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Ilker Camkerten

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Dear Scientist,

The eight International Congress on Advances in Veterinary Sciences & Technics (icavst) was hybrid organized in Sarajevo, Bosnia and Herzegovina. We are very happy for organizing this congress in such a beautiful city and country that we have strong historical ties.

We wanted to make this conference little bit special by bringing scientist together from different disciplines of veterinary area and to open new research and cooperation fields for them. In this sense, we desired to bring the distinguished scientist together to get know each other and to develop and implement new joint projects.

The scientist joined the congress was from different country and mostly from Turkey. Total over the one hundred scientists were registered in the congress. The total number of submissions were 25 and after a careful evaluation 23 submissions were accepted by our scientific committee and 5 of them were accepted as poster presentation and 18 of them were accepted as oral presentation and all those presentations was taken place in the conference booklet.

We would like to send our special thanks to **Dr. Tamercan Morkoç** and **Prof Dr. Hesham El Enshasy**, also the International University of Sarajevo, Universiti Teknologi Malaysia, for their contributions. Also, we would like to express our special thanks to the organization team especially **Mr. Musa Köse** and **Mr. İsmet Uzun**, ZENITH Group workers, and the scientific committee. And finally, most importantly we thank all the participants individually to join this conference.

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Abbreviation

FVM: Faculty of Veterinary Medicine

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Content & Program Schedule

09:30 Opening Speech

Invited Speaker

10:00 **Dr. Daniel Joe Dailin** "Probiotic Interventions in Poultry Production: Unveiling the Impact of Gut Microbiota Modulation for Enhanced Performance and Health in the Poultry Industry" 1

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15:55	Doğan Can Haney “Blood pressure monitoring in cats and dogs”	21

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INVITED SPEAKER

ORAL PRESENTATIONS

**FORENSIC MEANING OF CORE TEMPERATURE - AN
INDICATOR FOR ASSESSING THE SEVERITY OF HEATSTROKE
IN AN ANIMAL MODEL**

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Abstract:

Background/ Aim: Sudden deaths during efforts that are multifactorial and associated with exposure of the body to high temperatures beyond the power of thermoregulatory mechanisms are increasingly common. Autopsies are often performed, but the evidence is insufficient and non-specific. The research aimed to determine the core temperature values of rats exposed to different water temperatures (37°C, 41°C, 44°C), before the start of the experiment (T_b), after immersion in water (T_u), after 20 minutes of exposure (T_u) and at death. (T_s) rats for hyperthermia and heat stroke.

Material and Method: Forty rats were divided into five groups depending on the temperature and length of exposure to water: control group-CG37, G41-hyperthermia- group which exposure whose was a 20 minutes at 41°C, G41-heat stroke- group exposed until death at 41°C, G44- hyperthermia- group which exposure time was 20 minutes on 44°C, G44- heat stroke- group exposed until death on 44°C. A RET-4 probe was used to measure the core temperature of rats.

Results: Significant changes in the body temperature of rats were observed during the lethal outcome, $p < 0.0005$. After exposure to water temperature for a period of 20 minutes, depending on the group, it was observed that the body temperatures of rats differed significantly between G37 and G41, KG37 and G44, $p < 0.0005$ and G41 and G44, $p < 0.0005$. A significant difference was also observed in the postmortem temperature of groups G41 and G44, $p = 0.01$. a significant difference between body temperatures in groups CG37, G41-hyperthermia, G41- heat stroke, G44-hyperthermia and G44-heat stroke ($p < 0.0005$), and the significance of the differences in the CG37 group was $p = 0.044$.

Conclusion: Exposure of albino rats to different water temperatures also led to a change in the internal temperature; normothermia was established through thermoregulation in the control group, and in the other groups, hyperthermia and heat stress occurred.

Keywords: Temperature, Variation, Heat, Rats, Heat Stroke

THE EFFECT OF ARBUTIN ON THE CRYOPRESERVATION OF RAM SPERM

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Abstract:

This study was conducted to determine the effects of arbutin, an antioxidant added to the sperm diluent after thawing, on spermological parameters, Computer-Assisted Sperm Analysis (CASA), oxidative stress parameters, and DNA damage. Sperm samples were collected from a total of 3 male goats of the Sönmez breed raised under Afyonkarahisar conditions. The samples were pooled and divided into 5 equal volumes, which were then diluted with Tris-based extenders containing different amounts of arbutin, including the control group. The diluted samples were subjected to equilibration at 5 °C for 3 hours in 0.25 ml straws before being frozen in liquid nitrogen vapor. Subsequently, the sperm samples were stored in a liquid nitrogen tank (-196°C) until the day of analysis. In terms of subjective motility and CASA motility, the group containing 2,5 mM arbutin in the thawed sperm showed a significant superiority compared to both the control group and the other groups. The parameters VAP, VSL, VCL, ALH, and BCF exhibited the highest values in the group containing 10 mM arbutin. Regarding the midpiece abnormalities of the spermatozoa, a significant decrease was observed in the 7,5 mM and 10 mM groups compared to the other groups and the control group ($p < 0.05$). When looking at tail abnormalities, the lowest value was found in the 2,5 mM group, and the difference between this group and the 10 mM group was significant ($p < 0.05$). Among the HE test parameters of the spermatozoa, the lowest membrane integrity and viability (H+, E-) were observed in the control group, while the highest value was found in the 7,5 mM group, and the difference between them was statistically significant ($p < 0.05$). The values obtained for DNA damage in the groups containing 2,5; 5, and 7,5 mM arbutin were statistically significant ($p < 0.05$) compared to the control group. Among the oxidative stress parameters, the values of MDA (malondialdehyde) in the 2,5 and 5 mM groups were significantly lower ($p < 0.05$) compared to the 10 mM group. In the GSH (glutathione) parameter, the value obtained in the 10 mM group was statistically different ($p < 0.05$) from the control and other groups. The highest value obtained in the total antioxidant level showed a significant difference ($p < 0.05$) with the 7,5 and 10 mM groups. In terms of total oxidant level and oxidative stress index, a statistically significant difference ($p < 0.05$) was observed between the 10 mM group and the control and other groups. In conclusion, it has been observed that arbutin, used as an antioxidant in the freezing of goat sperm, has positive effects on motility, CASA parameters, abnormal spermatozoa rate, membrane integrity, oxidative stress, and DNA damage. However, it is deemed beneficial to evaluate its effects along with fertility results using a wider range of animal samples.

Keywords: Antioxidant, Arbutin, Ram, Cryopreservation, Sperm

**Supported by Afyon Kocatepe University Scientific Research Projects Coordination Unit (BAPK).
Project No: 21.SAG.BİL.20*

INVESTIGATION OF THE HEALING EFFECTIVENESS OF PINE RESIN IN EXPERIMENTALLY INDUCED CORNEAL WOUND IN RATS

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Abstract:

The cornea is the transparent, avascular outer layer of the eye that is constantly exposed to abrasive forces and mechanical trauma due to its anatomical location. Pine resin is a natural resin obtained from plants belonging to the Pinaceae family and contains up to 50% abietic acid. It has been used in traditional Korean medicine for the treatment of wounds. In this study, three groups were formed, each consisting of 8 male 2-month-old Wistar Albino rats (n=8). To create the corneal injury model, rats were anesthetized, and the boundaries of the wound to be created on the corneal surface using a 3mm punch biopsy were determined, followed by removal of the first two layers of the cornea with a cornea knife. Subsequently, the first group was considered as the control group and no application was performed. The second group was designated as the pine resin group and it was applied two times on a day. The third group was evaluated as the drug group and it was applied three times a day. On the third day, rats were euthanized, and their eyes were enucleated. The collected eyes were sent for histopathological examination and stained with hematoxylin-eosin. The lesions in the examined samples were evaluated for hyperemia, vascularization, cellular infiltration, and corneal edema under a microscope. As a result of the study, ulceration was observed in the control and drug groups, while no ulceration was observed in the pine resin group. Furthermore, the pine resin group exhibited lower values in terms of hyperemia, vascularization, cellular infiltration, and corneal edema. It was determined that neutrophil infiltration in the pine resin group was higher compared to the drug group but lower compared to the control group. The study concluded that pine resin reduces clinical symptoms and promotes healing in corneal injuries.

Keywords: Rat, Pine Resin, Corneal Injury

EFFECT OF PLATELET-RICH FIBRIN ON WOUND HEALING IN A DOG WITH COMORBIDITIES

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Abstract:

A wound is the disruption of tissue integrity in the skin, subcutaneous tissues, and muscle. Wound healing consists of hemostasis, proliferation, and remodeling stages. Platelet-Rich Fibrin (PRF) is a material derived from platelets and used in wound healing and tissue regeneration. It is considered more advantageous than Platelet-Rich Plasma (PRP). In this case presentation, the effect of PRF on wound healing was investigated in a dog with tissue injury resulting in material loss, brought to our faculty. During the initial examination, an open wound was present in the left metatarsal and phalanx region, involving the depth of the bone tissue. No orthopedic problems were detected during the clinical examination; however, in the following days, the dog was diagnosed with Canine Corona Virus, Ehrlichiosis, Anaplasmosis, and cystitis, and treatment was initiated. After performing mechanical debridement and irrigation of the wound, blood was collected from another dog known to be free of any diseases into anticoagulant-free tubes for the preparation of PRF, and it was centrifuged shortly thereafter. The middle portion of the blood tube containing the PRF layer was taken and mixed with Vaseline in sterile containers. This mixture was applied to the wound area daily for the first week and three times a week for the following two weeks, totaling 21 days, and covered with a dressing bandage. At the end of the first week, it was concluded that a significant demarcation area had formed in the wound edges, and the healing progressed rapidly. Throughout the 21-day period, there were no signs of infection, necrotic tissue, or aggressive wound edges in the wound area. On the contrary, it was concluded that the boundaries were clearly advancing, and the bone tissue healed without any necrosis.

Keywords: Platelet Rich Fibrin (Prf), Platelet Rich Plasma (Prp), Wound, Dog

DEVELOPMENT OF MONOCLONAL AND POLYCLONAL ANTIBODIES AGAINST FELINE ALPHA-1-ACID GLYCOPROTEIN [ACID GLYCOPROTEIN (AGP)]

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Abstract:

In this study, it was aimed to produce Monoclonal (Mab) and Polyclonal (PAb) antibodies needed for the development of kits that can analyze the presence and concentration of feline AGP. Cat AGP protein (2 mg/ml) produced by E. coli recombinant technique was used in immunization studies. Immunization of 2 New Zealand albino rabbits for polyclonal antibody and 2 BALB/C mice for monoclonal antibody were performed. Each mouse and rabbit were immunized with antigen (synthetic cat AGP) three times at three-week intervals. After each immunization, blood was taken from the animals and sera were stored. In the following period, antibody levels in the sera obtained by ELISA test were measured. Affinities of antibodies against the target analyte were determined by indirect ELISA method. Antibodies were purified by passing through protein A/G resin column. The cut-off value of antibody ELISA for rabbit was calculated as 0.11125. As a result of immunization of two different rabbits, the dilution ratio of rabbit number 1 was 1/25.6000 and the dilution ratio of rabbit number 2 was 1/512.000. Mices immunized for monoclonal antibody production were quantified by antibody ELISA test before the final immunization. After sufficient antibody was generated (>1/50,000), splenocytes were obtained for use in the fusion process. Fused splenocytes were grown in cell culture plates and stable clones were obtained. The supernatants were tested by WB and specific clones were identified. Selected clones were produced and antibodies were concentrated by ammonium sulfate precipitation from the supernatants. Selected monoclonal antibodies were tested for purification and confirmation by SDS-PAGE and WB. The cut-off value result of antibody ELISA for mice was calculated as 0.09025. According to the immunization results of two different mice, the dilution ratios were determined to be 1/64.000 for both of them. Mouse number 1 was entered into the fusion based on OD values. As a result, in this study, the affinities of locally produced monoclonal antibodies and polyclonal antibodies against the target antigen (Feline Alpha-1-acid glycoprotein (AGP)=Cat ORM2) were determined by ELISA method. It was decided that these antibodies could be used in ELISA and LFA tests to determine AGP levels in cat serum.

Keywords: AGP, Mab, Pab And Cat

**This study was supported by TUBITAK 1005 - National New Ideas and Products Res. Support Progr. with the project no. 119O931*

**DETERMINATION OF THE PREDICTIVE EFFECTS OF VITAL
EXAMINATION, HEMATOLOGY AND BLOOD GAS
PARAMETERS ON MORTALITY AND PROGNOSIS IN CALVES
WITH NEONATAL DIARRHEA; RETROSPECTIVE COHORT
STUDY OF 89 CASES**

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Abstract:

The main purpose of this observational retrospective cohort study was to determine mortality rates and durations, survival status and predictive parameters of prognosis based on vital signs, hematology and blood gas analysis in neonatal diarrheic calves registered at a university hospital during the calving season. Clinical findings, complete blood count and blood gas analysis data of 89 neonatal diarrheic calves that were not treated before were obtained retrospectively from the hospital automation system. It was determined that 42.7% (38/89) of the calves died during hospitalization or after discharge and 47.4% (median 9.25 hours) of these calves died in the 'first 24 hours' and 52.6% died (median 51.50 hours) 'after 24 hours or more'. When the data obtained from this study is evaluated; body temperature (°C), pH, base excess and sodium bicarbonate (mmol/L) parameters were found to be lower and hemoglobin (g/dl), hematocrit (%), lactate (mmol/L), chlorine (mmol/L), sodium (mmol/L) and anionic gap (mmol/L) parameters were found to be higher in dead calves compared to alive calves. Accordingly, hypothermia, metabolic acidosis and dehydration findings are seen as clinical conditions that should be considered. Logistic regression analysis showed that lactate (OR=1.429) and cCl⁻ (OR=1.232) concentration were major risk factors associated with death in calves with diarrhea.

As a result, following up for at least 72 hours and performing replacement fluid-electrolyte and other treatments during this period, is important. In addition, it was concluded that the high rates of calf deaths could be reduced by early treatment of the disease, since the general condition categories of calves with diarrhea (severe, comatose) worsened, and the death rate increased.

Keywords: Calf, Diarrhea, Neonatal, Predictive Effects, Prognosis

INVESTIGATION OF THE IMMUNOGENIC ACTIVITIES OF THYME (THYMUS VULGARIS) OIL AND THYMOL IN RABBITS WITH EXPERIMENTAL HEPATIC LIPIDOSIS

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Abstract:

In this study, it was aimed to investigate the effects of thyme oil and thymol on mRNA expression levels of inflammation-related genes. A total of 48 healthy New Zealand rabbits, aging 10-12 weeks and having an average weight of 3.41 ± 0.56 kg were selected for this study. Rabbits were divided into two main groups: Group-ND and Group-HCD; i.e. a normal diet group fed with standard rabbit feed and a high cholesterol diet group with 1% added cholesterol respectively. Group-ND and Group-HCD also were divided into 3 subgroups (n = 8). Group-ND comprised of group-1, group-2 and group-3 i.e. a standard rabbit diet, standard rabbit diet + thymol (6 mg/kg, oral) and a standard rabbit diet + thyme oil (20 mg/kg, oral) respectively. Group-HCD further comprised of group-4, group-5 and group-6 i.e. a high cholesterol diet, high cholesterol diet + thymol (6 mg/kg, oral) and a high cholesterol diet + thyme oil (20 mg/kg, oral) respectively. Blood samples and body weights both were recorded at intervals of 0, 4, 8 and 11 weeks respectively. Proinflammatory cytokines (TNF- α , IL-1 β , IL-6) and acute phase protein (C-Reactive Protein) analyzes was performed to monitor the inflammatory process in the liver. Real-Time PCR method was used to evaluate the mRNA expression levels of the target genes [STAT4, IFN γ , Tbet (tbx), IL-4, IL-5, IL-13, Gata3, IL-17A, GMCSF, ROR γ (RORC), IL-9, IL-10, IL -18, Foxp3, IL-8], associated with inflammation of the liver tissue. Grosspathological findings included yellowing, increase in size, thickening and rounding of the liver edges. In all high cholesterol diet groups there was a statistically significant (p <0.05) increase in glucose, triglyceride, total cholesterol and LDL-cholesterol levels. In the groups where the rabbits were fed on a normal diet, thymol and thyme oil were shown to reduce the mRNA expression of the IFN γ gene (p <0.05), thereby inhibiting the inflammatory response of macrophage cells. A 7-fold increase in the expression of the Tbet gene was seen in rabbits fed on a normal diet supplemented with thyme oil which depicts its role as an anti-inflammatory agent.

As a result, thymol and/or thyme oil plays a positive role on the affects of metabolic and immune parameters and may even have a positive epigenetic effect at the gene level in the correction of inflammatory processes associated with hepatic lipodosis.

Keywords: Hepatic Lipodosis, Non-Alcoholic Fatty Liver Disease (Nafld); High Cholesterol Diet; Thyme Oil; Thymol

**The author(s) received financial support for the research from ERU BAP, with Project Code: TDK-2017-7600*

PRELIMINARY FINDINGS OF A STUDY ON ETHICAL DECISION- MAKING OF VETERINARIANS IN TURKEY

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Abstract:

This study aimed to examine the ethical decision-making process of veterinary clinicians when faced with requests for desexing (spaying /neutering). The phenomenological approach, a qualitative research method, was used. The interviewed study group consisted of 21 practicing veterinary clinicians in Antalya, Türkiye. A semi-structured interview form was used as the data collection tool, incorporating a case study called "The Doberman Farm" from Bernard E. Rollin's book "An Introduction Veterinary Medical Ethics. Theory and Cases" A descriptive analysis method was used to analyze the data.

In the evaluation of this case, nine participants expressed the necessity of spaying female dogs living on a stray for population control. Six participants stated that spaying is necessary to improve poor welfare conditions and combat infectious diseases. One participant expressed support for spaying female dogs on strays but opposed neutering male dogs due to concerns about socialization issues. Additionally, eleven participants expressed a positive view of spaying household dogs. Among them, five participants mentioned the benefits of spaying in preventing behavioral disorders (hyperactivity, marking, aggression, etc.), while six participants highlighted the reduction of risks related to diseases such as mammary neoplasia and pyometra. Another participant expressed opposition to neutering male animals due to the risk of obesity, while another participant stated their opposing view based on their lack of experience with disease-related risks in household animals.

Based on the opinions expressed by the participants, it can be concluded that the main determinant in the ethical decision-making process is an approach focused on human health. On the other hand, it can be argued that desexing interventions are among the prophylactic measures concerning animal health and welfare. Specifically, in the context of this case, it can be inferred that veterinary clinicians in Türkiye exhibit a utilitarian approach in their ethical decision-making process.

Keywords: Spaying, Castration, Qualitative Research, Phenomenology, Ethical Decision Making Process

**Firat Üniversitesi BAP*

EFFECTS OF PROPOLIS-CONTAINING NANOFIBERS ON CORNEAL WOUND IN RATS

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Abstract:

The cornea is the outermost layer of the eye and is constantly exposed to trauma due to its anatomical location. Propolis is a substance produced by honey bees by mixing the extracts they collect from plants with their secretions. Studies have shown that propolis contains essential biological active substances for the life of organisms, which enhance epithelialization and have strong analgesic, anti-inflammatory, immunomodulatory, antioxidant, antitumor, antibacterial, antifungal, and antiviral effects. In our study, a total of 24 male 2-4-month-old Wistar Albino rats were used, with 8 rats in each group. Rats were anesthetized by injection of xylazine and ketamine, and the corneas were marked with a 3mm punch biopsy to create a clear wound border, followed by removal of the first two layers of the cornea using a corneal knife to create a corneal wound. In the experimentally induced corneal wound, no treated the first group, the second group was treated with nanofibers containing propolis produced by the electrospinning method, and the third group treated water-based topical propolis application. Topical propolis was applied once a day for 3 days, while nanofibers containing propolis were applied once following wound formation. Fluorescein staining was performed on the rats eyes every day throughout the study, and photographs were taken to measure the wound sizes. On the third day, the rats were euthanized under general anesthesia, and histopathological examination was performed on their corneas. In terms of cell infiltration, no significant difference was observed between the propolis and nanofibers containing propolis groups, while the control group showed a higher level of cell infiltration. There was no edema or ulceration observed in any of the three groups. Propolis and nanofibers containing propolis groups showed a significantly positive effect on wound healing compared to the control group.

Keywords: Corneal Wound, Propolis, Nanofibers, Rat

BIOFILM FORMING CAPACITY AND PRESENCE OF BIOFILM-ASSOCIATED VIRULENCE GENES OF ENTEROCOCCUS FAECALIS ISOLATES FROM SLAUGHTERHOUSE ENVIRONMENTS

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Abstract:

This study aims to investigate the presence of biofilm-producing *Enterococcus* and their biofilm-related virulence factor genes in the slaughter line of a class A cattle slaughterhouse in Kayseri. A total of 300 samples (180 carcasses, 48 knives, 6 saws, 42 hooks, 6 skin bands and surfaces, and 18 samples of slaughterhouse wastewater) were analyzed using conventional methods and PCR. The biofilm-forming abilities of the isolates were determined using congo red agar and microplate testing, and PCR was used to detect biofilm-associated virulence genes (*gelE* and *esp*). *E. faecalis* was isolated from 40 (13.3%) of analyzed samples, of which 35 (87.5%) produced biofilms. The *gelE* gene was detected in 33 (82.5%) biofilm-positive isolates, from which one (2.5%) contained also *esp* gene. In conclusion, this study determined the presence of biofilm-positive *E. faecalis* among the samples taken from a slaughterhouse in Kayseri province, and the relationship between virulence genes and biofilm formation. In conclusion, the isolation of biofilm-forming *E. faecalis* from the slaughterhouse environment indicates that fecal contamination is common in slaughterhouses. Therefore, if hygienic conditions in the slaughterhouse are not improved, the risk of cross-contamination of carcasses with *E. faecalis* can be a major concern in the food supply chain.

Keywords: *E. Faecalis*, Carcass, Cattle, Slaughterhouse, Slaughterhouse Wastewater

EVALUATION OF THE EFFICACY OF CONGO RED AGAR IN DETECTION OF BIOFILM FORMING ABILITIES OF VARIOUS FOODBORNE PATHOGENIC BACTERIA

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Abstract:

This study aimed to evaluate the sensitivity and specificity of Congo Red Agar (CCA) in determining the biofilm-forming abilities of various foodborne pathogenic bacteria in comparison with the microplate (MP) method. A total of 135 isolates obtained from various food and environmental samples, including 36 *Staphylococcus aureus*, 30 *Listeria* spp., 35 *Escherichia coli*, and 34 *Salmonella* spp. were used. Their biofilm-forming abilities were determined using CRA and MP methods. The agreement between the results of the two methods was investigated by calculating the Kappa coefficient of agreement. Of the 135 isolates examined, 51.1% were identified as biofilm producers in CRA and 53% in MP ($P>0.05$). Of the tested isolates, *Listeria* spp. *S. aureus*, *E. coli* and *Salmonella* spp. 60%, 97.2%, 11.4%, and 35.2% of isolates were biofilm positive in CRA, and 56.6%, 100%, 22.8%, and 32.3% in MP, respectively ($P>0.05$). The CRA was found to be high sensitivity only in *S. aureus* (97%) among analyzed isolates, while it was higher specificity than the MP method in other isolates [*Listeria* spp. (%39), *Salmonella* spp (%59) ve *E. coli* (%89)]. In conclusion, since the sensitivity of the CRA method was found to be low in the isolates analyzed except *S. aureus*, the combination of CCA and MP methods would increase the reliability of the findings in determining the biofilm-forming abilities of these bacteria.

Keywords: Biofilm, Congo Red Agar, Food Pathogens, Microplate

DETERMINATION OF CYTOTOXIC EFFECT OF CURCUMIN IN CAT FIBROSARCOMA CELLS

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Abstract:

Objective: Curcumin is a polyphenol component extracted from the rhizomes of *Curcuma longa*. Curcumin exhibits anti-cancer, anti-viral, antioxidant and anti-inflammatory effects on different diseases. In this study, it was aimed to investigate the cytotoxic effect of curcumin on feline fibrosarcoma cells in vitro.

Material and Methods: To determine the cytotoxic effect of curcumin, feline fibrosarcoma cells were exposed to different concentrations of curcumin (0.5, 1, 2 and 4 mM) for 24 and 48 hours and viability analysis was performed. In addition, changes in cell morphology were examined with an invert microscope.

Results: Our results showed decreased viability of feline fibrosarcoma cells after treatment with different concentrations of curcumin for 24 and 48 hours ($p < 0.05$). The viability of feline fibrosarcoma cells decreased to 82.87%, 62.20%, 59.10%, and 43.01%, respectively, after treatment with 0.5, 1, 2, and 4 mM curcumin for 48 hours ($p < 0.05$). In addition, invert microscope images confirmed the cell viability results.

Conclusion: The first target in cancer treatment is to increase apoptosis and decrease cell proliferation. Curcumin effectively reduced viability in feline fibrosarcoma cells. It is also recommended to investigate other molecular mechanisms such as apoptotic cell death state.

Keywords: Feline Fibrosarcoma, Curcumin, Cytotoxic Effect

AN ECHOCARDIOGRAPHIC STUDY OF BREED-SPECIFIC REFERENCE RANGES IN HEALTHY FRENCH BULLDOGS

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Abstract:

The objective of this prospective reference interval study was to provide breed-specific echocardiographic values for healthy French Bulldogs. A total of 42 healthy French Bulldogs (Study group) of both sexes (23 females and 19 males) were included in the study. The control group consisted of four other dog breeds (Cocker Spaniel [n = 2], Cavalier King Charles Spaniel [n = 4], Terrier [n = 5], and crossbreed [n = 5]). Standard M-mode, two-dimensional (2D), pulse wave (PW) Doppler, and tissue Doppler imaging (TDI) echocardiographic measurements were obtained from healthy French Bulldogs. The M-mode echocardiographic data obtained from French Bulldogs were compared to the data obtained from the control group. The left ventricular internal dimension at end-diastole (LVIDd; 3.35 cm)/body surface area (BSA m²; 0.53) ratio for the study group was = 6.32. Left ventricular measurements for French bulldogs and internal dimension at end-systole (21.23 ± 3.50 mm) and at end-diastole (33.50 ± 4.12 mm) were found to be significantly higher (P < .001) compared to control group values (left ventricular internal dimension at end-systole [LVIDs]; 17.46 ± 2.85 mm, LVIDd; 27.16 ± 4.20 mm, respectively). A statistically significant positive correlation in the French Bulldog group was noted between body weight and M-mode measurements such as EPSS, IVSd, IVSs, LVIDd, LVIDs, and LVPWd.

As a result, French Bulldogs had a greater systolic and diastolic left ventricular volume than the control group. Echocardiographic values reported in this study could be used as specific reference ranges in French Bulldogs.

Keywords: Dog; Echocardiographic; Pulsed Wave Doppler; Tissue Doppler Imaging

**The author(s) has not received any financial support.*

INVESTIGATION OF THE EFFECT OF CALSITRIOL BOLUS AFTER CALVING ON POSTPARTUM UTERUS INVOLUTION AND OVARIAN ACTIVITY IN DAIRY JERSEY COWS

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Abstract:

Investigation of the Effect of Calcitriol Bolus After Calving on Postpartum Uterus Involution and Ovarian Activity in Dairy Jersey Cows

In this study, it was aimed to study the parameters related to the oral administration of calcitriol bolus administered on the 1st postpartum day in Jersey cows and then the incidence of hypocalcemia, dry matter consumption, its effect on body condition score, incidence of mastitis, fertility and subsequent conception rate. For this purpose, a total of 27 pregnant heifers, 13 of which were in the study group and 14 in the control group, were followed up with the herd follow-up system for the last 60 days until the calving process, taking into account the dry period and transition period. Animals were recruited into the study 30 days before the expected due date and were followed from calving until the day of conception. The findings were recorded for later evaluation. The cows in the control group were not given any additives containing calcitriol after calving. Calcitriol-containing bolus (PhytoBiotics Active D Bolus) was given orally to the cows in the study group in the first few hours after calving. Active D bolus is a herbal feed supplement containing calcitriol glycosides and ursolic acid. It is aimed to dissolve in the rumen within 6-7 days after the application and to ensure the secretion of basic metabolites. The cows in the control group were not given any additives containing calcitriol after calving. All animals in both groups were similar according to the calving age and BCS. As a result of analyzes, it was determined that there were statistical differences between the groups in terms of fertility parameters. In the study group, the incidence of estrus (%) ($P < 0,09$), time to conceive again ($P < 0,001$) and the number of inseminations per pregnancy ($P < 0,003$) were determined. As a conclusion of this study, it was concluded that Active D bolus applied postpartum in Jersey dairy cows may have a positive effect on the prevention of metabolic diseases that may be seen in the postpartum period and may have an effect on uterine involution, ovarian activity and fertility parameters.

Keywords: Keywords: Hypocalcemia, Calcium, Vitamin D3, Postpartum Period, Jersey Breed, Dairy Cattle

ONE HEALTH FOR BETA LACTAMASE CHALLENGE

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Abstract:

Antibiotic resistance (AMR) is an increasingly important crisis. Especially the strains containing beta lactamase (BL) have increased in recent years. BL is an important agent that can hydrolyze almost all antibiotics of the beta lactam group. This enzyme is acquired by exogenous genes or chromosomal mutations. However, bacteria can spread these genes horizontally and vertically among species. Also, the spread of genes providing AMR are not only associated with environmental pathogens but also bacterial natural ecosystems are determinant in this respect. Several interconnected human, animal and environmental habitats can contribute to the emergence, evolution and spread of the problem. The increase of resistant clones and human-related AMR determinants in humans, animals and the environmental microbiome has the potential to change bacterial population genetics at the local and global level. The transmission of AMR or BL occurs at the local level across the borders between different ecosystems, such as farms, hospitals, wastewater treatment plants and natural environments. For this reason, studies under the concept of One Health can screen the spread of resistant bacteria in a wider area (even worldwide) and take appropriate measures. It should never be considered unilaterally for community health and animal health, it should be evaluated with the One Health concept. One health is a term that covers veterinarians, human physicians and other health professionals, but it is a concept that indicates the importance of controlling infectious diseases and the spread of these diseases that can be transmitted from animals to humans and pose a threat to public health.

Beta-lactamase-producing bacteria are frequently recovered from food animals, and many clinically beta-lactam-resistant nosocomial and non-nosocomial infections have also been reported. In this study, the importance of beta lactam resistance and the One Health approach for its solution are explained with clinical examples.

Keywords: One Health, Antibiotic Resistance, Beta Lactamase

**DETERMINATION OF RESISTANCE TO ANTIBIOTICS OF E.COLI AND
SALMONELLA SPP STRAINS ISOLATED FROM DAIRY FARM AND
ITS SURROUNDINGS IN AFYONKARAHISAR REGION**

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Abstract:

In recent years, a large number of multi-drug resistant bacteria have emerged that can be transmitted to humans through the food chain. Foodborne and antibiotic resistant pathogens, such as Escherichia coli, Salmonella spp, are a potential source of risk for contamination of the farm environment and products, as they are present in the gastrointestinal tract of animals.

A total of 290 samples, consisting of animal feces, milk, vegetables, soil, animal/vegetable irrigation water, and hand washing water collected from 5 different farms, were included in this study. A sample of each collected feces (1g/10ml), milk (25ml/225ml), vegetables (25g/225ml), soil (10g/90ml), animal/vegetable irrigation water and hand washing water (25ml/225ml) sample was homogenized with 0.1% peptone water and incubated at 37°C for 18–24 hours. After incubation, blood agar, XLD agar and EMB agar were inoculated from the homogenizer and incubated at 37°C for 18–24 hours. Identification of gram-negative colonies at the species level was analyzed by MALDI-TOF MS (BioMerieux, France) and VITEK 2 (BioMerieux, USA) automated system, while antibiotic susceptibility was determined by the VITEK 2 automated system. Detection of antibiotic resistance genes in isolates was performed in SimpliAmp™ (Applied Biosystems, USA) thermal cycler using A.B.T. branded (A.B.T.™ 2X HS-PCR MasterMix with BlueDye), Turkey) specific primers.

In total, 183 microorganisms of 44 different species were isolated from 290 samples. Of these identified isolates, 52 (28.4%) were identified as E.coli and 2 (1.1%) as Salmonella spp. While ereA, SHV, OXA, CTX-M gene regions could not be detected in all 52 E.coli strains, TET A gene was detected in 47, TEM in 48 and TET B gene in 50. No resistance gene was found in two isolated Salmonella spp. strains.

As a result, different antimicrobial resistance genes were detected in E. coli isolates isolated from farms and environmental samples included in our study. Dairy farm and environmental components were determined to contain antibiotic-resistant pathogenic E. coli and Salmonella spp., which pose a potential threat to human health. Workplace personnel related to the factors that cause antibiotic resistance should be trained on food safety and hygiene practices. In addition, preventive health approaches are needed to combat this threat.

Keywords: Escherichia Coli, Salmonella Spp., Antibiotic Resistance Gene, PCR, MALDI-TOF-MS, One Health

**This study is supported by Scientific Research Projects Coordinatorship of Afyonkarahisar Health Sciences University*

A RESEARCH ON NEONATAL CALF DISEASES IN MILAS PROVINCE

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Abstract:

Calf diseases and deaths in the neonatal period are a major challenge for animal breeders. This study aimed to investigate the common diseases and causes of calf mortality in Milas province. The data of Muğla Chamber of Veterinarians shows that 45 ruminant veterinarians work in Milas district. 34 of them participated in this study through face-to-face interviews. A semi-structured interview method was used in this research. All participants are male and have at least 10 years of professional experience. Veterinarians answered 15 closed-ended questions about calf diseases. The results of the study show that 65% of the calves born get sick during the neonatal period, and 21% die within the first week. 88% of the calves born have diarrhea. The most frequent diarrheal agents are E.coli (53%), Cryptosporidiosis (29%), Rotavirus (9%), Coccidiosis (6%), and others (3%). Treatment was initiated when 50% of the calves were moderately dehydrated. More diseases have been seen in cowsheds where animal keepers are employed. Calves of Holstein cows are more prone to diseases and deaths than other breeds. 76% of animal owners do not follow the vaccination program. 76% of veterinarians think that any disease is transmitted from cow to calf. Antibiotics are mostly used in the treatment of calf diseases, such as quinolone (67%), tetracycline (12%), sulphonamide (12%), macrolide (6%), and others (3%). They stated that the calves had taken enough colostrum, but the quality of the colostrum was not good. The average age of weaning is 2.5 months and animal owners commonly use calf starter feed. The main causes of calf mortality are lack of knowledge of animal breeders (29%), care conditions (26%), insufficient vaccination (21%), inadequate feeding (12%), insufficient and poor quality colostrum (9%), and others (3%). This study has shown that calf diseases and deaths are still a significant problem for animal breeders and it is concluded that the breeders need more education on how to prevent calf diseases.

Keywords: Calf Diseases, Diarrheal Agents, Neonatal Period

A RETROSPECTIVE STUDY ON CYSTIC ECHINOCOCCOSIS IN LIVESTOCK IN NORTHERN TÜRKİYE

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Abstract:

This study was conducted retrospectively to evaluate the cystic echinococcosis status of farm animals from samples sent to Samsun Veterinary Control Institute of the Ministry of Agriculture and Forestry between January 2016 and December 2022. A total of 990 cattle, 818 sheep and 160 goat necropsy materials were examined histopathologically and macroscopically and the total cystic echinococcosis positivity rate in livestock was found to be 3.1% (61) in some provinces in northern Türkiye. Cysts were detected in at least one of the lung and liver in all cases. Cysts were found in the liver in 24 cases (39.3%), in the lung in 23 cases (37.7%) and in both lung and liver in 11 cases (18%). In addition, cysts were found in the lung and spleen in 1 case, in the kidney and liver in 1 case and in the heart and liver in 1 case. The positivity rate was higher in sheep than in other ruminants and the difference with other ruminant species was statistically significant ($p < 0.001$). The difference between the prevalence rates according to years was statistically significant ($p = 0.001$). Türkiye is described as a highly endemic region for *Echinococcus granulosus* and *Echinococcus multilocularis*. The information presented in this study will contribute to the status of cystic echinococcosis in livestock in northern Türkiye and to the development of prevention and control strategies.

Keywords: Cystic Echinococcosis; Postmortem Examination; Farm Animals; Histopathology; Prevention And Control

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POSTER PRESENTATIONS

QUALITATIVE HISTOLOGIC ASSESSMENT VS. GEOMORPHOMETRIC ANALYSIS OF NERVE FIBER SHAPE AFTER THE INTRANEURAL APPLICATION OF LIPOSOMAL BUPIVACAINE

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Abstract:

Introduction: The preserved form of all components of the nerve fiber is a prerequisite for the proper conduction of the nerve impulse. various factors can change the shape of nerve fibers. In everyday practice, qualitative histological analysis is the gold standard for detecting changes in shape. Geometric morphometry is an innovative method that objectively enables the assessment of changes in nerve fibers' shape after local anesthetics action.

Methods and materials: A total of sixty sciatic nerves were used as material, which was intraneural injected with saline solution in the control group (n=30), and a solution of 1.33% liposomal bupivacaine (n=30) in the test group. After the animals were sacrificed, nerve samples were taken and histological preparations were made. The preparations were first described and examined using a qualitative histological method, after which digital images were made. The images were entered into the MorphoJ program and processed using the method of geometric morphometry.

Results: Qualitative histological examination revealed no differences in nerve fibers after intraneurally applied physiological solution and liposomal bupivacaine. Using the method of geometric morphometry, a statistically significant change in the shape of axons was found after intraneurally applied saline solution and liposomal bupivacaine (p=0.0059).

Conclusion: No significant differences in histological changes were found after the qualitative histological analysis of nerve fiber cross-section preparations. A statistically significant change in the shape of nerve fiber axons was observed after geometric morphometric analysis of digital images after intraneural application of saline and liposomal bupivacaine.

Keywords: Liposomal Bupivacaine, Nerve Fiber, Qualitative Histology, Geometric Morphometry, Shape

BLOOD PRESSURE MONITORING IN CATS AND DOGS

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Abstract:

Blood pressure is a parameter that represents the pressure exerted by blood on the walls of blood vessels and is considered a critical indicator for evaluating the overall health status of animals. Timely detection and monitoring of hypertension, especially, are of vital importance. This review examines the importance of blood pressure in cats and dogs and the methods used for blood pressure monitoring.

It is indicated for monitoring animals at risk of systemic hypertension, those showing signs of organ damage, suspected hypotension, and animals under sedation or anesthesia. Blood pressure measurement can be performed in the sternal or lateral position, with measuring in a sitting position providing convenience for cats.

For dogs, normal blood pressure values range from 110 to 190 mm Hg for systolic blood pressure and 55 to 110 mm Hg for diastolic blood pressure. In cats, normal values are defined as 120 to 170 mm Hg for systolic blood pressure and 70 to 120 mm Hg for diastolic blood pressure.

Blood pressure can be measured invasively or non-invasively. Invasive measurement directly assesses arterial pressure and is considered the gold standard method. Monitoring is achieved by connecting a catheter placed in an artery to a monitor via a transducer. The catheter can be inserted into the dorsal pedal artery and coccygeal artery, or rarely into the lingual, radial, and auricular arteries.

Non-invasive methods are divided into the Doppler technique and the oscillometric method. Non-invasive techniques offer easy equipment availability and application. However, operator inexperience and incorrect cuff size selection can lead to inaccurate results. In the Doppler technique, a probe is placed on the artery distal to the cuff to perform measurements. The oscillometric method involves an automated device that inflates and gradually deflates the cuff. Measurements obtained through this technique are suitable for calm or sedated patients.

Keywords: Blood Pressure, Cat, Dog, Monitoring, Doppler, Oscillometric

A CASE OF OVARIAN CYSTS IN A GUINEA PIG

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Abstract:

A 4-year-old intact female guinea pig (*Cavia porcellus*), weighing 0.9 kg, was admitted to the Small Animal Hospital, Fac. of Vet. Med. in Ankara for vaginal discharge coexisting with worse physical condition and abdominal enlargement. She also had an alopecia complaint. Transabdominal ultrasonographic examination revealed a fluid accumulation in uterus. Ovariohysterectomy was performed. During the surgical procedure, cystic ovaries were found. Ovaries and uterine horns were examined pathologically and it was diagnosed as polycystic ovarian. Macroscopically, both ovaries exhibited cysts with a diameter of 3.2 cm in the left ovary and 2.9 cm in the right ovary. These cysts had distinct transparent capsules, were fluctuant to touch, and contained a yellow liquid that leaked when incised. The uterine serosa appeared dark red in color. Microscopically, cysts lined with compressed epithelial cells were prominent in all microscope fields. In uterus, vessels displayed hyperemia and free erythrocytes were observed in the serosa. Ovarian cysts are nonfunctional, fluid-filled that can develop spontaneously in guinea pigs. The cysts cause irregular estrus cycles, persistent heat, infertility and hair loss are associated with hormones such as estrogen. Cyst sizes are highly variable and it is thought that there may be a correlation between the age and the size of the cyst. It is usually observed bilaterally, but in unilateral cases, it is more frequently formed with the right ovary. The most common clinical sign is progressive hair loss without an abnormal appearance on the skin. Non-specific symptoms such as loss of appetite, lethargy or vocalization may also be seen, and guinea pigs may be defined as pear-shaped due to abdominal tension. Although ovarian cysts are a common pathology in guinea pigs, they are often misdiagnosed or can be confused with other diseases. In addition, since it is one of the common small mammal that is housed as a pet today, it would be appropriate to recommend a early sterilisation as in small animal medicine.

Keywords: Guinea Pig, *Cavia Porcellus*, Ovarian Cyst, Vaginal Discharge, Alopecia

TICK-BORNE INFECTIONS IN HORSES

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Abstract:

Global warming, environmental and ecological changes and the availability of suitable habitats increase the prevalence of ticks, and the importance of tick-borne diseases affecting animals and humans is increasing worldwide. The main tick-borne diseases of horses are equine piroplasmosis (EP) caused by *Theileria equi* and *Babesia caballi*, equine granulocytic anaplasmosis (EGA) caused by *Anaplasma phagocytophilum* and Lyme disease caused by *Borrelia burgdorferi*. Equine piroplasmosis is one of the two protozoan diseases that must be reported to the OIE and can cause serious health problems in horses. EP causes restrictions on the international movement of horses and economic losses in the global horse trade. *A. phagocytophilum*, which causes an acute febrile illness in horses known as EGA, has a wide host range and is also of public health importance due to its zoonotic nature. *B. burgdorferi*, the causative agent of Lyme disease, which affects humans and different animals, can cause neuromuscular effects in horses and poor performance in sport horses. In addition to the ones mentioned here, *Coxiella burnetii*, the causative agent of Q fever, which is a worldwide zoonosis, and different *Rickettsia* species, which are considered to have high zoonotic potential, and different piroplasmida species, which are considered specific to other animal species, are reported to be detected in horses. Diagnosis, prevention and control of diseases are closely related to the awareness of horse owners, physicians and researchers. The aim of this review is to present a list of tick-borne agents detected in horses, to introduce ways of protecting horses from ticks, and also to emphasise the importance of the subject in the "one health" concept in terms of zoonotic species.

Keywords: Tick Borne, Infection, Horse

IS MILK A RISKY FOOD FOR TOXOPLASMOSIS?

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Abstract:

Toxoplasmosis caused by *Toxoplasma gondii* (*T. gondii*) is a protozoan disease of zoonotic importance, spreading worldwide and causing economic losses. The risk of contracting *Toxoplasma* infection varies in different human populations, depending on culture and eating habits. It is a fact that most *Toxoplasma* infections in immunocompetent individuals are asymptomatic. Whereas according to the Quality or Disability Adjusted Life Years (QALY/DALY) approach used for the quantitative estimation of the burden of disease, the value calculated for *T. gondii* (both acquired and congenital Toxoplasmosis) was found to be higher than other foodborne pathogens. This study aimed to present the risk of *T. gondii* in milk and its presence in milk and dairy products by screening the literature.

T. gondii has three life stages in its biology, oocyst, tachyzoite and tissue cyst, which can infect humans and other hosts. The main foods that transmit this parasite are meat and meat products through tissue cysts, water through oocysts, poorly washed fresh vegetables and fruits, molluscs and fish, and milk and dairy products through tachyzoites.

The biological stage of *T. gondii* excreted in milk by the acutely infected host is the tachyzoite, and regeneration of *T. gondii* tissue cysts in the peripartum period, and a recirculating, excretable tachyzoite hypothesis is possible. Milk is also a food susceptible to oocyst transmission through faecal contamination. Transmission consuming raw goat milk to humans has been documented, and unpasteurized goat milk is considered a source of Toxoplasmosis in rural children. According to the literature, the prevalence of *T. gondii* in various milk types varies between 1.07% and 88.9% according to the PCR method.

In conclusion, Toxoplasmosis has considerable importance in the "One Health" concept. Monitoring the disease to control zoonotic and foodborne contamination is essential. Therefore, milk and dairy products should consider for foodborne Toxoplasmosis.

Keywords: Toxoplasmosis, Risky Food, Milk, Polymerase Chain Reaction

Investigation of the effect of calcitriol bolus after calving on postpartum uterus involution and ovarian activity in dairy jersey COWS

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ABSTRACT

In this study, it was aimed to study the parameters related to the oral administration of calcitriol bolus administered on the 1st postpartum day in Jersey cows and then the incidence of hypocalcemia, dry matter consumption, its effect on body condition score, incidence of mastitis, fertility and subsequent conception rate. For this purpose, a total of 27 pregnant heifers, 13 of which were in the study group and 14 in the control group, were followed up with the herd follow-up system for the last 60 days until the calving process, taking into account the dry period and transition period. Animals were recruited into the study 30 days before the expected due date and were followed from calving until the day of conception. The findings were recorded for later evaluation. The cows in the control group were not given any additives containing calcitriol after calving. Calcitriol-containing bolus (PhytoBiotics Active D Bolus) was given orally to the cows in the study group in the first few hours after calving. Active D bolus is an herbal feed supplement containing calcitriol glycosides and ursolic acid. It is aimed to dissolve in the rumen within 6-7 days after the application and to ensure the secretion of basic metabolites. The cows in the control group were not given any additives containing calcitriol after calving. All animals in both groups were similar according to the calving age and BCS. As a result of analyzes, it was determined that there were statistical differences between the groups in terms of fertility parameters. In the study group, the incidence of estrus (%) ($P<0,09$), time to conceive again ($P<0,001$) and the number of inseminations per pregnancy ($P<0,003$) were determined. As a conclusion of this study, it was concluded that calcitriol bolus applied postpartum in Jersey dairy cows may have a positive effect on the prevention of metabolic diseases that may be seen in the postpartum period and may have an effect on uterine involution, ovarian activity and fertility parameters.

Keywords: Hypocalcemia, Calcium, Vitamin D3, Postpartum Period, Jersey Breed, Dairy Cattle

INTRODUCTION

The number of modern farms in Turkey continues to increase. In the past century, there has been an increase in knowledge in various disciplines such as nutrition, genetics, health, and herd management, and this knowledge has started to be utilized in modern farms. In light of these developments, although the milk yield per cow has increased, there has been an increasing trend in the incidence of peripartum diseases and fertility problems. The transition period is known as the most critical period in high-yielding dairy cattle farms, where problems arise and intensive efforts are made to overcome these issues (Çakırcalı al., 2023)

Transition period, also known as the period from three weeks before calving to three weeks after calving in dairy cows. The three-week period before calving is referred to as the prepartum period (precalving period = prefresh transition period = close-up period = late dry), the three-week period after calving is called the postpartum period (early postcalving period = early lactation period), and the period that includes a few days before and after calving is known as the peripartum period (Grummer1995).

The transition period is considered the most critical period among the lactation stages. It is important to understand the changes occurring in the organism and the corresponding changes in nutritional requirements during this period. Animals during the transition period undergo significant metabolic, endocrinological, and nutritional changes in preparation for lactation. These changes can have various effects on the reproductive system, digestive system, immune system, and mammary glands (Alaçam, 2005). Metabolic diseases that occur during this period have a significant negative impact on milk production and reproductive performance, which are key factors in the profitability of dairy farming, ultimately reducing farm profitability (Hayırlı et al., 2012).

Almost all dairy cows during the transition period experience varying degrees of immunosuppression (Goff and Horst, 1997a). The incidence of many diseases during this period is associated with stress factors (Drackley et al., 2007). The high incidence of mastitis and metritis, which cause significant economic losses, is attributed to the suppression of the

immune system. It is predicted that cows with high body condition scores experience more severe immunosuppression. Both neutrophil and lymphocyte functions are decreased during this critical period. The occurrence of metabolic diseases such as milk fever and ketosis during this period can further exacerbate immunosuppression, leading to a loss of 60-80% of immune function. Increased stress during this period elevates plasma cortisol levels, further intensifying immunosuppression (Bobe et al., 2004). As a result, the transition period makes dairy cows more susceptible to infectious diseases (Drackley et al., 2001). Jersey cows in the early lactation period experience varying levels of negative energy balance (NEB) due to inadequate dry matter intake and the metabolic priority of milk production (Baird, 1982).

A decrease in blood calcium concentration is observed a few days before birth due to the utilization of calcium (Ca) for colostrum synthesis. In most cases, this level does not easily reach normal levels until a few days after birth. With the onset of milk synthesis, the demand for Ca increases approximately fourfold. Until the absorption capacity of Ca in the digestive system is enhanced, the requirement for Ca needs to be met from the bones (Horst et al., 1997)."

The blood calcium level usually cannot reach normal levels immediately in the days following birth. The elevation in corticosteroid and estrogen levels during birth, along with a decrease in vitamin D receptors in the intestines, can disrupt calcium absorption. The increased demand for calcium, due to the rapid increase in milk production, is approximately four times higher than normal. The increased calcium requirement is met by mobilizing calcium from the bones until calcium absorption in the digestive system improves (Goff and Horst, 1997b). The blood calcium level is regulated and controlled by parathyroid hormone and the production of 1,25-dihydroxycholecalciferol from vitamin D3. If not upregulated, the system starts very slowly. In cows, only a small amount of calcium (8-10 g) circulates in the blood, while the rest is stored in the bones (6000 g) and intestines (80-100 g). Cows are equipped with a mechanism to utilize stored calcium, but the activation of this mechanism is slow if the animal is not prepared (Goff, 2008).

Hypocalcemia in clinical and subclinical forms. Both forms can weaken the immune system and lead to an increased incidence of diseases (Horst et al., 1997). Hypocalcemia can cause

retention of the placenta by reducing uterine muscle tone, prevent full contraction of the teat sphincter muscles by hindering the contact of teats with the ground when the animal is unable to stand, and result in mastitis. The decreased uterine muscle tone due to hypocalcemia can lead to uterine prolapse. Additionally, it can cause a decrease in feed intake. The reduction in feed intake reduces the physical filling of the rumen and promotes the passage of volatile fatty acids (VFAs) from the rumen to the abomasum, leading to a decrease in the height of solid mass in the rumen and reduced contractility in the abomasum. These events make cows more prone to abomasal displacement. The decrease in feed intake exacerbates negative energy balance, making the animal more susceptible to fatty liver and ketosis. Furthermore, hypocalcemia reduces insulin secretion, which suppresses tissue glucose uptake. Reduced glucose uptake accelerates lipid mobilization, increasing the risk of ketosis (Grummer, 1995).

Clinical hypocalcemia is characterized by sudden decrease in ionized calcium levels in the body upon the onset of lactation, leading to symptoms such as muscle spasms, partial paralysis, loss of consciousness, coma, and in severe cases, death. It is commonly observed in high milk-producing cows, but the overall incidence of clinical hypocalcemia is generally lower compared to subclinical hypocalcemia (Goff, 2008). Subclinical hypocalcemia (total blood Ca <2.1 mmol/L) often goes unnoticed as it does not exhibit distinct clinical symptoms. Subclinical hypocalcemia affects more than 50% of postpartum cows in dairy farms and predisposes them to various diseases (Reinhardt, et al., 2011). Low blood calcium concentrations in cows can result in compromised fertility parameters, including disruption in ovarian cycling, estrus detection, conception, and pregnancy maintenance. These conditions are believed to be associated with increased negative energy balance, reduced blood flow to the ovaries due to low calcium levels, weakened immune function, impaired uterine muscle contraction, and consequently slower involution process (Reinhardt et al., 2011; Philippa et al., 2018).

In order to prevent hypocalcemia in cows, various methods are utilized including the use of anionic salts (Overton and Waldron, 2004; Goff and Horst 1997a; Correa et al., 1993a;b), regulation of mineral content in the diet (Moreira et al., 2009; Cattle, 2001), administration of Vitamin D (Moreira et al., 2009), use of zeolite (Overton and Waldron, 2004), regulation

of calcium and phosphorus ratio supplementation of selenium and Vitamin E (Miller, 1993), low-calcium diets (Oetzel et al., 1988), dietary cation-anion difference (Oetzel et al., 1988; Grummer, 1995; Oetzel, 2004), and various boluses (Oetzel et al., 1988). Additionally, calcitriol, also known as 1,25-dihydroxycholecalciferol, which is the active form of Vitamin D normally produced in the kidneys, is used for the same purpose. Calcitriol binds to and activates the Vitamin D receptor in the cell nucleus, leading to increased expression of several genes. It primarily regulates blood calcium (Ca^{2+}) levels by enhancing calcium absorption in the intestines and is used for correcting hypocalcemia. Calcitriol has a rapid onset of action (1-4 days) and a short half-life (4-6 hours) (Oetzel et al., 1988).

This study aims to investigate the effects of oral administration of calcitriol bolus on hypocalcemia, milk production, milk composition, incidence of certain postpartum diseases, reproductive performance, and subsequent conception rate in high-yielding dairy cows within the first day after calving.

MATERIALS AND METHODS

Animal Material:

This study was conducted using the 27 pregnant heifers selected from among the 50 dairy cows on a farm located in Kırikkale. The animals used in the research are kept in a semi-open barn with a locking system, and automatic locking system feeders and drinkers are used to determine individual dry matter intake. The farm is monitored by a herd monitoring system called SCR (Allflex Livestock Intelligence).

A total of **27 pregnant heifers**, consisting of 13 in the study group and 14 in the control group, were included in the research. Their dry period, transition period, and the last 60 days until parturition were monitored using the herd monitoring system. The animals were acquired 30 days before the expected calving date and were followed until the day they conceived after calving.

Group Formation:

During the 3-week period before calving, the Dry Matter Intake (DMI) and prepartum Body Condition Score (BCS) were monitored for the 27 selected cows considering the planned

calving dates. Among the selected cows, 13 were classified as the study group and 14 as the control group. Each cow included in the study and control groups was individually placed in calving pens one month before parturition. Their feed and water intake were monitored, and daily feed intake and rumination rate were observed from the graphical data of the herd monitoring system called SCR. The birthing process was closely monitored from the beginning to the end when the system provided a birthing alert.

Study Group (Active D; n: 13):

Cows in the study group were orally administered a bolus containing calcitriol (PhytoBiotics Active D Bolus) within a few hours after calving. The Active D bolus is a plant-based feed additive supplement containing calcitriol glycosides and ursolic acid. It plays an effective role in increasing calcium uptake in the blood. It dissolves in the rumen within 6-7 days after administration and releases its essential metabolites.

Control Group (CON; n: 14):

Cows in the control group did not receive any supplement containing calcitriol after calving.

Group Rations:

Both the study and control groups were fed a ration consisting of alfalfa, silage, straw, feed, barley, grass silage, and corn flakes. The ration values for both groups are shown in Table 1. The same ration was providing Group d to both groups throughout the study.

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Postpartum Monitoring and Interventions for Animals

BCS and Dry Matter Intake

The prepartum and postpartum 30th-day Body Condition Score (BCS) values of the 27 pregnant heifers were determined by using a combination of inspection as described by Ferguson et al. (1994) and palpation as described by Widman et al. (1982). Scores ranging

from 1.0 to 5.0 were assigned by the same person after the morning milking. The daily dry matter intake of the animals was monitored starting 30 days before the expected calving date (-30) and continued for the first 30 days (+30) of lactation. Weekly records were kept for each animal, and the daily rumination rates were recorded from the SCR system for later use.

Table 1. Group Ration

Feed	DM	AF
DM %	100,00	53,02
Fodder	49,00	63,06
HP%	17,53	9,29
RUP(%CP)	39,22	39,22
RDP(%CP)	60,78	60,78
Sol Prot (%CP)	31,78	31,78
ME (mCal/kg)	2,44	1,30

Retained Fetal Membranes and Metritis

During the first 3 days after calving, the expulsion process of the fetal membranes was monitored in both animal groups. Animals that did not expel the fetal membranes or were suspected of retaining them underwent vaginal examination. After the examinations, interventions were carried out for animals that did not expel the fetal membranes, and in necessary cases, a decision was made to administer parenteral antibiotics. Particularly during the first 10 days postpartum, the animals were examined for puerperal metritis, and attention was paid to lochia discharge following estrus within 40 days postpartum. During the daily examinations of the animals included in the study, the presence of a foul-smelling and non-clear discharge from the vagina was considered as a uterine infection. For cases of retention of fetal membranes and subsequent puerperal metritis, the same treatment protocol was established for each animal and applied until recovery. Animals with metritis were not bred until they recovered, even if they exhibited estrus.

Involution Monitoring and Genital System Examinations

On the postpartum 3rd day, the presence of retained fetal membranes in the vagina and vulva area was primarily checked by inspection, and in suspicious cases, vaginal and ultrasound (USG) examinations were performed for verification. Rectal examination was performed on all animals in the active and control groups on the postpartum 3rd and 30th days to examine the position and tone of the uterus.

Failure to determine the boundaries of the uterus on the 10th day, the uterus hanging outside the pelvic boundaries and not perceiving the uterine tone were defined as delayed uterine involution. In animals with delayed uterine involution, attention was paid to the condition of lochial discharge from the uterus during the rectal examination on the 10th day postpartum.

On the postpartum 30th day, the genital organs, ovaries, and uterus were examined by rectal and ultrasound methods. This examination evaluated the involution status of the uterus, scoring of vaginal discharges, and the presence of clinical endometritis. Subsequently, ovarian examination was performed to check the CL (corpus luteum) and the presence of cysts.

In animals where the fetal membranes were not expelled and uterine involution was delayed, an inspection was conducted on the postpartum 30th day to examine the vaginal discharge.

Mastitis

Animals were also monitored for mastitis during the postpartum period. The California Mastitis Test (CMT) was performed in cases suspected during pre-milking and during milking (Baştan, 2019; 2022). In necessary cases, both parenteral and intramammary antibiotic treatments were administered.

Hypocalcemia, Ketosis, and Abomasal Displacement

In the presented study, an investigation was conducted considering metabolic diseases based on daily rumination and lying animal alerts from the SCR system, as well as daily examinations. Animals showing ketosis were examined through system alerts due to sudden decrease in milk yield and decrease in rumination, and after the examination, the presence of acetone odor from the mouth, slowing of rumen movements, and decreased

appetite were considered as indicators of ketosis. In terms of hypocalcemia, one animal exhibited sudden lying behavior on the second day after calving, weakness in reflexes, decreased appetite, and weakened rumen movements. It was diagnosed after a field examination and inspection. Regarding abomasal displacement, sudden decrease in rumination, abnormal defecation, and no abnormal conditions observed in rumination and appetite were taken into account. The criterion was the detection of a ping sound through auscultation.

Evaluation of Fertility Parameters

In the study, the first estrus times of all animals were determined using the Allflex SCR system. After rectal and ultrasonographic examinations, the estrus indexes of animals in estrus were monitored and recorded through the system. Based on the daily observations and examinations of the animals, the times of their first estrus after calving were determined, and the first insemination of animals without metritis was performed when they exhibited estrus for the second time. After a voluntary waiting period, artificial insemination was performed with Jersey semen on animals that exhibited estrus and had an estrus index of 60% or higher according to the Allflex system, and the results were recorded. Pregnancy examination was conducted using ultrasonography on the 30th day following artificial insemination. Linear rectal probes with a scanning depth of up to 240 mm were used for uterine, ovarian, and pregnancy examinations, employing a 6.4-inch-wide monitor ultrasound device. Pregnancy diagnosis was confirmed by performing a follow-up ultrasound examination on cows on the 60th day to check for possible embryonic death.

Based on the obtained values, the following fertility parameters were calculated:

Service period: The duration between the calving date and the date of the last insemination resulting in the subsequent pregnancy.

Gestation period: The duration between the calving date and the date of becoming pregnant with the respective calf. The calving interval refers to the duration between two consecutive calving dates.

Number of inseminations per pregnancy: The number of inseminations performed until the next pregnancy after calving.

Statistical Analysis

Descriptive statistics were calculated for the data, with quantitative variables presented as "Mean \pm Standard Error" or "Median (Minimum-Maximum)," and categorical variables presented as frequency (n) and percentages (%). Prior to hypothesis testing, the data were examined for normality using the Shapiro-Wilk test in terms of parametric test assumptions, and for homogeneity of variances using the Levene test. Group differences for quantitative variables were examined using the student t-test for variables that met the assumptions of parametric tests, and the Mann Whitney U test for variables that did not meet the assumptions. The Fisher exact test was used to examine differences in the frequency distributions of categorical variables between groups. A significance level of $p < 0.05$ was used for all statistical evaluations. SPSS 21 software package was used for the analysis

RESULTS

The transition period, antepartum, and postpartum period of 27 Jersey cows were examined in the study. The findings obtained from the study, which investigated the effects of a postpartum bolus of calcitriol administered on the first day after calving on preventing postpartum problems, protecting against hypocalcemia, controlling the involution process, genital canal examination, estrus timing, time to rebreeding, and number of inseminations per pregnancy, are presented below.

Body Condition Score (BCS) of Cows

The BCS values of the 27 pregnant heifers (13 in the study group and 14 in the control group) before calving and on the 30th day postpartum are presented in Table 2.

Postpartum Period Follow-up

The findings obtained from the examinations conducted until the 10th day postpartum are presented in Table 3.

Table 2. Follow-up of BCS in the study and control groups before calving and on the 30th day postpartum

	Study Group n	Mean ± Std. Error	Median (Min- Max)	Control Group n	Mean ± Std. Error	Median (Min- Max)	P	
BCS Before Calving	13	3 ± 0.14	3 (2 - 4)	14	3.07 ± 0.16	3 (2 - 4)	0.583	x
BCS Day 30	13	2.41±0.03	3 (2 - 3)	14	2.41±0.02	3 (2 - 3)	0.584	y

x: Mann Whitney U test, y: Student t test

Table 3. Results of placental expulsion, uterine involution, retention of fetal membranes, and metritis in the control and study groups.

		Study Group n (%)	Control Group n (%)	P*
Placental Expulsion	No	1 (%7.7)	2 (%14.3)	1
	Yes	12 (%92.3)	12 (%85.7)	
Uterine Involution	No	2 (%15.4)	3 (%21.4)	1
	Yes	11 (%84.6)	11 (%78.6)	
Retention of Fetal Membranes	No	11 (%84.6)	11 (%78.6)	1
	Yes	2 (%15.4)	3 (%21.4)	
Metritis	No	12 (%92.3)	11 (%78.6)	1
	Yes	1 (%7.7)	3 (%21.4)	

In the study group, metritis was diagnosed in 1 animal, while in the control group, it was diagnosed in 3 animals, resulting in a total of 4 animals with purulent or mucopurulent vaginal discharge observed during the postpartum period between days 25-35. There was no significant difference between the two groups in terms of retained fetal membranes and metritis ($P>0.05$).

Placental Expulsion and Retained Fetal Membranes

When evaluating the timing of placental expulsion and the incidence of retained fetal membranes between the groups, it was determined that in the study group, 92.3% of the animals expelled the fetal membranes within the first 24 hours after calving, while in the control group, 85.7% of the animals did the same. The incidence of retention of fetal membranes was 15.4% in the study group and 21.4% in the control group. However, there was no statistically significant difference between the groups ($P>0.1$).

Uterine Involution

In evaluating uterine involution, delay in involution was detected in 15.4% of the animals in the study group and 21.4% of the animals in the control group during the rectal examination performed on the 10th day. However, there was no statistically significant difference between the groups ($P>0.1$).

Metabolic Diseases and Mastitis

The numbers of mastitis and metabolic diseases observed in the animals during the study period, especially in the first 30 days postpartum, are shown in Table 4 for both the study and control groups.

Table 4. Results of mastitis, hypocalcemia, ketosis, and abomasal displacement in the study and control groups.

		Study Group n (%)	Control Group n (%)	P
Mastitis	No	13 (%100)	13 (%92,9)	0,596
	Yes	0 (%0)	1 (%7,1)	
Hypocalcemia	No	13 (%100)	13 (%92,9)	1
	Yes	0 (%0)	1 (%7,1)	
Ketosis	No	11 (%84,6)	12 (%85,7)	1
	Yes	2 (%15,4)	2 (%14,3)	
Abomasal Displacement	No	13 (%100)	14 (%100)	NA
	Yes	0 (%0)	0 (%0)	

In the study and control groups, no cases of abomasal displacement were observed. Following the tests and clinical findings, clinical mastitis was observed in 1 animal in the control group, while no cases of mastitis were detected in the animals in the study group. The incidence of ketosis was found to be 15.4% in the study group and 14.3% in the control group. Regarding hypocalcemia, no cases of hypocalcemia were found in the animals in the study group, while 1 animal in the control group was diagnosed with hypocalcemia, resulting in an incidence of 7.1% in the control group. There was no statistically significant difference between the two groups in terms of mastitis ($P>0.59$) and metabolic diseases ($P>0.05$).

Fertility Parameters and Pregnancy Examination

After completing all the procedures in the study, fertility parameters were determined through calculations. The time to first postpartum estrus, estrus index during this period (%), interval between inseminations, and interval between postpartum pregnancies were determined ($P<0.001$), as well as the number of inseminations per pregnancy. Significant differences were observed between the study and control groups, particularly in the number of inseminations per pregnancy ($P<0.003$). The specified fertility parameters are provided in Table 5. Following pregnancy examinations, the dates of positive pregnancy examinations were recorded. The average time to subsequent pregnancy was determined as 73 days in the study group and 121 days in the control group, showing a statistically significant difference between the two groups in terms of the time to subsequent pregnancy parameter ($P<0.001$).

Table 5. Results of various fertility parameters in the study and control groups

	Study Group			Control Group			P	
	n	Mean ± Std. Error	Median (Min-Max)	n	Mean ± Std. Error	Median (Min-Max)		
First postpartum estrus	13	42,31 ± 4,65	48 (10 - 61)	14	53 ± 3,59	49,5 (36 - 83)	0,079	y
Estrus index (%)	13	80,62 ± 2,83	78 (62 - 96)	14	71,14 ± 4,46	75 (42 - 96)	0,09	y
Interval between postpartum pregnancies	13	73,69 ± 3,17	73 (56 - 95)	14	123,79 ± 9,04	121 (60 - 201)	<0,001	y
Number of inseminations per pregnancy	13	1,62 ± 0,18	2 (1 - 3)	14	2,71 ± 0,24	3 (1 - 4)	0,003	x

x: Mann Whitney U test, y: Student t test

DISCUSSION

In current research worldwide, the 5-point scale method developed by Edmonson (1989) is commonly used for determining the BCS in dairy cows. Ruegg (1991) reported that BCS should be monitored 4-6 times in each lactation and should be accompanied by gynecological examinations. At the beginning of the dry period, the BCS should be the same as the predicted BCS at calving (Whitter et al., 2023). During calving, every half kilogram of body fat provides the energy required for 3.2 liters of milk production. Many healthy dairy cows experience a negative energy balance during the first three months of lactation, and low-condition cows tend to lose condition more rapidly in the first weeks after calving. This condition can lead to a decrease in conception rates and an extended inter-calving interval, resulting in economic losses. Freshly calved dairy cows have a tendency to convert most of the consumed feed into milk. In first-calving heifers, the BCS should be 5 or 6 on a 1-9 scale during this period. Higher BCS increases the risk of calving difficulties. It can also increase

the risk of fetal death, injury to the birth canal, increased load on the legs leading to lameness, and foot diseases. Additionally, cows with high BCS are more prone to metabolic diseases such as ketosis, as high BCS occasionally causes an increase in ketone bodies in tissues and blood (Whittier et al., 2023). In the present study, BCS was evaluated at calving, and it was determined as 3 ± 0.14 in the study group and 3.07 ± 0.16 in the control group. No significant difference was found statistically between the groups, indicating that the groups were comparable.

Ferguson (2023) reported the postpartum first 30 days as the period with the highest BCS loss. In the current study, BCS was determined as 2.41 ± 0.03 in the study group and 2.41 ± 0.02 in the control group based on the evaluation performed on postpartum day 30. As previously reported (Ferguson, 2023), key points to consider in herd-level BCS evaluation are the changes related to the lactation period, the level of BCS score change determined after monthly checks, and the determination of score change between existing groups of animals. By considering these three points, it is possible to determine whether the desired environmental conditions for the cows are sufficient. In the present study, no statistically significant difference was observed in terms of calving time and postpartum evaluation on day 30 in both groups ($P > 0.05$), suggesting that the current conditions on the farm were considered to be optimal for the cows.

Overall, the findings of this study emphasize the importance of monitoring BCS in dairy cows, particularly during the postpartum period. Proper management of BCS can help minimize the risk of metabolic diseases, improve fertility parameters, and ultimately contribute to the overall productivity and profitability of dairy farming operations.

The methods for determining and monitoring energy balance in dairy cow farming can be summarized under the following headings: (1) Evaluation of body condition score, (2) Determination of certain blood metabolite and hormone levels, (3) Measurement of live weight, (4) Evaluation of milk composition, (5) Determination of dry matter intake (LeBlanc et al., 2002). In the presented study, dry matter intake was monitored weekly for each animal starting 30 days before the expected calving date (-30) and throughout the first 30 days of lactation (+30), and daily rumination rates were also monitored using the SCR system. It was observed that DMI in both the control and treatment groups was very similar, showed

parallelism with the results of BCS, and there was no statistical difference between the groups ($P>0.05$). Based on the BCS and DMI results of the study and control groups, it was considered that selecting and implementing only one method could be sufficient for determining and monitoring energy balance.

It has been reported that the first calving age is largely dependent on the age at first breeding. (Duru et al., 2004) For example, it has been reported that Holstein heifers can be used for breeding at 420-480 days of age for the first time, so the first calving age should be between 720-780 days. It has been reported that having an ideal BCS (BCS 3.00) at birth shortens the postpartum first estrus interval (Grainger et al., 1982). In the study, the average first calving age for the treatment group and control group was found to be 771.92 days and 782.21 days, respectively. There was no statistically significant difference between the groups in terms of calving age ($P=0.75$). However, it was confirmed that the study was conducted with a herd with a sample calving age ($P>0.05$).

During the postpartum period, milk production tends to increase periodically, reaching its peak around 6-8 weeks after birth. Any decrease or fluctuation in milk production during this period may indicate the possibility of metabolic or other health issues in the animal. It has been reported that by observing milk production in the first weeks after calving, the presence or likelihood of metabolic diseases can be detected with a 98% accuracy rate. In a study, a decrease of 3-6 L/day in milk production compared to healthy cows was observed 7-10 days before diagnosing metabolic problems such as ketosis or abomasal displacement. Furthermore, it was reported that this decrease intensifies 2-3 days prior to the onset of the disease (Leblanc et al., 2002). Other economically significant diseases causing a reduction in milk production, such as mastitis, abomasal displacement, and metritis, have been reported (Leblanc, 2014). In the presented study, although statistically insignificant, clinical metabolic diseases were observed in 2 animals in the treatment group, including 2 cases of clinical ketosis, while in the control group, 2 cases of clinical ketosis, 1 case of hypocalcemia, and 1 case of clinical mastitis were diagnosed. No abomasal displacements were observed in either group. Although not statistically significant, it is believed that an oral bolus containing calcitriol administered immediately after calving may have an effect in

preventing postpartum diseases, and further studies with a larger sample size are needed to investigate this topic further.

The ongoing contractions of the uterus after calf play an important role in the expulsion of fetal membranes by disrupting the fetal-maternal connections. The sufficient intensity and regular intervals of contractions are closely related to inadequate secretion of postpartum prostaglandin F2 alpha and the level of ionized calcium in the blood. Inadequate secretion of prostaglandin F2 alpha and low levels of ionized calcium in the blood can lead to delayed uterine involution and the development of puerperal disorders such as postpartum metritis and retained placenta (Risco, 1992). Some studies have found significantly lower levels of calcium and phosphorus before, during, or after parturition in animals with retained placenta (Tveit et al., 1991). The absorption of calcium from the intestines is positively influenced by vitamin D, parathyroid hormone, and an acidic pH in the intestinal environment, while cortisol and estrogen have a negative effect on calcium absorption (Goff and Horst, 1997b). The high levels of cortisol and estrogen at the time of birth and the decrease in the number of vitamin D receptors in the intestines can explain the low levels of calcium. However, some researchers have reported no significant differences in the same parameters between animals with and without retained placenta (Tveit et al., 1991). In the presented study, retained placenta was observed in 21.4% of animals in the control group and 15.4% of animals in the treatment group. When comparing the two groups, no statistically significant difference was found. It is believed that this may be due to the inclusion of heifers that had their first calving in the study, the inclusion of animals with normal calving, and the limited sample size in both the control and treatment groups. It is suggested that further studies, especially involving multiparous animals of advanced age, are needed to better demonstrate the effectiveness of calcitriol.

Monitoring the process of involution using various methods is important for distinguishing between physiological and pathological changes and for the treatment of infections (Sheldon, 2006). It is known that postpartum uterine infections can delay uterine involution (Fonseca et al., 1983; Mateus et al., 2002). In assessing the completion of involution, the criteria include the palpable presence of the uterus in the pelvic cavity during rectal palpation and the evaluation of the dimensions of the uterine horns and body the uterus

could be palpated in the pelvic cavity in 58% of cases on postpartum day 14 and in 100% of cases on postpartum day 28. Gonzalez et al., 1999 reported that the uterus could be palpated abdominally with a 95% probability in the first week postpartum, 91.8% probability in the second week, and 17.2% probability at 6 weeks postpartum. Uterine involution is reported to vary depending on physical trauma, overall health status of the animal, age, breed, proper ration preparation, lactation number, milk production, and many other factors (Sheldon, 2006). Under optimal conditions, uterine involution is completed between postpartum days 23 and 42, but in over 50% of animals, it occurs between postpartum days 29 and 35 (Zain et al 1995). It has been reported that uterine involution is completed between postpartum days 15-25 in cows that allow calf suckling, between postpartum days 25-30 in cows undergoing machine milking, and between postpartum days 30-40 in high-yielding cows (Kaewlamun et al., 2011). In the presented study, the location and position of the uterus were evaluated considering the monitoring of uterine involution and its potential impact on uterine infections and reproductive performance. Since uterine involution continued until postpartum day 40 in both groups, it was concluded that the administration of calcitriol bolus immediately after birth was not directly related to the involution process monitored in the groups.

The period from calving to the next conception is considered as the service period in cows. In dairy farming, it is ideal to have a cow calve once a year, milking for 10 months and dry for 2 months. The calving interval is equal to the sum of the service period and the gestation period or the lactation period and the dry period (Özçakır and Bakır, 2003). Since the gestation period cannot be altered, it is desired for the service period to meet the above condition. In order for the calving interval to be around 12 months, the service period should be within 70-90 days (Özçakır and Bakır, 2003). In cows, the service period significantly increases during spring and summer months due to increased environmental temperature and humidity, while it approaches optimal values during autumn and winter months when the environmental temperature is most suitable for physiological activities (De Rensis et al 2003). In a study conducted in Thailand, it was reported that the service period was longer in cows calving in February (299 days) and shorter in cows calving in October/November (133 days) (Kaewlamun et al., 2011). Cows prepare their reproductive organs for pregnancy during the service period after calving. During the dry period, the worn-out milk secretory

tissues regenerate and prepare for the upcoming lactation. In a study investigating the effect of heat stress on some reproductive performance traits in Jersey cows, it was found that the service periods in autumn (73.59 days) and summer (72.92 days) were higher compared to spring (70.47 days) and winter (61.94 days) (Teke and Akdağ, 2012). In the presented study, the mean time to rebreeding was 123.79 days in the control group and 73.69 days in the study group ($P < 0.001$). These results indicate that the administration of a calcitriol bolus in farms with low reproductive efficiency and longer service periods can be crucial in achieving desired fertility parameters.

The time of the first estrus after calving and the heat index (%) observed during this period, it is known that the interval between calving and postpartum first estrus in dairy cows is between 25-45 days (Crowe, 2008). However, it is considered normal for the first estrous cycle after calving to last less than 21 days (Remnant, 2015). Irregular estrous cycles observed in cows during this period lead to an extension in the interval of postpartum first ovulation. This condition negatively affects milk and reproductive efficiency. Nowadays, there are many methods for detecting estrus. The accurate detection of estrus directly affects fertility parameters. It has been reported that an increase in this rate enhances the success of insemination and consequently improves pregnancy rates (Dinç, 2015). In the presented study, the average heat index determined in the first estrus through estrus monitoring was found to be 80.62% in the study group and 71.14% in the control group ($P > 0.09$). The number of inseminations performed for a cow to become pregnant is expressed as the number of inseminations per pregnancy. However, for this, the accurate determination of estrus time is necessary. For successful breeding, the number of inseminations per pregnancy should be low. The number of inseminations per pregnancy is considered good between 1.0-1.5, moderate between 1.5-2.0, and poor above 2.0 (Alpan and Arpacık, 1998). In a study evaluating the reproductive performance of Jersey cattle raised on a state farm in Ethiopia, Lemma (2010) reported a service period of 174.68 days and a number of inseminations per pregnancy of 1.79. In a study conducted using data from Jersey cattle raised at Karaköy Haras between 2003 and 2009, the service period was determined as 102.84 days (Gürses et al., 2014). In the presented study, the average time to re-conception and the number of inseminations per pregnancy were found to be 123.79 days and 2.71 in the control group, and 73.69 days and 1.62 in the study group, respectively. After evaluating the groups, a

statistically significant difference was determined between the time to re-conception ($P < 0.001$) and the number of inseminations per pregnancy ($P < 0.003$). These results not only demonstrate the success of estrus detection but also suggest that the administration of calcium bolus after calving can improve ovarian functions, reduce the time to re-conception, decrease the number of inseminations per pregnancy, and potentially contribute to significant differences in reproductive efficiency.

CONCLUSION

In conclusion, when the results obtained in this study are considered together, the administration of Calcium bolus after calving in dairy Jersey cows has the following effects: it does not show any significant changes in SRC between the two groups during the lactation period, there is no significant difference in SRC and results together, suggesting that selecting and applying only one method may be sufficient for determining and monitoring energy balance, it does not provide a significant difference in terms of the incidence of metabolic diseases, but it significantly differs between the two groups in terms of the number of inseminations per pregnancy and the time to re-conception.

Therefore, it is concluded that the administration of Calcium bolus after calving can improve ovarian functions, reduce the time to re-conception, and decrease the number of inseminations per pregnancy. In addition, the simple use of the bolus and its functional effects are considered as one of the alternative and innovative methods to support the cow during a specific stress period, compared to the application of phytobiotics. However, it is believed that further comprehensive research is needed, especially regarding the effect of Calcium on the involution process and postpartum diseases, and a more detailed examination in multiparous animals.

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Ethical Statement

Research has been granted permission from the Kırıkkale University Animal Experiments Local Ethics Committee with decision number 2023/03 and date 22/03/2023

Animal Welfare

The authors confirm that they have adhered to arrive guidelines to protect animals used for scientific purposes.

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VEHBI GÜNEŞ

YOUNG RESEARCHER OF THE YEAR

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2ND DENİZ YENİ

"THE EFFECT OF ARBUTIN ON THE CRYOPRESERVATION OF RAM SPERM"

3RD TOLGA MERİÇ TÜMBEK

"INVESTIGATION OF THE HEALING EFFECTIVENESS OF PINE RESIN IN EXPERIMENTALLY INDUCED CORNEAL WOUND IN RATS"

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