Research Paper

Genome Analysis of Antimicrobial Resistance Genes and Virulence Factors in Multidrug-Resistant Campylobacter fetus Subspecies Isolated from Sheath Wash.

Tshipamba ME, Lubanza N and Mwanza M.

ABSTRACT

Campylobacter fetus subspecies are mostly characterized by reproductions problems in cattle and sheep. This study aimed to study the genetic profile and assess the genes mechanism of resistance and their virulence factors using genome sequence analysis. A total of 59 confirmed Campylobacter fetus subspecies based on molecular assays and DNA sequencing were subjected to antimicrobial susceptibility test against 14 antibiotic agents representing the five classes of antibiotics using the disc diffusion method. In addition, sequencing the genome of all strains induced complete resistance against all tested antibiotics. The results of the antimicrobial test indicated that 54.4% had a resistance profile, 26.3% were intermediate, while 19.3% were observed to be susceptible. The Whole Genome Sequencing (WGS) result revealed the presence of different genes, such as Broad-specificity multidrug efflux pump and 16S rRNA (guanine 527 -N 7 ) -methyltransferase (gidB), efflux pump conferring antibiotic resistance (MacA and MacB), protein-altering cell wall charge conferring antibiotic resistance (PgsA), which have never been reported in Campylobacter fetus subspecies. The WGS also revealed the presence of genes that involved in colonization, adhesion, motility, and invasion, such as type IV secretion system protein (VirD4), S-Layer, cytolethal distending toxin (A, B, and C), Campylobacter invasion antigen (CiaB), and fic domain protein (fic) were among important CDS. The presence of these uncommon genes explains the resistance of Campylobacter fetus subspecies against different tested antibiotics. The results of this study can be used to implement molecular surveillance of Campylobacter fetus subspecies and conduct further studies on the resistance mechanism in these subspecies.

Keywords: Broad-specificity multidrug efflux pump, Campylobacter fetus subspecies, Genome analysis, Methyltransferase gidB, Multidrug resistance.
Research Paper

Impact of In-Ovo Injection of Folic Acid and Glucose on Hatchability and Post-Hatching Performance of Broiler Chicken.

Abdel-Halim A, Mohamed FR, Elmenawey MA, Gharib HB.


ABSTRACT
The present study was designed to investigate the impact of in-ovo injection of folic acid and glucose on hatching eggs from 55 weeks old broiler breeders. A total number of 900 hatching eggs were collected from Arbor Acres broiler breeders, then, eggs were divided into 6 groups including 1) Negative Control (non-injected, NC), 2) Dry Punch Control (pricked without injecting any solution, DPC), 3) Positive Control (eggs were injected with 0.5 mL normal saline, PC), 4) Folic Acid group (eggs were injected with 0.2 mg/ egg folic acid, FA), 5) Glucose group (eggs were injected with 125 mg/ egg glucose, Glu), and 6) Folic Acid with Glucose group (eggs were injected with 0.2 mg folic acid with 125 mg/ egg glucose, FA+Glu). Each treatment was divided into five replicates of 30 eggs each. Eggs were injected into the albumen under the air sac. After in-ovo injection, the eggs were stored for four days before hatching. After hatching, the chickens were reared in groups according to the treatments. All treatments were divided into 10 replications of 9 chickens in each. In-ovo injection with folic acid decreased the albumen pH significantly to 9.19 after 4 days of injection, while the negative control was 9.43. Hatching quality was severely affected by all in-ovo injection treatments, but no significant differences were found between the treatment groups concerning the hatchability of fertile eggs. Injection treatments had no significant effect on the growth rate or the production number in any of the weeks. Injection of folic acid and (FA+Glu) significantly increased chickens’ body weight at two and four weeks of age. Also, the dressing percentage when using folic acid and (FA+Glu) was significantly increased to 72.1% and 72.5%, respectively, compared to the positive control group (68.3%). In conclusion, our data suggested that in-ovo injection with a mixture of folic acid and glucose (0.2 mg folic acid+ 125 mg/ egg glucose) could be used to enhance carcass characteristics. Further studies should be conducted to find the effects of in-ovo injection folic acid and glucose on different incubation days and at different sites of injection.

**Keywords:** Broilers, Folic Acid, Glucose, Hatchability, In- Ovo injection, Old breeders, Post-hatch
Moreover, the effect of silver nanoparticles on the expression of antibiotic resistance genes (i.e., E. coli, Salmonella, Klebsiella) was measured as 0.31 mg/ml, and 0.62 mg/ml for ESBL-producing Klebsiella spp. cells which was investigated using SEM. It can be concluded that silver nanoparticles have a noticeable toxic effect of AgNPs on E. coli and Klebsiella spp. Nanoparticles have been extensively used as an applicable and safe alternative to antibiotics.

Antibiotic resistance genes were downregulated in both bacteria species and there was a noticeable antibacterial activity and could be considered an applicable alternative for the treatment of antibiotic-resistant bacteria. In vitro investigation of the antibacterial effect of silver nanoparticles on ESBL-producing E. coli and Klebsiella spp. isolated from apparently healthy pigeons in a live bird market, namely Riazuddin Bazar in Chattogram city, Bangladesh, indicated promising results. Vaccine production trials are still under investigation. Accordingly, this review article aims to shed light on coccidiosis in rabbits. Coccidiosis in rabbits has two forms, namely hepatic and intestinal. Affected animals indicated the symptoms of diarrhea, reduced appetite, dehydration, and weight loss as well as liver and intestine damage. They are susceptible to important diseases that can reduce their productivity, causing severe economic losses. The current study aimed to investigate the effect of copper nanopowder on physiological and biochemical parameters of apparently healthy Holstein heifers. Two experimental groups (control and treatment) and each one included seven Holstein experimental animals. Copper nanopowder in a dose of 0.04 mg/kg was orally administered daily to the usual diet. The obtained results indicated that the addition of copper nanopowder to the diet of experimental animals increased the growth, stimulated the function of hematopoiesis, and improved the characteristics of mineral metabolism of the Holstein heifers. Vaccine production trials are still under investigation. Accordingly, this review article aims to shed light on coccidiosis in rabbits. Coccidiosis in rabbits has two forms, namely hepatic and intestinal. Affected animals indicated the symptoms of diarrhea, reduced appetite, dehydration, and weight loss as well as liver and intestine damage. They are susceptible to important diseases that can reduce their productivity, causing severe economic losses. The current study aimed to investigate the effect of copper nanopowder on physiological and biochemical parameters of apparently healthy Holstein heifers. Two experimental groups (control and treatment) and each one included seven Holstein experimental animals. Copper nanopowder in a dose of 0.04 mg/kg was orally administered daily to the usual diet. The obtained results indicated that the addition of copper nanopowder to the diet of experimental animals increased the growth, stimulated the function of hematopoiesis, and improved the characteristics of mineral metabolism of the Holstein heifers. Vaccine production trials are still under investigation.

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Macroscopic sarcocysts of domestic sheep and goats in Soran City, Erbil, Iraq. 

Sarcocystis species were identified molecularly by 18S rRNA gene sequence analysis. Moreover, the ultrastructure of the sarcocysts was investigated by both scanning and transmission electron microscopy. The macroscopic sarcocysts were detected in 9.1% (91/1000) of the esophagi. The prevalence of this infection was also at a higher level among individuals aged above 40 years (28.57%). Furthermore, men (26.11%) were more inclined to be inflicted, farmers (31.25%) and animal keepers (20.6%) while the lowest prevalence was demonstrated in women (22.5%) with no significant difference. Considering the human occupation, the disease was observed at a higher level among abattoir workers (33.3%), followed by sheep and goats farmers (31.25%). The prevalence of human brucellosis in the New Valley Governorate, Egypt was 23.9% in humans while it was 0% in cattle, sheep, and goats. The prevalence of brucellosis was 0% in cattle, sheep, and goats while it was 23.9% in humans. The prevalence in women is higher (23.9%) than in men (22.5%). The characteristic features of the macroscopic sarcocysts were investigated by electron microscopy. The macroscopic sarcocysts were detected in 9.1% (91/1000) of the esophagi. The prevalence of this infection was also at a higher level among individuals aged above 40 years (28.57%). Furthermore, men (26.11%) were more inclined to be inflicted, farmers (31.25%) and animal keepers (20.6%) while the lowest prevalence was demonstrated in women (22.5%) with no significant difference. Considering the human occupation, the disease was observed at a higher level among abattoir workers (33.3%), followed by sheep and goats farmers (31.25%).
Canine parvovirus (CPV) infection is a global infectious and contagious viral disease of canine, shepherds (26.7%), Doberman (23.07%), and Griffon (16.6%). Among different risk factors, the season, the age, and the breed of the dog were recorded to study the prevalence of CPV. The overall prevalence of CPV infection in dogs was reported as 59.7%. Dogs between 0 and 3 months of age indicated the highest prevalence of 68% followed by 4-6 months of age (25%). The maximum prevalence was noticed in non-descript dogs (48.5%) followed by German shepherds (26.7%) and Doberman (23.07%). Age and seasonal variations are risk factors in the prevalence of CPV infection. Identification of the potential risk factors associated with the disease may be helpful to construct the ideal preventive measures.
Government Authorities (LGAs) in the Central Zone, reported the disease in the past five years. Moreover, 56, 426, and 11147 cases were reported as deaths, and the cattle at risk archived information of Central Zone Veterinary Centre (CZVC) for the past five years in the research recommended the strengthening of control measures against this disease in the Central Zone. Therefore, 3.8%, 13%, and 0.5% were reported as CBPP prevalence, case fatality rate, and mortality rate, respectively. In this extensive study, the parameters obtained during the study were used to determine the epidemiology of Contagious Bovine Pleuropneumonia (CBPP) in the Central Zone of Tanzania. The present study used data from archives to investigate the pattern of CBPP occurrence, with more cases being reported between August to December. In conclusion, CBPP was a seasonal problem in Central Tanzania. Therefore, the present study recommended that control measures be strengthened to prevent future outbreaks.

Research Paper

Keywords:
Contagious Bovine Pleuropneumonia, Prevalence, Central Zone, Tanzania.

Effect of L-Carnitine and Yeast Chromium Supplementation on Productive Performance of Pekin and Sudani Duckling during Growth Period


ABSTRACT

The present study aimed to evaluate the effect of L-carnitine and Yeast chromium supplementation on the productive performance of Pekin and Sudani duckling breeds. A total number of 450 both unsexed Pekin and Sudani ducklings (225 per each breed) one-day-old were investigated in the current study. The experimental period lasted 12 weeks of age. Experimental ducklings were randomly divided into the 5 equal treatments with 90 ducklings (45 from each breed). Each experimental treatment was the control with basal diets, while treatments 2 and 3 received basal diets supplemented with 200 and 400 mg/kg diets L-carnitine (LC), respectively, while treatments 4 and 5 received basal diets supplemented with 400 and 600 μg/kg diets Yeast chromium (Cr), respectively. The results indicated that growing duckling performance, including live body weight, body weight gain, feed intake and feed conversion ratio, relative weight of carcass quality and weight of lymphoid organs significantly increased with supplemented diets. Therefore, both L-carnitine and Yeast chromium supplementation had a positive effect on the productive performance of Pekin and Sudani duckling breeds. A total number of 450 both unsexed Pekin and Sudani ducklings (225 per each breed) one-day-old were investigated in the current study. The experimental period lasted 12 weeks of age. Experimental ducklings were randomly divided into the 5 equal treatments with 90 ducklings (45 from each breed). Each experimental treatment was the control with basal diets, while treatments 2 and 3 received basal diets supplemented with 200 and 400 mg/kg diets L-carnitine (LC), respectively, while treatments 4 and 5 received basal diets supplemented with 400 and 600 μg/kg diets Yeast chromium (Cr), respectively. The results indicated that growing duckling performance, including live body weight, body weight gain, feed intake and feed conversion ratio, relative weight of carcass quality and weight of lymphoid organs significantly increased with supplemented diets. Therefore, both L-carnitine and Yeast chromium supplementation had a positive effect on the productive performance of Pekin and Sudani duckling breeds.
Clostridium perfringens

Crossing the Risk Factors of Clostridium perfringens Locally Isolated from Different Species.

ABSTRACT


Keywords: isolates had CPA gene and

Samples were subjected to isolation and identification (morphologically and biochemically) for obtaining its ability to produce many virulence factors. In the current study, 135 intestinal samples were collected from different animal species of different localities in Egypt. Samples were subjected enterotoxin (CPE gene), whereas 23% of isolates of chicken and cattle intestinal samples contained CPA, Net B, and CPE genes as virulence factors. Consequently, those isolates are highly recommended to be used in the preparation of enterotoxemia and necrotic enteritis vaccines as they are more virulent strains.

The antimicrobial agents (combination of nisin and lysozyme had the most significant reduction of aerobic spore-forming bacteria compared with control cheese which was in continuous increment. The application of a protective culture, nisin, lysozyme, and natamycin) combination of nisin and lysozyme (25 mg kg\(^{-1}\)), lysozyme (100 mg kg\(^{-1}\)), nisin (25 mg kg\(^{-1}\)), and combination of protective culture and natamycin (40 mg kg\(^{-1}\)) were studied on the growth of aerobic spore-forming bacteria. Inhibitory effect of nisin, lysozyme, and natamycin were studied on the activity of 28 isolates of spore-forming bacteria. Inhibitory effect of protective culture, nisin, lysozyme, and natamycin were studied on the activity of 28 isolates of spore-forming bacteria. The results revealed that the addition of different natural antibacterial additives with various concentrations with each additive individually was found to be significantly effective in retarding microbial spoilage in low-salt soft cheese.

The application of natural antimicrobials instead of chemical preservatives, especially in low-salt soft cheese, can be highly possible due to their low cost, environmental friendliness, and health benefits. However, the use of these natural additives may not completely prevent microbial spoilage due to the developed resistance of bacterial strains to these agents over time. Therefore, there is a need for continuous research on the development of new natural antimicrobials and the optimization of their usage to enhance the microbiological quality of dairy products.


Keywords: C. burnetii, CPA gene, CPE gene, Net B gene

The Q fever is a worldwide zoonotic disease caused by Coxiella burnetii, an obligate intracellular bacterium. This pathogen affects humans, ruminants, equines, carnivores, rodents, and birds. A cross-sectional study was carried out from March 2017 to May 2018 to assess the seroprevalence and identify the risk factors of Coxiella burnetii infection in horses (Equus caballus) in Algeria, a country with a high livestock density. A total of 182 horses (67.5% males and 32.5% females) were included in the study. The samples were collected from 18 localities in Algeria, including 18/182 (9.9%) positive samples. The univariate analysis of risk factors for Coxiella burnetii infection showed that the risk of seropositivity was significantly higher in horses that had contact with small ruminants (RR: 15.6). In addition, the seroprevalence demonstrated higher seropositivity in horses that had contact with small ruminants (p=0.004) and in El-Bayadh district (p=0.005). The multivariate logistic regression analysis indicated that all the 26 factors associated with age, sex, breed, housing, presence of ticks, geographical localization, and presence of birds were significant risk factors for Coxiella burnetii infection. The factors influencing the risk of C. burnetii seropositivity in horses were compared with other studies conducted in different countries. The findings of the current study highlight the need for prophylactic measures to reduce the risk of Q fever transmission to animals and humans.
ABSTRACT

Incidence of Appendicular Bone Fracture in Dogs and Cats: Retrospective Study at Veterinary Hospital of Cairo University and some Private Clinics in Egypt.

Appendicular bone fractures in small animal practice constitute a major challenge facing veterinary orthopedic surgeons concerning affected limb and bone as well as the extent of tissue damage, site, and shape of the fracture line. Therefore, this retrospective study was designed to provide descriptive data at referral veterinary teaching hospital, faculty of veterinary medicine, Cairo University, and some private pet clinics in Cairo district, Egypt to identify and determine the prevalence of appendicular fractures arising from trauma in dogs and cats treated in private clinics in Egypt showed high incidence (87% in dogs and 71.8% in cats) out of total fracture cases and this incidence correlated with some predisposing factors (including breeds, weight, age, and gender) and causative agents that resulted in different types of appendicular fractures.

Fractures were classified according to the specific limb (forelimbs / hind limbs), specific bone fractures (Humerus, radius, ulna, femur, tibia and fibula, and the other bones), extent of tissue damage (open or closed and incomplete or complete), site (proximal, diaphyseal or distal zones), number (single or comminuted), and the direction of the fracture line (transverse, oblique or spiral). From the investigated fractures were classified, recorded more frequently in dogs than cats. In dogs, the most common fractures in the femur, tibia/fibula, humerus, and radius/ulna were complete comminuted diaphyseal femoral, complete transverse distal humoral, and complete transverse and oblique diaphyseal radial/ulnar fractures respectively. Moreover, cats were complete transverse distal radial/ulnar fractures.

Male dogs and cats showed a higher population (breed, age, gender, and animal size). The highest records of fracture were in mongrel dogs, and cats as rescued from the streets as well as those brought from the owners for the first time in their life. In contrast, cats were complete transverse distal radial/ulnar fractures recorded in Miniature breeds and svelte breeds for cats. The bone fracture mostly occurred in dogs younger than one-year-old, and cats aged one to three years. A fracture in the hindlimbs was more significant than the forelimbs, and the bones most frequently fractured were the femur.

The bone fracture incidence was higher in males than females. The bone fracture mostly occurred in dogs younger than one-year-old, and cats aged one to three years. A fracture in the hindlimbs was more significant than the forelimbs, and the bones most frequently fractured were the femur.

Keywords: Incidence of Appendicular Bone Fracture, Retrospective Study, Dogs, Cats, Veterinary Teaching Hospital.
The Effect of Dietary Supplementation of Cod Liver Oil on Ratio of Saturated and Unsaturated Fatty Acids in Giant Prawn (Macrobrachium rosenbergii).

**ABSTRACT**

This research was conducted experimentally with a completely randomized design. The treatment is given a dose of cod liver oil 0% (control), and treatments 1-4 use 3% dose addition to each treatment. The main parameters studied were the content of saturated and unsaturated fatty acids in pangasius fish meat. The observed contents of Pangasius Fish.

**Keywords:** Cod liver oil, Feed, Giant prawn, Saturated fatty acids.

**References:**

ABSTRACT

The contamination of goat milk with pathogenic fungi can cause health hazards for the consumers either they consume it raw or even in the processed form. Since there are few studies concerning yeasts in raw goat milk, the present study aimed to determine the prevalence of yeasts and isolate *Candida albicans* from raw goat milk samples. Also, this study determined the distribution of virulence genes and the antifungal susceptibility profile of *Candida albicans* isolates. A total of 30 goat milk samples (collected from free-grazing goats) were mycologically examined. The confirmed *Candida albicans* isolates were subjected to PCR assay to detect the virulence genes (SAP4, RAS1, ALS1, HWP1, and PLB1). Also, antifungal sensitivity testing was performed against the commercially available antifungal agents and probiotics (*Lactobacillus acidophilus* and *Lactobacillus plantarum*). The mycological examination revealed that 14 out of 30 (46.7%) goat milk samples were positive for yeasts and only 4 (13.3%) isolates were confirmed as *Candida albicans*. The results from the PCR assay showed that RAS1 and ALS1 were found in 4 (100%) isolates, HWP1 and SAP4 were found in 2 (50%) isolates, while PLB1 was not detected in tested *Candida albicans* isolates (0%). Antifungal sensitivity testing results showed that ketoconazole gave the best activity against *Candida albicans* isolates, followed by fluconazole, nystatin, and itraconazole. All isolates were resistant to terbinafine. Moreover, both *Lactobacillus acidophilus* and *Lactobacillus plantarum* showed antifungal effects against *Candida albicans*, but *Lactobacillus plantarum* was more effective than *Lactobacillus acidophilus*. Antifungal resistance is a major problem that can lead to failure of candidiasis treatment. Regular antifungal sensitivity testing and searching for an alternative bio-eco-friendly approach for proper control and treatment of candidiasis are strongly needed to prevent treatment failure and emergence of resistant isolates.

Keywords: Antifungal sensitivity testing, *Candida albicans*, Goat milk, Virulence genes, Probiotics.