1-
THE USE OF EARLY-AGE FEED RESTRICTION AND/OR POTASSIUM
CHLORIDE FOR ALLEVIATING THE ADVERSE EFFECTS OF HEAT
STRESS ON BROILER CHICKS:
1. EFFECTS ON BROILER PERFORMANCE, CARCASS TRAITS AND
ECONOMIC EFFICIENCY.

The present study was carried out to investigate the possibility of alleviating the adverse
effects of heat stress to which broiler chicks are exposed during the summer season by
means of early-age feed restriction (EFR) and/or dietary supplementation with potassium
chloride (KCl). Three hundred and sixty, one-day-old, broiler-type Hubbard chicks were
randomly divided into two halves, each of which was assigned to four treatments
(T,ip_num,i_date), and given starter diets from 1 to 21 days of age, then, the birds were
switched to grower diets from 22 to 42 days of age. Two feeding regimens were imposed
on these birds. Chicks of the first half (T1, T2, T3 and T4) were full-fed (FF) during the
entire experimental period from 0 to 6 weeks of age, while birds of the other half (T5, T6,
T7 and T8) were subjected to feed restriction; only during the first week of life. Each of
the starter and grower diets were isocaloric and isonitrogenous, and originally contained
about 0.8% K. Diets of T1 and T5 were unsupplemented with KCl and served as controls,
while diets for chicks of T2 and T6, T3 and T7 or T4 and T8, were supplemented with
KCl at levels of 0.75, 1.5, and 2.25%, respectively. Thus, in these diets, supplemental KCl
plus basal K provided dietary K levels of 0.8, 1.2, 1.6 or 2.0%, respectively.
The criteria of response were live body weight, weight gain, feed intake, feed conversion
ratio, mortality rate, carcass traits, and economic efficiency. The obtained results can be
summarized as follows: Early feed restriction (during the first week) had no significant
effects on final body weight (at 6 weeks of age), weight gain, mortality rate of chicks or
their carcass traits, but significantly decreased feed intake and improved the efficiency of
feed utilization. Dietary KCl levels of 1.5 or 2.25% resulted in significant increases in
live body weight, improved the efficiency of feed utilization of chicks and attained the
lowest mortality rate, while carcass traits were not affected. The use of early-age feed
restriction, and/or supplemental KCl especially at a level of 1.5 or 2.25% reduced
mortality rate, and improved weight gain and feed conversion of chicks. But because the
combination of early-age feed restriction and dietary inclusion of KCl at a rate of 2.25%
significantly improved the viability of chicks as evidenced by no observed mortality, it
had the advantages over the other treatments; for the sake of safety and economic use
under hot environmental conditions of summer season, as is the case of the present study.
Keywords: broiler performance, early-age feed restriction, dietary potassium chloride.

2-
THE USE OF EARLY-AGE FEED RESTRICTION AND/OR POTASSIUM
CHLORIDE FOR ALLEVIATING THE ADVERSE EFFECTS OF HEAT
STRESS ON BROILER CHICKS:
2- EFFECTS ON SOME PHYSIOLOGICAL PARAMETERS, BLOOD
CONSTITUENTS And Digestibility Of Nutrients.

The present study was carried out to investigate the possibility of alleviating the adverse
effects of heat stress to which broiler chicks are exposed during the summer season by
means of early-age feed restriction (EFR) and/or dietary supplementation with potassium
chloride (KCl). Three hundred and sixty, one-day-old, broiler-type Hubbard chicks were randomly divided into two halves, each of which was assigned to four treatments (T, ip_num, i_date), and given starter diets from 1 to 21 days of age, then, the birds were switched to grower diets from 22 to 42 days of age. Two feeding regimens were imposed on these birds. Chicks of the first half (T1, T2, T3 and T4) were full-fed (FF), during the entire experimental period from 0 to 6 weeks of age, while birds of the other half (T5, T6, T7 and T8) were subjected to feed restriction; only during the first week of life. Each of the starter and grower diets were isocaloric and isonitrogenous, and originally contained about 0.8% K. Diets of T1 and T5 were unsupplemented with KCl and served as controls, while diets for chicks of T2 and T6, T3 and T7 or T4 and T8, were supplemented with KCl at levels of 0.75, 1.5 and 2.25%, respectively. Thus, in these diets supplemental KCl plus basal K provided dietary K levels of 0.8, 1.2, 1.6 or 2.0%, respectively.

The criteria of response were some physiological changes, levels of some blood constituents and nutrients digestibility. The obtained results can be summarized as follows: Early-age feed restriction (during the first week) of broiler chicks decreased significantly (P<0.01) body temperature, panting rate, blood pH and sedimentation rate, and plasma corticosterone (P<0.05), but increased (P<0.01) the activity of alkaline phosphatase and plasma concentrations of K and T3. However, blood hemoglobin, concentrations of plasma total protein, total lipids, glucose, cholesterol, Na, Cl, and T4 were not affected. Supplemental KCl decreased significantly (P<0.01) body temperature, panting rate, and blood pH and sedimentation rate, but increased (P<0.01) the activity of alkaline phosphatase, and the concentrations of plasma total protein, Na, K, T3 and T4. However, blood hemoglobin, and plasma concentrations of total lipids, glucose, cholesterol, Cl and corticosterone were not affected. Early-age feed restriction did not affect digestibility of crude fiber (CF), organic matter (OM), ether extract (EE), nitrogen free extract (NFE), nitrogen retention, ash retention, or K retention, but decreased dry matter (DM) and crude protein (CP) digestibility. Supplemental KCl did not affect nitrogen retention and the digestibility of CF or NFE, but the high level (2.25%) improved the digestibility of DM, OM, EE, and CP and ash and K retention. The use of early-age feed restriction with 2.25% dietary KCl level for broiler chicks in hot climate during the summer season was recommended.

Keywords: Broiler chicks, physiological parameters, early-age feed restriction, dietary KCl.

### 3- Immuno-physiological effects of L-carnitine on growing rabbits under environmental in Egypt

The current study was carried out to investigate the effect of dietary supplementation of different L-carnitine (LC) levels on growth performance, serum concentrations of some biochemicals, hormones and minerals, and enzymatic activity as well as immune response of growing New Zealand White rabbits kept under heat stress condition in Egypt. Total of 60 weaned rabbits (4 wk of age) were divided into four groups (15 in each with) with five replicates for each group. Rabbits in all experimental groups were fed the same basal diet (19% CP and 10% CF); but differed in L-carnitine content. Rabbits in the 1st group (G1) were fed the basal diet without LC (control). Those in the 2nd (G2), 3rd (G3) and 4th (G4) were fed the basal diet supplemented with LC at levels of 25, 50 and 100 mg/kg diet, respectively. Results revealed that all levels of LC
improved (P).
In conclusion, dietary L-carnitine supplementation (100 mg/kg diet after weaning) improved growth performance and enhanced subsequent immune responses in rabbits throughout their early growing phase from 4 up to 8 weeks of age.

4-
Effect of repeated GnRH injection and intra-vaginal mechanical stimulation on reproductive performance of doe rabbits
Various hormonal treatments were used for induction of ovulation to increase fertility of rabbits. Aim of this study was to investigate the effect of repeated GnRH injections or intra-vaginal mechanical stimulation (IVMS) at mating for six consecutive litters, on fertility of naturally mated New Zealand White rabbit does. Does failed to kid after one service were mated in the next parity. Kindling rate (KR), number of total (NTB) and live (NLB) borns, viability rate (VR) and kit weight (AKW) at birth as well as gestation period length (GPL) were recorded after kidding for six consecutive parities. Also, concentrations of FSH and LH were determined after mating of the 2nd litter. Results showed that GnRH treatment showed highest (P)

5-
Functional, Anatomical and Histological Development of Caecum in Rabbits
Rabbit caecum is the largest digestive compartment of gastrointestinal tract (GIT) representing a distinct organ for fermentation. This study aimed to investigate development of rabbit caecum with age progress from 3- up to 16-wk. New Zealand White rabbits were slaughtered at 3-, 4-, 6-, 8-, 12- and 16-wk of age (3 rabbits at each age) to determine fermentation parameters, and anatomical and histological characteristics of caecum in relation with growth performance. With age progress, LBW, feed intake and weight gain increased (P)

6-
Physiological Response and Stress Indicators of California Rabbits Under Intensive Conditions in Egypt
For rabbits, minimum space allowances and stocking densities should always refer to the final weight that rabbits would reach. To investigate the effects of cage density on growth performance and some blood parameters of rabbits, ninety California rabbits (27-day old) were housed in wire cages (50 x 50 x 30 cm for each) in groups of 1, 2, 3 and 4 rabbits/cage; corresponding to stocking densities of 4, 8, 12 and 16 rabbits/m2 for G1, G2, G3 and G4, respectively. From weaning up to 12 wk of age, G1 showed the highest (P)

7-
Effect of Dietary L-carnitine Supplementation on the Concentration of Circulating Serum Metabolites in Growing New Zealand Rabbits
The present study was conducted to evaluate the effect of three dietary L-carnitine levels on serum metabolites and hormones in growing New Zealand rabbits. Twenty 4-week-old growing New Zealand rabbits were assigned to four groups, each with five replicates. Four experimental diets were formulated by adding four levels (0, 25, 50, and 100 mg/dl) of supplemental L-
carnitine to a basal diet in pellet form from 4 to 8 weeks of age. At the end of the 8th week, rabbits were slaughtered to measure serum parameters. L-carnitine administration induced a marked dose-dependent reduction of serum cholesterol, triglycerides, LDL-c, VLDL and elevation of HDL-c. Circulating serum aminotransferases (AST and ALT), alkaline phosphatase enzymes and cortisol were decreased while glucose and serum thyroid hormones (T3 and T4) were significantly increased. Serum creatinine was significantly increased, and serum electrolytes (Na+, K+ and Cl-) were altered. These alterations directly proportional to the dose of L-carnitine. In conclusion, L-carnitine supplementation induces improved serum lipid and lipoprotein metabolism but alters other circulating serum metabolites and hormones.

8-

**Freezing and Fertilizing Capacity of Frozen Rabbit Semen Extended with Gelatin Addition.**

The use of frozen semen in rabbits is greatly limited due to its low fertility rates. The current study aimed to evaluate the effect of gelatin addition to semen extender on motility, livability, abnormality and acrosome integrity of rabbit spermatozoa during freezing process and on fertility after artificial insemination (AI). Pooled semen collected from bucks (n= 15) belonging to a line selected by Animal Production Research Institute, Egypt (APRI). Semen was processed in tris-buffer extender with gelatin addition at levels of 0, 1, 2 and 3% (g/100 ml extender) at a rate of 1:5, and frozen in liquid nitrogen. Results showed that when compared with control semen, 2% gelatin addition had positive (P

9-

**DETRIMENTAL EFFECT OF SELENIUM AND VITAMIN E TREATMENTS ON IN VITRO VIABILITY OF VITRIFIED AND CULTURED RABBIT EMBRYOS**

The ability to successfully cryopreserve embryos with limited loss in viability is essential for the success of assisted reproductive technologies. The aim of this study was to investigate the impact of vitamin E (VE) +selenium (Se) and vitamin C (VC) as ascorbic acid on in vitro quality, freezability and culture of rabbit embryos. Total of 9 New Zealand White (NZW) rabbit does (5.7-5.9 mo of age and 3.25 - 3.50 kg live body weight, LBW) as embryo donors and 3 NZW fertile bucks (7- 8 mo of age and 3.6â€“4.1 kg LBW for natural mating were used in this study. All does and bucks were kept under the same condition of feeding and management in a private farm, being individually housed in metal cages (40 x 50 x 60 cm). Rabbit does were divided into three similar groups, (3 in each). Does in the 1st group (G1) were considered as a control group without treatment. While, does in the 2nd (G2) and 3rd (G3) groups were treated with 1%
of VE+Se and 1% VC given in drinking water, respectively, for 15-18 days before mating as a treatment period. At the end of treatment period, does in all groups were naturally mated by untreated rabbit bucks. After 72 h of mating, does in each group were slaughtered to embryos collection by flushing. The recovered embryos from each group were washed, evaluated and preserved by vitrification method. Post-thawing embryos were in vitro cultured for assessing their ability to develop up to hatched blastocyst stage. Results showed that embryo recovery rate after collection was not affected by treatment, being 89.3, 87.9 and 83.9, for G1, G2 and G3, respectively (P≥0.05). Embryos of G3 (treated with VC) showed the highest (P

The present study recommend to supplement drinking water of rabbit does with 1% ascorbic acid within 15 pre-conception to obtain high quality embryos having high freezing ability and developmental competence post-vitrification.

10-

REPRODUCTIVE PERFORMANCE OF RABBIT DOES FED DIETS SUPPLEMENTED WITH CHROMIUM YEAST OR VITAMIN E AND SELENIUM YEAST UNDER HEAT STRESS

Total of 30 nulliparous New Zealand white (NZW) rabbit does and 9 fertile NZW bucks were used in this study to investigate the effect of dietary supplementation of 1.5 mg/kg diet from chromium yeast (CY) or 0.5 mg/kg diet from a combination of vitamin E plus selenium (VE+Se) as compared to control diet (C) during the hot summer months in Egypt, on reproductive performance of rabbit does following the 1st and 2nd parities. All animals were fed ad libitum on a commercial diet (10.5 MJ ME/kg, 18.5% CP and 12.5% CF). The experimental feeding period lasted from 2 wk prior to mating and the 1st parity up to the end of weaning kits of the 2nd parity. Kindling rate (KR) and gestation period length (GPL) of does, litter size (LS) as the total number of kits (live and dead) and LBW of live kits were recorded at birth. Also, reproductive index (RI) was calculated. Blood samples were collected one day pre-treatment, at 1st mating and the end of experiment. Concentration of plasma Cr and Se was determined for all sampling times; however estradiol 17-² (E2) concentration was determined at 1st mating. Results revealed that KR was higher (P