratic polynomial and broken line- quadratic ascending models, SID lysine requirements for weight gain were  $1.47 \pm 0.11$ ,  $1.57 \pm 0.04$  and  $1.49 \pm 0.05$  and for FCR were  $1.57 \pm 0.17$ ,  $1.61 \pm 0.02$  and  $1.59 \pm 0.08$ , respectively. In conclusion, SID lysine requirements for body weight gain ranged between 1.47 to 1.57 and for FCR between 1.57 to 1.61 percent.

**Keywords:** broken line linear ascending, broken line quadratic ascending, lysine, Standardized ileal digestible, Quadratic polynomial, Turkeys.



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## Immune response of broilers to vitamin C and coenzyme Q<sub>10</sub> under cold stress condition

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### Abstract

This experiment was conducted to determine the effect of vitamin C (VC) and coenzyme Q<sub>10</sub> (CoQ<sub>10</sub>) on immunity response of broilers in cold stress condition using 500 male chicks in a completely randomized design with 5 treatments and five replicates. Treatments were: positive control (PC, normal conditions growth without antioxidants), negative control (NC, cold stress without antioxidants), cold stress + VC (300 mg/kg diet), cold stress + CoQ<sub>10</sub> (40 mg/kg diet) and cold stress + VC + CoQ<sub>10</sub> at above mentioned doses. To induce cold stress, from day 15 until end, temperature fixed at 15°C. Vaccine titers, humeral and cellular immune response and relative immune organs weight were studied. Results showed that cold stress decreased relative spleen weight but there was no significant difference between treatments. Relative weight of bursa was increased in cold stress condition (P<0.01) and using antioxidant especially CoQ<sub>10</sub> decreased it (P<0.05). Lymphocyte percent decreased in cold stress (P<0.05). Improved cell-mediated immune response to subcutaneous injection of phytohemagglutinin and proliferation of T lymphocyte in vitro were observed (P<0.05). In conclusion, use of antioxidants VC and CoQ<sub>10</sub> in the cold stress condition improved immune system activity and decreased mortality.

**Keywords:** broiler, cellular immune, coenzyme Q<sub>10</sub>, cold stress, humeral immune, Vitamin C.



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## Effects of addition of alfalfa hay as an absorbant on fermentation quality and effluent loss in corn silage

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### Abstract

The objectives were to investigate the effects of addition of alfalfa hay as an absorbent on fermentation quality and effluent production of corn silage. Three levels of corn forage with dry matter (DM) contents of 18.3, 21.7 and 25.5 percent were supplemented with 0, 5, 10, and 20 percent alfalfa hay, on as fed basis, and ensiled in three replicates in polyvinyl chloride mini-silos in a completely randomized design. Concentrations of ash and total nitrogen increased and that of neutral detergent fiber decreased significantly as the level of absorbent increased ( $P < 0.05$ ). Increasing the level of absorbent significantly increased the DM of silage where the higher levels of DM were observed in silages with 10 and 20 percent absorbent. The pH values were within the optimum range of corn silage (ranging from 3.79 to 4.33); however, silage pH was affected by the interaction between DM and level of absorbent ( $P < 0.05$ ). The pH increased as the level of absorbent increased, however, the effect was less observed in silages with 26 percent DM. Also, there was an interaction between the DM and absorbent in the concentration of residual water-soluble carbohydrate of silage where the differences in water-soluble carbohydrates in silages with 18 percent initial DM were lower than those in silages with 22 and 26 percent DM. As the level of absorbent increased, aerobic stability was improved with the effects becoming less pronounced as the level of DM increased. Effluent production was markedly reduced as the level of absorbent increased so that it dropped to 0 ml at 20 percent alfalfa hay addition at all DM levels ( $P < 0.05$ ). The concentrations of DM and nitrogen were higher in effluent produced from silages treated with higher level of absorbent; however, total DM and nitrogen losses were lower due to considerably lower effluent production. Results showed that using a minimum of 10 percent alfalfa hay could effectively reduce effluent production and improve aerobic stability of corn silage while maintaining its optimal pH.

**Keywords:** dry matter, ensiled forage, nutrient loss, silage effluent.



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## A comparison of milk somatic cell count between industrial and traditional dairy farms in Tehran province

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### Abstract

In this study, somatic cell counts (SCC) of milk were determined in six industrial and traditional dairy farms in Tehran province during different seasons. The prevalence of udder disorders and mastitis was estimated on the base of SCC as an indicator as well. In this research, industrial and traditional dairy farms during 9 months were studied by total 32620 SCC records. Milk samples were collected individually. Least square mean ( $\pm$ standard error) ( $n \times 1000$  per ml) in industrial and traditional culture systems were 80.11 ( $\pm 12.60$ ) and 234.57 ( $\pm 12.97$ ), respectively. The SCC in traditional dairy farms was approximately 2.9 times higher than those of industrial ones ( $P < 0.05$ ). The highest SCC was found in summer that was statistically different from spring and autumn ( $P < 0.05$ ). In industrial dairy farms, sub-clinical and clinical mastitis were estimated to 36.6 and 11.8%, respectively. The corresponding values for traditional ones were 59.6 and 34.7%, respectively. The results showed that if the SCC decreases by a half, mastitis disease incidence would be reduced up to 30-50 percent.

**Keywords:** dairy cattle farm, mastitis, milk somatic cell count, seasons.



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## The Effect of different levels of copper and *cichorium intybus* on egg yolk cholesterol content and performance of laying hens

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### Abstract

This experiment was conducted to investigate the effects of various levels of *cichorium intybus* and copper on performance and egg yolk cholesterol. Total of 324 layer hens (Hy-Line W-36) were used in a randomized complete blocks with nine treatments, three replications of 12 birds in each from 38 to 50 weeks of age. Experimental diets include control, four levels of copper (150, 200, 250 and 300 mg/kg) and four levels of *cichorium intybus* (15, 20, 25 and 30 percent of diet). Different levels of *cichorium intybus* and copper significantly decreased serum and yolk cholesterol than control. The level of 300 mg/kg copper significantly reduced serum and yolk cholesterol but significantly decreased egg weight, egg production and increased feed conversion ratio compared to control. Levels of 25 and 30 percent of *cichorium intybus* significantly decreased egg production than control treatment. Yolk color improved by different levels of *cichorium intybus* than control and copper levels. In conclusion, the best result for lower yolk cholesterol were achieved by those laying hens fed a diet with 150 mg/kg copper of diet or 15 percent of *cichorium intybus*.

**Keywords:** *cichorium intybus*, copper, laying hen, performance, yolk cholesterol.



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## Determination of optimum levels of energy and protein in grower diet of Japanese quail (*Coturnix coturnix Japonica*)

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### Abstract

In order to determine the optimal levels of energy and protein in grower diet of Japanese quail, 360 day old Japanese quails were used in a 3×3 factorial arrangement of dietary treatments that comprised three levels of metabolisable energy (2750, 2850, and 2950 Kcal/kg) and three levels of crude protein (24, 26 and 28 percent) with four replicates per treatment in a completely randomized design. Feed intake and body weight were measured weekly and feed conversion ratio was calculated. At 35 d of age, four birds (from both sexes) from each replicate were randomly selected and killed following blood sampling to evaluate carcass traits. The blood samples were assayed for the sera concentrations of growth hormone. Results indicated that birds fed on diets containing 2850 kcal/kg metabolisable energy and 26 percent protein had higher daily weight gain and better feed conversion ratio and carcass yield ( $P<0.05$ ). The sera concentration of growth hormone was higher in birds fed on diet containing 2750 kcal/kg metabolisable energy ( $P<0.05$ ). This study indicated that Japanese quails can grow faster and more efficiently on diet containing 2850 kcal/kg metabolisable energy and 26 percent protein. Therefore, the diet containing 2850 kcal/kg metabolisable energy and 26 percent protein could be recommended as dietary metabolisable energy and protein requirements for growing Japanese quails.

**Keywords:** energy, growth, Japanese quail, protein.

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