



Journal of  
**Animal Production**

(College of Abouraihan – University of Tehran)

Vol. 16 ■ No. 2 ■ Autumn 2014-Winter 2015

**Effect of  $\alpha$ -linolenic acid in maturation medium on developmental competence and quality of blastocysts derived from parthenogenetic activation/fertilization *in vitro***

Javad Mohammad-Moradi<sup>1</sup>, Ali Akbar Khadem<sup>2</sup>, Seyed Ahmad Hosseini<sup>1</sup>, Arash Veshkini<sup>3</sup>, Ali Asadi Alamouti<sup>4</sup>, Abdollah Mohammadi-Sangcheshmeh<sup>4\*</sup>

1. B.Sc. Student, Department of Animal and Poultry Science, College of Abouraihan, University of Tehran, Iran
2. Associate Professor, Department of Animal and Poultry Science, College of Abouraihan, University of Tehran, Iran
3. M.Sc. Student, Department of Animal and Poultry Science, College of Abouraihan, University of Tehran, Iran
4. Assistant Professor, Department of Animal and Poultry Science, College of Abouraihan, University of Tehran, Iran
5. Assistant Professor, Department of Animal and Poultry Science, College of Abouraihan, University of Tehran

Received: July 2, 2014

Accepted: November 29, 2014

**Abstract**

*In vitro* maturation (IVM) was carried out in the presence of different concentrations (10, 50, 100 or 200  $\mu$ M) of  $\alpha$ -linolenic acid (ALA). Embryonic cleavage, blastocyst formation following parthenogenetic activation (PA) and *in vitro* fertilization (IVF), and numbers of total and apoptotic cells in blastocyst were then determine for the 50  $\mu$ M concentration and compared with the control group. Out data revealed that ALA increased maturation (MII) rate as compared with control group ( $P < 0.05$ ) and oocytes in 200  $\mu$ M ALA group showed a lower MII rate as compared with the control group. When oocytes treated with 50  $\mu$ M ALA were subsequently used for PA or IVF, a higher ( $P < 0.05$ ) rate of blastocyst formation was observed and these embryos had a higher total cell number and a lower apoptotic cell number ( $P < 0.05$ ) as compared with the control group. In conclusion, our results show that supplementation of maturation medium with 50  $\mu$ M ALA had a positive effect on meiotic maturation by increasing the MII rate and this in turn, stimulated blastocyst formation and also improved quality of the yielded blastocysts.

**Keywords:** Apoptosis, blastocyst, goat oocyte,  $\alpha$ -linolenic acid.



Journal of  
**Animal Production**

(College of Abouraihan – University of Tehran)

Vol. 16 ■ No. 2 ■ Autumn 2014-Winter 2015

## The effect of *Citrus Limon* essential oil on nutrient digestibility and ruminal fermentation of male Holstein calves

*Bahriye Shahi*<sup>1</sup>, *Rasoul Pirmohammadi*<sup>2\*</sup>, *Abdolrahman Amini*<sup>3</sup>

1. Former M.Sc. Student, Department of Animal Science, Faculty of Agriculture, University of Urmia, Urmia, Iran
2. Associate Professor, Department of Animal Science, Faculty of Agriculture, University of Urmia, Urmia, Iran
3. Ph.D. Student, Department of Animal Science, Faculty of Agriculture, University of Urmia, Urmia, Iran

Received: June 9, 2014

Accepted: November 9, 2014

### Abstract

The aim of this study was to evaluate the effects of different levels of *Citrus Limon* essential oil on nutrient digestibility, blood and ruminal metabolites in male Holstein calves. This study were conducted using four male Holstein calves, each fitted with a permanent rumen cannula (average body weight 650±20 kg) that received experimental diets including control with 600, 800 and 1000 mg/d lemon essential oil and control with monensin 300 mg/d in a change-over complete randomized block design with five periods of 17 days. Apparent digestibility of OM in ration including of 1000 mg per day of *Citrus Limon* was higher than the others treatments (P<0.05). Experimental treatments had not affected on DM, CP, EE, NDF and ADF digestibility. The effect of treatments were not significant on glucose, HDL, albumin, total protein, cratinin, and triglyceride and urea concentration, but cholesterol values and BHB concentration in serum of control treatment were more than the other treatments (P<0.05). The concentration of propionate in rumen of animals received 1000 mg *Citrus Limon* essential oil, was more than control of treatment, but their concentration of butyrate was low than control treatment (P<0.05). In conclusion, results showed that utilization of 1000 mg per day dose of *Citrus Limon* essential oil in diet could improve the OM digestibility, rumen fermentation characteristics and blood BHB concentration of male Holstein calves.

**Keywords:** blood parameter, *Citrus limon*, essential oil, fistula, monensine, volatile fatty acids.



Journal of  
**Animal Production**

(College of Abouraihan – University of Tehran)

Vol. 16 ■ No. 2 ■ Autumn 2014-Winter 2015

## Effect of different sources of copper on performance, gas production parameters and nutrients digestibility in Zandi lamb

Nasrin Hoseinpour<sup>1</sup>, Mohammad Ali Norouzi<sup>2\*</sup>, Ahmad Afzalzadeh<sup>3</sup>

1. M.Sc. Student, Department of Animal and Poultry Science, College of Abouraihan, University of Tehran, Iran
2. Assistant Professor, Department of Animal and Poultry Science, College of Abouraihan, University of Tehran, Iran
3. Associate Professor, Department of Animal and Poultry Science, College of Abouraihan, University of Tehran, Iran

Received: May 25, 2014

Accepted: October 18, 2014

### Abstract

This study was conducted to investigate effect of different sources of copper on gas production parameters and nutrients digestibility in Zandi male lambs. In the first experiment, 18 male lambs (initial body weight  $17.53 \pm 1.62$ ) divided into three groups and fed one of the three experimental diets for 70 days. Dietary treatments were control (basal diet without copper supplement), basal diet plus 10 ppm copper from sulfate and basal diet plus 10 ppm from proteinate copper. In comparison with control, copper supplementation improved average daily gain and feed conversion ratio, but there was no significant difference among the dietary treatments for dry matter intake. Dry matter, organic matter, crude protein and acid detergent fiber digestibility was higher for lambs fed with organic copper compared to lambs fed with control and inorganic copper ( $P < 0.01$ ). In the second experiment, an *in vitro* gas production technique was used to evaluate the effects of copper sources on the amount and rate of gas production, dry matter degradability, utilization of metabolizable energy (ME), and ruminal fermentation patterns using rumen fluid from three lambs as inoculum. Rate of gas production (c) did not differ among the treatments. Asymptotic of gas production (b) was higher for diets containing supplemental copper compared to control. It seems that supplementation of fattening lamb diet with of organic copper could be improved rumen fermentation and performance of lambs.

**Keywords:** digestibility, gas production, organic copper, performance, Zandi lamb.



Journal of  
**Animal Production**

(College of Abouraihan – University of Tehran)

Vol. 16 ■ No. 2 ■ Autumn 2014-Winter 2015

## Effects of *Salvia mirzayanii* leaf powder on performance and cecal microbial population of broilers

Farzad Bagherzadeh Kasmani<sup>1\*</sup>, Samira Omidikia<sup>2</sup>, Hamid Reza Mirzaie<sup>3</sup>, Mehran Mehri<sup>4</sup>

1. Assistant Professor, Department of Animal Science, Faculty of Agriculture, University of Zabol, Zabol, Iran
2. Former M.Sc. Student, Department of Animal Science, Faculty of Agriculture, University of Zabol, Zabol, Iran
3. Associate Professor, Department of Animal Science, Faculty of Agriculture, University of Zabol, Zabol, Iran
4. Assistant Professor, Department of Animal Science, Faculty of Agriculture, University of Zabol, Zabol, Iran

Received: August 12, 2014

Accepted: November 2, 2014

### Abstract

This experiment was conducted to evaluate the effects of dietary *Salvia mirzayanii* supplementation on performance, carcass characteristics, internal organs and cecal microbial population in broilers. A total of 200, one-day-old broiler chicks (Ross 308) were fed five experimental diets containing different levels of *S. mirzayanii* (zero, 0.25, 0.50, 0.75 and one percent of diet) until 42 days of age. From 1-21 days of age, birds fed one percent *S. mirzayanii* had lower body weight gain and feed intake and higher feed conversion ratio ( $P < 0.05$ ). Regarding 22-42 days of age and whole of experiment (1-42), feed conversion ratio in birds fed diet containing 0.5 percent *S. mirzayanii* significantly ( $P < 0.05$ ) decreased compared with control group. Relative carcass and breast muscle weights of birds fed one percent *S. mirzayanii* were lower than other groups ( $P < 0.05$ ). Using *S. mirzayanii* at the levels of 0.25 and 0.5 percent significantly increased cecal lactic acid bacterial population ( $P < 0.05$ ). Feeding with the levels higher than 0.5 percent *S. mirzayanii* decreased cecal coliforms compared with control group ( $P < 0.05$ ). Based on results of this experiment, using 0.5 percent *S. mirzayanii* leaf powder in diet of broilers would improve cecal microbial population as well as growth performance.

**Keywords:** broiler, microbial population, performance, *Salvia mirzayanii*.



Journal of  
**Animal Production**

(College of Abouraihan – University of Tehran)

Vol. 16 ■ No. 2 ■ Autumn 2014-Winter 2015

## Effect of feeding different levels of dietary vermi-humus on growth performance and meat quality in broiler chickens

*Hamid Reza Khajavi<sup>1</sup>, Mohammad Amir Karimi Torshizi<sup>2\*</sup>, Hamed Ahmadi<sup>2</sup>*

1. M.Sc. Student, Department of Poultry Science, Faculty of Agriculture, Tarbiat Modares University, Tehran, Iran
2. Assistant Professor, Department of Poultry Science, Faculty of Agriculture, Tarbiat Modares University, Tehran, Iran

Received: August 2, 2014

Accepted: November 14, 2014

### Abstract

In order to evaluate the effect of feeding different levels of vermi-humus supplement (as a source of humic acid) on the performance of broiler chickens an experiment was conducted using 240 broiler chickens (Ross 308) in a completely randomized design by four treatments (vermi-humus levels of 0, 0.5, 1 and 1.5 percent) and five replicates of 12 chickens per each for 42 day. The experimental treatments had no significant effect on the growth performance, carcass percentage, internal organs weights, serum concentrations of calcium and phosphorus and tibia bone ash. Increasing the levels of vermi-humus up to one percent of diet resulted in linear decline in pH of breast meat ( $P < 0.05$ ), although the level of 1.5 percent increased the pH value. The thigh meat pH increased at 1 and 1.5 percent levels of vermi-humus supplementation in diet compared to control and 0.5 percent groups. The concentration of malon dialdehyde of fresh and preserved thigh meat decreased linearly with increasing the levels of vermi-humus supplementation in diet, while the malon dialdehyde of breast meat changed in quadratic manner ( $P < 0.01$ ). Water holding capacity of meat increased linearly with enhancement of level of vermi-humus supplement in the diet ( $P < 0.01$ ). Addition of vermi-humus at the level of one percent in diet leads to improvements in the color, smell, juiciness and overall acceptance of breast meat compared to the control ( $P < 0.05$ ), but these parameters had not affected in thigh meat. The results showed that feeding vermi-humus up to one percent of diet could improve the breast meat quality, taste and flavor without adverse effect on performance.

**Keywords:** humic acid, meat quality, sensory characteristics, vermi-humus, water holding capacity.



Journal of  
**Animal Production**

(College of Abouraihan – University of Tehran)

Vol. 16 ■ No. 2 ■ Autumn 2014-Winter 2015

## The effect of *Malva Sylvestris* on *in vitro* degradability and fermentation parameters of *Atriplex Leuococlada*

I. Khodadadi<sup>1</sup>, T. Mohammadabadi<sup>2\*</sup>, M. Chaji<sup>2</sup>, M. Sari<sup>2</sup>

1. M.Sc. Student, Department of Animal Science, College of Animal Science and Food Technology, Khouzestan Ramin Agriculture and Natural Resources University, Ahwaz, Mollasani - Iran
2. Assistant Professor, Department of Animal Science, College of Animal Science and Food Technology, Khouzestan Ramin Agriculture and Natural Resources University, Ahwaz, Mollasani - Iran

Received: December 31, 2013

Accepted: July 5, 2014

### Abstract

This experiment aimed to investigate the effect of (zero, 20, 40 and 60 mg/kg *Atriplex* forage) *malva sylvestris* on digestibility and microbial fermentation of *Atriplex* in one-humped camel. Fermentation parameters by gas production technique and *in vitro* digestibility by two-stage digestion were measured by two years old female fistulated camels. Addition 40 and 60 mg/kg *malva sylvestris* increased gas produced from *Atriplex* forage ( $P < 0.05$ ). Gas production rate constant didn't affect by *malva sylvestris* ( $P > 0.05$ ). Addition *malva sylvestris* (60 mg/kg) to *Atriplex*, significantly decreased partitioning factor, microbial biomass, the efficiency of microbial biomass and organic matter actually degradable ( $P < 0.05$ ). Addition of *Malva sylvestris* 40 and 60 mg/kg were significantly reduced medium pH ( $P < 0.05$ ). The compared with control the highest ammonia-nitrogen concentrations was for treatment containing 20 mg/kg *malva sylvestris* (11.37 mg/100 ml) ( $P < 0.05$ ). Also this treatment had the greatest NDF digestibility comparison to control ( $P < 0.05$ ). Adding *malva sylvestris* in 20, 40 and 60 mg/kg to *Atriplex* increased the protozoa population at 12 and 24 in comparison to control 48 h incubation ( $P < 0.05$ ). Species of *Diplodinium camli*, *Diplodinium maggi*, *Epidinium eudatum* and *Eudiplodinium maggi* in treatments containing *malva sylvestris* were the highest. In conclusion, high fermentation *malva sylvestris* increase digestibility and gas production of *Atriplex* in one-humped camel diets.

**Keywords:** *Atriplex*, Digestibility, Gas production, *Malva sylvestris*, Protozoa.



Journal of  
**Animal Production**

(College of Abouraihan – University of Tehran)

Vol. 16 ■ No. 2 ■ Autumn 2014-Winter 2015

## Investigation of growth, carcass characteristics and economic efficiency of Zel breed and their crossbred

*Hossein Gholami<sup>1\*</sup>, Mohammad Reza Kianzad<sup>2</sup>*

1. Assistant Professor of Department of Animal Nutrition and Physiology, Animal Science Research Institute (ASRI)
2. Assistant Professor of Department of Animal Breeding and Genetic, Animal Science Research Institute (ASRI)

Received: February 19, 2013

Accepted: July 5, 2014

### Abstract

This study was carried out by using two hundred ewes (2-4 years old) as pure breeding (Zel × Zel) and crossbreeding (Chal × Zel). In each treatment, 30 male and 30 female lambs were fattened in a feedlot experiment for three periods; 75, 100 and 125 days. At the end of each period, 10 lambs of each treatment were slaughter and carcasses analysis was down. The lean meat percentage and bone percentage in each feedlot periods was not affected by genetic composition and lamb gender ( $P < 0.05$ ), but carcass fat percent in feedlot periods were significantly ( $P < 0.05$ ) lower in Zel male and crossbred female lambs. Weight of crossbred lambs at the weaning and finishing were 22 and 26 percent heavier than the purebred lambs, respectively. In this study, under industrial breeding conditions, ewes produced 5382 kg live weight lambs in pure breeding system (with 165 percent increase) and 6774 kg live weight lambs, under crossbreeding system (with a 234 percent increase). Consequently, breeding of purebred or crossbred Zel lambs which fattened in an intensive feedlot condition would be economically beneficial to farmers.

**Keywords:** Chal breed, Crossbreeding, Meat production potential, Pure breeding, Zel breed



Journal of  
**Animal Production**

(College of Abouraihan – University of Tehran)

Vol. 16 ■ No. 2 ■ Autumn 2014-Winter 2015

## Effect of Artichoke (*Cynara scolymus* L.) leaf powder and vitamin E on performance and some blood parameters of meat type Japanese quail

Morteza Alemi<sup>1</sup>, Firooz Samadi<sup>2\*</sup>, Saba Samadi<sup>3</sup>

1. Graduate M.Sc., Department of Animal Physiology, Faculty of Animal Science, Gorgan University of Agricultural Sciences and Natural Resources, Gorgan, Golestan, Iran
2. Associate Professor, Department of Animal Physiology, Faculty of Animal Science, Gorgan University of Agricultural Sciences and Natural Resources, Gorgan, Golestan, Iran
3. Graduate M.Sc., Department of Horticulture, Faculty of Plant Production, Gorgan University of Agricultural Sciences and Natural Resources, Gorgan, Golestan, Iran

Received: February 20, 2014

Accepted: July 5, 2014

### Abstract

In order to investigate the effects of Artichoke leaf powder and vitamin E on performance, internal organs relative weight and some blood parameters, 240 day-old quails were assigned to four treatments including, basal diet (control), basal diet supplemented with levels of 1.5 and 3 percent of Artichoke leaf powder and basal diet supplemented with 300 mg/Kg diet vitamin E with four replicates and 15 birds in each in a completely randomized design. Birds receiving diet supplemented with vitamin E showed greater body weight gain than other treatments ( $P < 0.05$ ). No significant difference was observed in body weight gain between birds receiving diets supplemented with Artichoke leaf powder and those birds received control diet, throughout the experiment. Birds treated with diet containing three percent Artichoke leaf powder had higher feed conversion rate ( $P < 0.05$ ). The concentrations of albumin and HDL were greater in blood serum of birds fed diet containing 1.5 percent Artichoke leaf powder compared to other treatments ( $P < 0.05$ ). According to the results of this study, using Artichoke leaf powder till three percent has no negative effect on feed intake and weight gain throughout the study (1-42 d). Inclusion of 300 mg/kg vitamin E in the diet of Japanese quail improves growth performance during the first three weeks of study.

**Keywords:** Artichoke, blood parameters, Japanese quail, performance, vitamin E



Journal of  
**Animal Production**

(College of Abouraihan – University of Tehran)

Vol. 16 ■ No. 2 ■ Autumn 2014-Winter 2015

## Evaluation the effect of black cumin (*Nigella Sativa* L.) supplementation in diet on performance and some blood parameters in broiler chickens

Parvin Saeedi<sup>1</sup>, Saleh Tabatabaei<sup>2\*</sup>, Somayeh Sallary<sup>2</sup>, Khalil Mirzadeh<sup>2</sup>, Mehdi Zarei<sup>3</sup>

1. M.Sc. Graduate, Department of Animal Science, Faculty of Animal Sciences and Food Industries, Ramin Agriculture and Natural Resource University, Ahwaz, Iran
2. Assistant Professors, Department of Animal Science, Faculty of Faculty of Animal Sciences and Food Industries, Ramin Agriculture and Natural Resource University, Ahwaz, Iran
3. Associate Professor, Department of Food Hygiene, Faculty of Veterinary Medicine, Shahid Chamran University of Ahwaz, Ahwaz, Iran

Received: October 14, 2014

Accepted: December 1, 2014

### Abstract

In order to evaluation the effect of *Nigella Sativa* supplementation on performance, immune response and some of blood parameters, a total of 192 one day old Ross 308 broilers were used in a completely randomize design with four treatments, four replicates and 12 observations in each replicate. Treatments included the increasing levels of zero (control), 0.4, 0.8 and 1.2 percent *Nigella sativa*. In grower and whole period of experiment, the weight of birds received 0.4 and 0.8 percent of *Nigella sativa* was higher than control group birds ( $P<0.05$ ). The supplementation of *Nigella sativa* in diet has not effect on feed intake and feed conversion ratio in starter, grower and total rearing periods. The weights of bursa and thymus in birds received 0.4 and 0.8 percent of *Nigella sativa* were higher than control group birds ( $P<0.05$ ). The weight of liver in birds belong to 0.4 percent of *Nigella sativa* was higher than control group ( $P<0.05$ ). Addition of *Nigella sativa* in diet reduced the glucose, triglyceride, cholesterol, LDL and increased the HDL in blood serum. The use of *Nigella sativa* in dietary of birds caused the higher total white blood cells and lower heterophil: lymphocyte ratio. The birds which received 0.4 and 0.8 percent of *Nigella sativa* had the higher total antioxidant capacity than control group in blood plasma. In conclusion, the use of *Nigella sativa* up to 0.8 percent in diet, in addition to improvement the performance, increased the immune system activity and total antioxidant capacity in Ross 308 broiler chickens.

**Keywords:** broiler chickens, cholesterol, heterophil, *Nigella sativa*, performance.



Journal of  
**Animal Production**

(College of Abouraihan – University of Tehran)

Vol. 16 ■ No. 2 ■ Autumn 2014-Winter 2015

## Investigation of methods of extraction, concentration and conservation of rumen content fibrolytic enzymes

*Hossein Manafi Rasi<sup>1\*</sup>, Mohammad Chamani<sup>2</sup>, Salman Afshar<sup>3</sup>*

1. Assistant Professor, Department of Animal Science, Institute of Scientific-Applied Higher Education of Jihad-e-Agriculture, Tehran, Iran
2. Association Professor, Department of Animal Science, Agriculture Faculty, Science and Research Branch, Islamic Azad University, Tehran, Iran
3. Research Expert, Department of Animal Science, Institute of Scientific-Applied Higher Education of Jihad-e-Agriculture, Tehran, Iran

Received: May 21, 2014

Accepted: October 31, 2014

### Abstract

This study was carried out to determine the potential of rumen microorganisms in samples taken from slaughterhouse to produce fibrolytic enzymes and to compare different methods for extraction, concentration and conservation of them. According to the results, the average specific activity of cellulase and xylanase were 7.5 and 16.5 U/mg protein respectively. The application of homogenizing and sonication methods to extract rumen content enzymes showed that the former had better performance in the liberation of enzymes. To determine optimum time length for the maximum release of enzymes from solid phases, various time lengths including one, 1.5 and two min were examined. Based on this experiment, one minute appeared the best. To attain a high level of concentration of enzymes obtained from rumen liquor, various procedures were applied. The results indicate that freeze drying and precipitation of enzyme using ammonium sulphate were the best methods, while trichloroacetic acid precipitation turned out to be the most inappropriate method due to improper effect on enzymatic activity. In order to examine the effect of temperature and time length on enzymes activities, some methods including liquid nitrogen, freezing in  $-70^{\circ}$  and freezing in  $-20^{\circ}$  were applied. The comparison of different methods of enzymes conservation indicated that applying liquid nitrogen for long term as well as keeping in the freezer ( $-70^{\circ}$ ) for medium term purposes were the best.

**Keywords:** cellulase, concentration, conservation, extraction, rumen, xylanase.