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*Proceedings of*

**International E-Conference on**

# ANIMAL SCIENCE AND VETERINARY MEDICINE

**March 21-22, 2022 | Webinar**

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## NOTE:

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## SPEAKER PRESENTATIONS

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## Migratory birds: the silent carrier of multidrug resistant bacterial pathogens!

**Prof. Dr. Md. Tanvir Rahman**
Department of Microbiology and Hygiene, Faculty of Veterinary Science, Bangladesh Agricultural University, Mymensingh-2202, Bangladesh

Antimicrobial resistance (AMR) posses a major threat to human health globally. Migratory birds could be a potential source of antibiotic-resistant (ABR) bacteria. Not much is known about their role in the transmission of ABR in Bangladesh. In this study, 66 freshly dropped fecal materials of migratory birds were analyzed for isolation and identification of bacteria based on cultural properties, biochemical tests, and PCR. Disk diffusion test and PCR were also done to detect resistance phenotype and genotype. Among the 66 samples, 60.61% were positive for *Enterococcus* spp. 21.21% for *Salmonella* spp. and 39.40% for Vibrio spp. *Enterococcus* isolates were frequently found resistant (100–40%) to ampicillin,streptomycin, meropenem, erythromycin, and gentamicin; *Salmonella* resistant (72–43%) to chloramphenicol, tetracycline, ampicillin, streptomycin, and erythromycin; and Vibrio spp. resistant (77–31%) to vancomycin, ampicillin, erythromycin, tetracycline, and streptomycin. In addition, 60% *Enterococcus* spp., 85.71% *Salmonella* spp., and 76.92% Vibrio spp. isolates were MDR in nature. In addition, 55 *E. coli* isolates including 21 ESBL producer and MDR. Genes encoding resistance to tetracycline (tetA, 100%, tetB, 31.43%), fluoroquinolone (qnrA, 35.71%; qnrB, 25%), and streptomycin (aadA1) were detected in the isolated *E. coli*. All the ESBL-producing *E. coli* isolates harbored at least two or more beta-lactamase genes e.g., *blaTEM, blaCTX-M, blaCMY, and blaSHV.* Interestingly many of these *E. coli* also carried APEC-specific genes- *fimC* (67.27%), *iucD* (29.09%), andpapC(5.45%). Frequent detection of MDR bacteria from migratory birds travelling to Bangladesh suggests their potentiality to carry and spread ABR bacteria and are of great public health concern. We recommend these birds to be kept under AMR surveillance program to minimize the potential risk of contamination of one health components to reduce AMR-related hazards.

**Keywords:** Antibiotic resistance, Migratory birds, Transmission, MDR, Genotype, ESBL, One health

## Biography:

Dr. Md. Tanvir Rahman is a Professor in the Department of Microbiology and Hygiene at Bangladesh Agricultural University (BAU) and the Director of Professor Mohammad Hossain Central Laboratory of BAU. His academic qualification includes DVM from Bangladesh Agricultural University, MSc from University of Guelph, Canada, PhD from University of Warwick, UK and Postdoc from the Max Planck Institute for terrestrial Microbiology, Germany. His major responsibilities are teaching, research and supervision. Prof. Rahman is currently leading a research group working on antimicrobial resistance, host-microbes interaction, ecology, vaccine, food hygiene, and public Health at BAU.

Dr. Rahman is also an Adjunct Visiting Professor, Xinxiang University, Henan, China, General Secretary, Bangladesh Society for Veterinary Education and Research, Member of Technical expert committee for the development of AMR surveillance protocol, Government of Bangladesh and Member of the Technical Committee on Biological Risk and Biosecurity, Bangladesh Food Safety Authority, Government of Bangladesh.

Earlier Prof. Rahman worked as the Senior Regional Vaccine Consultant of Government of the People's Republic of Bangladesh and Head of the Department of Microbiology and Hygiene, Bangladesh Agricultural University, He has published around 131 papers in national and International peer-reviewed journals and supervised and co-supervised 85 MS and PhD students and complete several research projects in home and abroad. Prof. Rahman is also working as editor and reviewer for several International peer reviewed Journals including Bangladesh Veterinary Journal, Antibiotics (MDPI), Veterinary Infectious Diseases (Frontiers in Veterinary Science), Microbiological Research (Elsevier). Veterinary World (India), Journal of Veterinary Science (Korea) etc.

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## Quality and Safety of Delactosed Dairy Products

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Mineral elements are ingested through the diet. Essential minerals have structural, biochemical, nutritional and catalytic functions; therefore, they are fundamental for human and animal health. In this research, thirty commercial delactosed dairy products from different varieties were supplied by various markets and their mineral contents were determined by using inductively coupled plasma mass spectrometry (ICP-MS) with the following aims: (1) to highlight the differences among various products; (2) to evaluate if it is possibly related to the analyzed samples of their product group; (3) to evaluate the nutritional quality and safety related to intake of these dairy products. Evident differences were found among the samples depending on the type of product. Based on shares of the RDA, the analyzed dairy samples are a good source of Ca (up to 58% of the nutrient reference values), with a relatively high concentration of Na (between 5.5% and 22%). Any safety risk for consumers due to exposures to toxic elements through analyzed samples is excluded. The obtained results give reason to expect further insight concerning the direct comparison between the delactosed and non-delactosed product, in order to evaluate if the manufacturing process can affect the content of some mineral.

**Keywords:** food safety; delactosed dairy products; mineral elements; principal component analysis

## Biography:

Dr. Rosalia Crupi ia a research assistant at Department of Veterinary Science, University of Messina.

Interests: veterinary pharmacology; toxicology; pharmacological activity of natural substances; nutraceuticals; dietary contaminants; animal welfare

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# Valutation of isoflurane requirements in anesthetized cats treated with continuous rate infusions (CRI) of fentanyl or tramadol or fentanyl-tramadol .

**Claudia Interlandi[1], Francesco Macrì[1], Filippo Spadola[1], Giovanna Lucrezia Costa[1]**
[1]Department of Veterinary Sciences, University of Messina.

This study compared effects of fentanyl, tramadol, and fentanyl-tramadol continuous rate infusions (CRIs) on requirementes of isoflurane, analgesia and vital signs, in cats undergoing ovaristerectomy. Sixteen adult cats (weighing 3±2 kg) were enrolled and allocated in three groups: fentanyl (F),tramadol (T), fentanyl and tramadol FT. Group F was administered with fentanyl bolus 1µgkg-1 followed by a continuous intravenous infusion 5µgkg-1h-1. Group T was administered with tramadol, initial bolus was 1.5mgkg-1 and was then maintained as CRI 2.6mgkg-1h-1. Group FT was administrated simultaneously with tramadol and fentanyl through two separate venous accesses, the tramadol dose was 0.8mgkg-1 for bolus and 1.3mgkg-1hour-1 for CRI; fentanyl doses were 0.5µgkg-1 for bolus, and 2.5µgkg-1hour-1 for CRI. Anesthesia was performed with dexmedetomidine 5µgkg-1 followed by alfaxolone 7mgkg-1 intramuscularly and maintenance with oxygen and isoflurane at variable flows. Heart rate (PR), respiratory rate (RR), systolic arterial pressure (SAP), End-Tidal CO2 (EtCO2), oxygen saturation (SpO2), minimum alveolar concentration (MAC) and temperature (T°), were recorded. Analgesia was assessed, by means of a cumulative pain scale, giving scores of percentage changes in vital signs evaluated. Data obtained showed that the FT protocol resulted in good stability of the monitored vital parameters, with a significant reduction in the dosage of the analgesics themselves and in the isoflurane requirement, compared with the other groups. Pain analgesic scores revealed low scores, indicating a good analgesic plan. The combination of fentanyl and tramadol provided good quality analgesia and it was shown to maintain a good anesthetic plan, without side effects. Results demonstrated that fentanyl and tramadol infusion administered in CRI had valid effects in reducing anesthetic needs in cats.

**Keywords:** Analgesia,Fentanyl, Tramadol, Cats, Slow Infusion.

## Biography:

CLAUDIA INTERLANDI is a Researcher at the Department of Veterinary Sciences, University of Messina, and she is mainly engaged in veterinary practice management, welfare of pets, including non-conventional animals, surgical procedures, clinical governance and practice evidence-based veterinary medicine.

## Diclofenac leading to endangering of vultures and as vet medicine

**Syed Muhammad Khan**
University of Education Lahore, Pakisthan

The Oriental white-backed vulture (OWBV; Gyps bengalensis) was once one of the most common raptors in the Indian subcontinent. A population decline of >95%, starting in the 1990s, was first noted at Keoladeo National Park, India. Since then, catastrophic declines, also involving Gyps indicus and Gyps tenuirostris, have continued to be reported across the subcontinent. Consequently these vultures are now listed as critically endangered by BirdLife International. In 2000, the Peregrine Fund initiated its Asian Vulture Crisis Project with the Ornithological Society of Pakistan, establishing study sites at 16 OWBV colonies in the Kasur, Khanewal and Muzaffargarh-Layyah Districts of Pakistan to measure mortality at over 2,400 active nest sites. Between 2000 and 2003, high annual adult and subadult mortality (5-86%) and resulting population declines (34-95%) (ref. 5 and M.G., manuscript in preparation) were associated with renal failure and visceral gout. Here, we provide results that directly correlate residues of the anti-inflammatory drug diclofenac with renal failure. Diclofenac residues and renal disease were reproduced experimentally in OWBVs by direct oral exposure and through feeding vultures diclofenac-treated livestock. We propose that residues of veterinary diclofenac are responsible for the OWBV decline.

## Biography:

S.M. khan is currently pursuing an MS in Zoology from the University of Education, Lahore, Pakistan; he has, in the past, volunteered for WWF-Pakistan and written extensively on conservation issues and challenges in WWF-P's Natura magazine, Mashable Pakistan, and on several Medium Blog Publications

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# Influence of environmental conditions on the chemical Immobilization of Fallow Deer (Dama dama).

**Giovanna Lucrezia Costa (1), Leonardi F. (2), Spadola F., Macrì F., Interlandi C. (1).**
(1)Department of Veterinary Sciences, University of Messina, Italy.
(2)Department of Veterinary Sciences, University of Parma, Italy.

The objective of the clinical study is to evaluate of two dosages of tiletamine - zolazepam/ xylazine in deers caught in different climatic and environmental conditions, on physiological parameters and on duration and quality of anesthesia. The geographical area covered are the Peloritani mountains of Sicily; Thirty-six females and four males deers (Dama Dama); age and weight: 3,5±1,5 years and 44±17 kg, divided into two groups of twenty subjects (A and B), anesthetized to be transported. The deers free were captured in winter (12°C) with 1 mgkg-1 of xilazine and 1 mgkg-1 of tiletamine/zolazepam (group A). The deers were grouped in a large enclosure in spring (22°C), 12 hours before capture with 2 mgkg-1 of xilazine and 1,5 mgkg-1 of tiletamina/zolazepam (group B). Heart rate (HR), respiratory rate (RR), body temperature (BT), hemoglobin oxygen saturation (SpO2), blood lactate concentration (BLC), and immobilization quality (IQ) were evaluated at 10, 20, and30 min after induction. Induction time (IT, minutes) and duration of recumbency (DR, minutes) were also recorded. HR remains constant throughout the monitoring in both groups. RR in both groups at 20 minutes decreases, but the subjects of group B have a lower RR than those of the group A. SpO2 shows hypoxemia in group B. BT and BLC are significantly higher in B group. IT is about 8 minutes, while DR is about 50 minutes, in both groups. We get a better sedation in subjects of A group. The grouping of the subjects of B group in the paddock results in a great muscular strain and for the capture was required a higher dosage of anesthetic mixture.

**Keywords:** environmental, tiletamine/zolazepam; xilazine; deer

## Biography:

Degree in Veterinary Medicine 1999, University of Messina. 2000 Ph.D. in Anaesthesiology of Domestic Animals." "2006 Researcher of Veterinary surgery -. 2007 Specialized in Clinical Bovine.: Member of Association of Veterinary Anaesthetists Member of Italian Clinical Practice; Practical teaching of Research Doctorate of "Animal Surgery and Anaesthesiology"; Practical teaching of Research Doctorate of "Animal Surgery and Anaesthesiology"; Teaching Specialization Course in Pathology and clinical efficacy of pets Faculty of Veterinary Medicine the University of Messina; Practical teaching of "Anesthesia in dogs and cats"; Practical teaching of Research Doctorate of "Animal Surgery and Anaesthesiology".

## Chronic alcohol intake regulates expression of SARS-CoV2 infection-relevant genes in an organ-specific manner

**Marion M. Friske, Francesco Giannone, Mona Senger, Robin Seitz, Anita C. Hansson and Rainer Spanagel**

Institute of Psychopharmacology, Central Institute of Mental Health, Heidelberg University, Germany

Chronic alcohol consumption and alcohol use disorder (AUD) have a tremendous impact on the patient's psychological and physiological health. There is some evidence that chronic alcohol consumption influences SARS-CoV2 infection risk, but the molecular mechanism is unknown. Here, we generated expression data of SARS-CoV2 infection relevant genes (Ace2, Tmprss2 and Mas) in different organs in rat models of chronic alcohol exposure and alcohol dependence. ACE2 and TMPRSS2 represent the virus entry point whereas Mas is activating the anti-inflammatory response once the cells are infected. Across three different chronic alcohol test conditions, we found a consistent upregulation of Ace2 in the lung, which is the most affected organ in Covid-19 patients. Other organs such as liver, ileum, kidney, heart, and the brain showed also up-regulation of Ace2 and Mas but in a less consistent manner across the different animal models, while Tmprss2 was unaffected in all conditions. We suggest that alcohol-induced up-regulation of Ace2 can lead to an elevated stochastic probability of cellular virus entry and may thus confer a molecular risk factor for a SARS-CoV2 infection.

**Keywords:** COVID19, Ace2, Tmprss2, Mas, Alcohol Use Disorder

## Biography:

Marion Friske studied Biochemistry and Biophysics at the University Bayreuth and Albert- Ludwigs-University Freiburg. She did her Master Thesis at the Max-Planck-Institute for Immunology and Epigenetics Freiburg focusing on ELAV, a neuron-specific transcription factor essential for neuronal growth. Since 2019, she is PhD student at the Central Institute of Mental Health Mannheim in Rainer Spanagel's Lab, researching on molecular mechanisms of Alcohol Use Disorder (AUD) in human postmortem and rat brain tissue. At the moment, she is working on a translational single-nuclei Sequencing approach combining brain tissue from deceased AUD patients, organoids and post-dependent rats..

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# Antibacterial modes of herbal flavonoids combat resistant bacteria

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The increasing dissemination of multidrug resistant (MDR) bacterial infections has endangered a global crisis in public health. Currently, the infections caused by Gram-negative (G-) bacteria are more than Gram-positive (G+) bacteria in the clinic. A report from China Antimicrobial Resistance Surveillance System (CARSS)a showed that G- bacteria accounted for 71.1%, while Gram-positive (G+) bacteria about 28.9 % from the 3,249,123 isolated strains.How to develop the effective antibacterial agents against resistant bacteria is becoming the most urgent demands in the resistant era. Herbal flavonoids with multi-target antibacterial actions are emerging arsenal to overcome resistant bacterial infections. In this work, we focus mainly on the antibacterial mechanisms of herbal flavonoids. Advances in herbal flavonoid compounds distribute in heat-clearing Chinese medicine show the prospect therapy of resistant bacteria. Additionally, we summarize the targets of recent flavonoid compounds and divide into direct antibacterial compounds (DACs) and host-acting antibacterial compounds (HACs) based on their modes of action. We also discuss associated functional groups of flavonoid compounds and highlight recent pharmacological activities against diverse resistant bacteria to treat the clinical infection of resistant pathogens.

**Keywords:** Herbal flavonoids; heat-clearing Chinese medicine; antibiotic resistance; multidrug resistant bacteria; antibacterial modes

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## Relationship Between Body Condition And Metabolic Profiles In Cows

**Ilir Dova[1], Enkeleda Ozuni[1], Majlind Sulce[1], Ana Kapaj[2], Pëllumb Zalla[1], Arjan Shumeli[2]**
[1]Faculty of Veterinary Medicine, Agricultural University of Tirana, Tirana, Albania

The purpose of conducting this study was primarily to determine the interconnection of the metabolic profile indicators with the BCS in cows in various physiological states. From the current study it was found out that the interconnection of the BCS with the metabolic indicators based on the physiological status was quite strong in cows two weeks prior to calving (R2=0.69; Fllog=6.36, P=0.00051). In the two-week period following calving this relationship remains equally strong (R2=0.65; Fllog=4,5; P=0.0053). Whereas in the one-month period following caving the relationship becomes week and not scientifically significant (R2=0.44; Fllog=1.9; P=0.13). In the two-month period after calving the relationship tends to turn moderate, but otherwise statistically significant (:R2=0.55; Fllog=3.1; P=0.025).

**Keywords:** BCS, metabolic profiles, multi-factor regress, physiological periods

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# Carbon nanotubes combat methicillin-resistant *Staphylococcus aureus in vitro*

**Xiaoye Liu[1,2,*] Xiaohui Si[1], Lianyu Song[1], Xin Hu[2], Xiaomin Ren[1], Jing Liu[2], Qian zhang[1,*]**

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[2.]Animal Science and Technology College, Beijing University of Agriculture, No.7 Beinong Road, Changping, Beijing 102206, China.

The large-scale and unreasonable usage of antibiotics in animal husbandry for a long time has caused the outbreak of drug resistance crisis, seriously threatened the health of livestock and poultry. As a new material, carbon nanotubes have the characteristics of stable performance, easy to be modified and can enter bacterial membrane, and it is not picnic to induce bacterial resistance. Single-walled carbon nanotubes (SWCNTs) and multi-walled carbon nanotubes (MWCNTs) were treated at the gradient concentrations of of 1, 0.5, 0.25 and 0.125 mg/ml to determine the minimum bactericidal concentration (MBC) of *Staphylococcus aureus* ATCC29213, Methicillin-resistant *Staphylococcus aureus*-AR1 (MRSA-AR1), Methicillin-resistant *Staphylococcus aureus*-ST9 (MRSA-ST9) that derived from pig. Reseults revealed that the two kinds of carbon nanotube showed good bacteriostatic effect on three strains of *Staphylococcus aureus*, ATCC29213, MRSA-AR1 and MRSA-ST9 at the concentrations of 0.125 mg/ml. The colony with inhibitory effect was observed under the microscope, and it was found that the carbon nanotube particles diffused into the colony. Carbon nanotubes have larger specific surface area and smaller tube diameter. Therefore, they can be in full contact with bacteria. The antibacterial activity may be produced by affecting the aggregation between bacterial cells. The results showed that the application of carbon nanotubes could be an effective antibacterial materials used in veterinary clinics. Our work willshed light on the alternative strategies to treat the clinical infection of resistant bacteria and development of novel antibacterial agents.

**Keywords:** Carbon nanotubes, Antibacterial activity, *Staphylococcus aureus*

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## Halloysite nanotube with silver and tannic acid: A sustainable Nano-enabled antibacterial combination therapy (NeACT) for application in animal agriculture

**Satwik Majumder[a], Charles Viau, Amarpreet Brar, Jianguo Xia, Saji George**

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The prevalence of antimicrobial resistance (AMR) among pathogenic bacteria warrants alternate therapeutic strategies that are efficient in remediating zoonotic infections. Combination therapy with more than one antimicrobial with complementary action has shown possibilities to prevent or slow down AMR. The application of nanoclay-based biomaterials could, however, resolve challenges of poor bioavailability, cytotoxicity, stability, release, and overdosing and play a significant role in formulating cost-effective sustainable therapeutics. In this study, a nanocomposite (GH-TA-Ag-NT) containing nanosilver (AgNPs) grafted onto tannic acid (TA)-modified halloysite nanotubes (HNT) was generated and tested for physicochemical and antibacterial properties. The Transmission Electron Microscopy, Fourier Transformed Infra-Red, Dynamic Light Scattering, and X-ray Diffraction Spectroscopies confirmed the synthesis of the nanocomposite. GH-TA-Ag-NT demonstrated enhanced stability, drug-bioavailability with a slow-release of Ag+ and TA. The nanocomposite showed excellent antibacterial performance in comparison to commercial TA-stabilized AgNPs when tested against E. coli ATCC 25922, S. aureus ATCC 25923, and a multi-drug resistant (MDR) *Salmonella enterica* serovar Typhimurium (isolated from infected swine) owing to the combinatorial effect mediated through anti-efflux/anti-biofilm properties, oxidative stress, loss of bacterial membrane potential, and integrity. The toxicity and antibacterial efficiency of GH-TA-Ag-NT to remediate gastrointestinal infection were demonstrated in the S. Typhimurium infected *Caenorhabditis elegans* model. The nanocomposite was less toxic, reduced Salmonella colonization significantly in 24 h of exposure, and improved worm survivability. In summary, we demonstrated a unique and novel strategy to counter AMR bacteria applying Nano-enabled Antibacterial Combination Therapy (NeACT) with GH-TA-Ag-NT with multi-functional characteristics that could resolve the common challenges of poor bioavailability, cytotoxicity, stability, drug release, and overdosing. Thus, it warrants potential use as a therapeutic against zoonotic pathogens in animal agriculture.

**Keywords:** Animal agriculture, Sustainable nanotechnology, Halloysite nanoclay, Tannic acid, Nanosilver, Nano-enabled Antibacterial Combination Therapy (NeACT), Antimicrobial resistance (AMR), Zoonotic infections, *Salmonella enterica* serovar Typhimurium, Caenorhabditis elegans.

## Biography:

My research addresses the implications and application of sustainable nanotechnology in the field of food and agricultural safety and security. The extensive use of antibiotics relevant to human health in animals has contributed significantly to the emergence and transmission of antimicrobial resistance (AMR) through direct contact from infected animals or the food supply chain. Continuous surveillance for AMR among bacterial isolates from farms is vital for the effective management of zoonotic infections. Therefore, I am monitoring antimicrobial resistance and virulence characteristics in bacterial isolates from infected livestock of Canadian farms through phenotypic and genotypic studies. Combination therapy with more than one antimicrobial agent comprised of complementary mechanisms of action has shown possibilities to prevent or slow down AMR. However, such therapies have still shown vulnerability towards AMR or faced challenges of poor bioavailability, cytotoxicity, stability, release, and overdosing. The application of nanomaterials could resolve these issues and play a significant role in advanced formulations of cost-effective and sustainable therapeutic strategies as a multiple drug carrier. Hence, the ultimate goal of my research is to create nano-enabled therapeutics to restrict bacterial pathogenicity and thus, zoonotic infections.

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