Compendium of Abstracts

Sl. No.	Abstracts
1.	**ABST. No. PS-1-1** **Incidence of *Bacillus* spp. in ready-to- eat foods, beverages and water from different tourist destinations of north western Himalayas, Himachal Pradesh, India** **Neha Rana[1]**, Neena Kumari[1], Ashok Kumar Panda[1], Tania Gupta[2], Rajesh Chahota[2], Sidharath Dev Thakur[1] [1] Department of Veterinary public Health and Epidemiology, [2]Department of Veterinary Microbiology, Dr. GC Negi College of Veterinary and Animal Sciences, CSK Himachal Pradesh Agricultural University Palampur, Himachal Pradesh, 176062, India akpanda2003@gmail.com **Abstract** The present study determined the incidence of *Bacillus* species in ready-to-eat (RTE) foods, beverages and water from 12 different tourist destinations of north western Himalayas, Himachal Pradesh, India. A total of 220 samples comprising RTE milk products, RTE meat products, beverages and water, were tested. *Bacillus* isolates were characterized by cultural and biochemical methods and reconfirmed by amplifying 16S *rRNA* (1500 bp) through polymerase chain reaction (PCR). Isolates were investigated for the presence of toxins; *hbl* (hemolytic enterotoxin), *nhe* (non-hemolytic enterotoxin) and *cytK* (cytotoxin) and *ces* (emetic toxin) by multiplex PCR. Twenty five out of 220 (11.4%) samples were contaminated with *Bacillus* species. RTE milk products had highest incidence of *Bacillus* (17.5%) followed by water (8.3%), RTE meat products (7.5%) and beverages (7.5%). These isolates were identified as *B. cereus* (76.0%, n=19/25), *B. alvei* (12.0%, n=3/25), *B. polymyxa* (8.0%, n=2/25) and *B. firmus* (4.0%, n=1/25). *B. cereus* recovery was highest from cheese (25%) followedby khoa based foods (14 %, n=3/21), milk based beverages (12%), paneer based foods (8.6 %) and water (8.3%).*nhe* complex was most predominant (76%) toxin gene, followed by *cytK* (40%) and *hbl* complex (28%). *ces* was not found in any of the tested isolates.
2.	**ABST. No. PS-1-6** **Antimicrobial Resistance *Escherichia coli* and *Klebsiella* in Dairy Farm Milk in Punjab, India: An Emerging Food Safety Concern** **P. Jindal,** J.S. Bedi, R. Singh, R.S. Aulakh and J.P.S Gill School of Public Health and Zoonoses Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana-141004, Punjab (India) bedijasbir78@gmail.com **Abstract** Food safety is a serious public health concern in India. To meet the burgeoning demand of food, intensive dairy farming practices involves use of antibiotics as prophylactic and growth promoting agents. India is among one of the largest consumers of antibiotics in 2010 with 12.9 $\times 10^9$ units consumption with increasing use in animal husbandry. The present aimed to study the antimicrobial resistance profile of two indicator organisms' viz. *E.coli*&*Klebsiella* from bovie milk along with molecular characterization of antibiotic resistance genes. A cross sectional study was designed to randomly select dairy farms from seven different sub-districts of Ludhiana Punjab). The milk samples were collected from randomly selected 90 dairy farms. The samples were subjected to isolation and identification of target organisms. Out of 90 samples, 31 isolates of *E. coli and* 30 isolates of *Klebsiella* were observed. The molecular profile of these isolated reflected the presence of tetracycline, sulphonamide and floroquinolone resistance genes. Large dairy farms (more than 30 lactating animals in herd) showed the highest prevalence for antibiotic resistant genes. Further, milk samples subjected to antibiotic residues detection, confirmed the traces of oxytetracycline, sulphadiazine and enrofloxacin antibiotics. Despite having a legal framework, there is need for effective implementation and compliance regarding judicious use of antimicrobial drugs to combat the menace of antimicrobial resistance through food products.

3.	**ABST. No. PS-1-7** **Antibiogram profile of *Enterococci* of animal and human origin specific to vancomycin and β-lactamase resistance** **Chaitanya Gottapu[1],** Ch. Bindu Kiranmayi[2], T. Srinivasa Rao[3], N.Subhashini[2], B. Swathi vimala[1], Srinivas K[1], Y. Suresh[1], Prasastha Ram V[1], B. Suresh[4] [1]M.V.Sc. Scholar, [2]Assistant Professor, [3]Associate Professor and Head, [4]Junior Research Fellow Department of veterinary Public Health and Epidemiology, NTR College of veterinary Science, Gannavaram, AP -521102 chaitanyakumargottapu@gmail.com **Abstract** *Enterococci* is an emerging foodborne pathogen having worldwide public health concern. The present study was undertaken to characterize *Enterococcus* species of animal and human origin based on cultural isolation, PCR detection and antibiogram. A total of 119 samples (38 carabeef, 33 pork, 19 chicken meat,10 mutton and 19 human diarrhoeic) were collected in sterile containers. Overall prevalence of *Enterococcus* species was found to be 67.06% by genus-specific PCR targeting 16S rRNA. Among meat samples, carabeef (65.78%) revealed the highest prevalence; followed by pork (33.33%), chicken meat (31.57%) and mutton (0.2%). *Enterococci* were found in 17 human diarrhoeic samples (89.47%). Out of 75 isolates, multiplex-PCR assay targeting *ddl gene* (*E.faecium*), *ddl gene* (*E.fecalis*), *GA1,2* (*E.gallinarum*) enabled detection of *E. faecium* (61), *E.fecalis* (6) and *E.gallinarum* (8). Vancomycin resistant *Enterococci* (VRE) were detected in 13.3% of the isolates of which *Van*C2 was predominant (50%) followed by *Van*B (40%) and *Van*C (10%). Resistance to β-lactam antibiotics like Penicillin (65.33%), Aztreonam (100%), Cefotaxime (100%), Ceftazidime (85.33%) and Ceftriaxone (53.6%) was detected. *blaZ* gene mediated β-lactamase genes were detected in 19 (25.33%) of Enterococci isolates. *Enterococci* isolates revealed higher resistance against, Aztreonam (100%), Polymyxin (100%), Cefpodoxime (100%), Ceftazidime (85.33%), intermediate resistance against Penicillin (65.33%), Ciprofloxacin (9.33%) and Erythromycin (50.66%) and sensitivity to Gentamicin (66.6%), Ampicillin (81%), Ciprofloxacin (56%) and Tetracycline (62.66%). ERIC PCR and REP-PCR analysis revealed a greater degree of heterogeneity among *Enterococci* isolates.

4.

ABST. No. PS-1-9

Detection of ESBL - *bla*TEM, *bla*SHV, *bla*CTX-M genes in *E.coli*, *Salmonella* spp. and *Aeromonas* spp. isolated from marketed fish samples in Chhattisgarh state

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Abstract

Food commodities contaminated with beta lactamase producing pathogens pose a serious threat to public health. A total of 200 fish samples, collected from retail fish market of Durg, Raipur, Rajnandgaon and Balod districts of Chhattisgarh state., were examined for the presence of extended spectrum beta-lactamases (ESBL) producing *E.coli*, *Salmonella* spp. and *Aeromonas* spp.Prevalence was found higher in marine water fish samples than fresh water fish samples. The overall prevalence of *Salmonella* spp., *E.coli* and *Aeromonas* spp. was 23%, 38% and 35%, respectively.Highest multiple antibiotic resistance index was 1.00 for *Salmonella* isolates and 0.88 for both *E.coli* and *Aeromonas* isolates.The isolates were screened for ESBL production by phenotypic method and multiplex PCR from genomic as well as plasmid DNA targeting bla_{TEM}, bla_{SHV}, and bla_{CTX-M}genes followed by their sequencing. Overall prevalence of bla_{TEM}, and bla_{SHV} genesin *E.coli* were 11.84% and 1.31%, respectively, whereas in *Salmonella*bla_{TEM} and bla_{CTX-M} were 6.52% and 4.34%, respectively. The higher percentage of resistant genes was detected in plasmid DNA in comparison to genomic DNA. However, none of the *Aeromonas* isolates were found positive for bla_{TEM}, bla_{SHV}, and bla_{CTX-M} genes. The study indicated the presence of multidrug resistant ESBL producing *E.coli*, *Salmonella* spp in fish samples in Chhattisgarh state.

5.

ABST. No. PS-1-10

A comprehensive study of genetic diversity and antibiogram profile of human and animal Enteroaggregative *Escherichia coli* isolates from India

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Abstract

Enteroaggregative *Escherichia coli* (EAEC) is an emerging foodborne pathogen worldwide, often responsible for persistent diarrheoa in the infants and young animals. In present study, a total of 1519 diarrhoeal fecal samples from human infants (n=890) and young domestic animals (n=629) from eight different states of India were investigated. The recovered *E. coli* isolates by cultural method were further confirmed as EAEC by PCR targeting chromosomal associated genes (*aai*A, *ast*A, *pil*S, *ecp,irp*2, *pic*, *fim*A) and plasmid-borne genes (*cvd*432, *agg*R, *aaf*A, *agg*A, *agg*3A) as well as by gold standard HEp-2 cell adherence assay.

A total of 197 EAEC isolates were recovered from diarrhoeal cases of human infants (n=95) and young animals (n=102) which were further subjected to Pulse Field Gel Electrophoresis (PFGE) to address their genetic diversity and to the antimicrobial susceptibility test to know their susceptibility towards antibiotics used in routine practice.

Overall, a highly diverse PFGE profile was observed for most of the EAEC test isolates. However, irrespective of place of isolation, sharing or circulation of identical clones of EAEC between different species of young animals including human infants was evident. The antibiogram profile revealed an alarming multidrug resistance (MDR) profile among diarrhoeal EAEC isolates of human & animal origin. The infant origin EAEC isolates were more resistant to Beta-lactam, Third generation Cephalosporins and Fluroquinolones, while the animal origin EAEC isolates were resistant to Beta-lactam, Tetracyclines and Sulphonamides. However, all the EAEC isolates of infant and young animals were found sensitive to Imipenem drug.

6.	**ABST. No. PS-1-11** **Isolation, Identification and Antibiotic Sensitivity profile of *Salmonella* Enteritidis recovered from local poultry meat shops** **Diksha Gourkhede**[1], Kaushik Satyaprakash[1], Bhoomika Sirsant[1], Jay Prakash Yadav[1], Richa Pathak[1], Deepa Ujjawl[1], D. B. Rawool[1], S. V. S. Malik[1] and S. B. Barbuddhe[2] [1]Division of Veterinary Public Health, ICAR-IVRI, Izatnagar, Bareilly, U.P-243122 [2]National Research Centre on Meat, Chengicherala, Hyderabad, Telengana- 500092 deepak.rawool@yahoo.com **Abstract** Non-typhoidal Salmonellae (NTS) are leading cause of foodborne infections and the emergence of antimicrobial resistance among them is a global concern. In the present study, isolation and molecular identification of *S.* Enteritidis was attempted from poultry faecal droppings, caecal and meat samples. The identified *S.* Enteritidis isolates were then subjected to antibiotic sensitivity studies as per CLSI 2017 guidelines. A total of 72 samples comprising of faecal droppings (n=23), caecum (25) and meat (n=24) samples were collected aseptically from local poultry meat shops of Bareilly and were processed immediately for isolation of *Salmonella* by standard conventional method. All the presumptive *Salmonella* colonies on XLD medium were processed for recommended biochemical tests as well as by PCR targeting genus specific *inv A* gene. Of the 72 samples, 13 were found to be positive for *Salmonella* genus by both, PCR and biochemical tests. These 13 isolates were then subjected to identification of *S.* Enteritidis serovar by serotype specific conventional PCR targeting *sdf* gene. Of the 13 genus confirmed *Salmonella* isolates, 9 *S.* Enteritidis isolates amplified *sdf* gene. The antibiotic sensitivity studies of the identified *S.* Enteritidis isolates revealed an alarming multidrug resistance (MDR), as of the 9 *S.* Enteritidis isolates, 7 were resistant to three or more classes of antibiotics namely β lactam group, aminoglycosides, tetracyclines, fluoroquinolones, sulfonamides and glycopeptides. These MDR *S.* Enteritidis isolates were further processed to determine the MIC range. The MIC range observed were 10-30 µg/ml, 10-240 µg/ml, >240 µg/ml, >240 µg/ml and >240 µg/ml for ciprofloxacin, tetracycline, ampicillin, vancomycin and sulphomethoxazole, respectively.
7.	**ABST. No. PS-1-13** **Does sanitizing/hygienic interventions improves the microbiological quality of street foods?** Anukampa, D.K. Singh, K.N. Bhilegaonkar, Ashok Kumar, D. Bardhan, Vinodh Kumar, O.R., Shagufta Bi., Sivakumar, M., Pruthvishree, B.S., Karthikeyan, R. and **Z.B. Dubal*** Division of Veterinary Public Health, ICAR- Indian Veterinary Research Institute, Izatnagar, Bareilly- 243 122, U.P., India. drzunjar@yahoo.co.in **Abstract** A total of 1020 foods of animal origin and associated environmental samples were collected aseptically before and after intervention from 18 local food vendors of Bareilly (U.P) to assess the efficacy of an intervention to improve the microbial quality of street foods. Aerobic plate count (APC), enumeration of *Staphylococcus aureus, E. coli,* sulphite reducing *Clostridia,* presence of *Salmonella* spp. and *Listeria monocytogenes* of the samples was performed. The pre and post-intervention microbiological quality of food samples were assessed and the mean log reduction of APC was observed for swabs of hand (HS), plate (PS), table (TS) and cloth (CS) were within the range of 2.56-5.61, 1.96–5.31, 2.56–6.32 and 2.66–6.77 log10 cfu/cm^2. The *E. coli* were in the range of 1.12–3.78, 1.22–3.72, 1.69-4.16 and 0-4.33 log10 cfu/cm^2 and *S. aureus* in the range of 1.30-3.74, 1.47-2.30, 1.36–2.55 and 1.2–2.86 log10 cfu/cm^2 for HS, PS, TS and CS samples, respectively. Percent positivity in samples was also reduced significantly from 48.58% to 38.12% for *E. coli,* and 44.66% to 34.85% for *S. aureus.* The cooked food samples showed low microbial count before and after intervention strategies whereas the raw foods and processed/ready-to-eat foods showed a different trend in which 88.33% & 73.33% samples were within the acceptable limits before intervention and the microbial load was reduced drastically and within acceptable limits after an intervention. Before

	intervention the number of samples positive for *S. aureus* and number of samples within acceptable limits for raw foods, processed/ready-to-eat foods, cooked foods was 45.33%, 45.23%, 21.05% and 66.67%, 75.0%, 91.66%, respectively. After the intervention, there was a reduction in pathogenic counts for processed/ready-to-eat foods, raw foods and cooked foods. Interestingly, before intervention 82.89% of food samples were within the acceptable limits which increased to 90.78% after intervention. The cooked samples were less frequently contaminated with *E. coli* and *S. aureus,* while most of the raw food samples showed the presence of *E. coli* and *S. aureus*. The samples like chicken gravy, cooked chicken, omelet, boiled egg & boiled milk were negative for *S. aureus*. Few samples of raw egg, omelet, salad, chutney and meat samples were positive for SRC and *Salmonella*, while improved bacterial quality was noticed after an intervention. Interestingly, *L. monocytogenes* could not be recovered from any of the samples. It was observed that the sanitizing or hygienic interventions improve the microbiological quality of street foods.
8.	**ABST. No. PS-1-14** **Efficacy of benzalkonium chloride, hydrogen peroxide with per acetic acid and chlorine on clean and dirty raw shelled eggs sanitation and egg safety** **Santosh Sajjan*,** Madhavaprasad C.B. and Prashant S. Bagalkote Department of Veterinary Public Health and Epidemiology Veterinary College, KVAFSU, Vinobanagar, Shivamogga, Karnataka. *Corresponding author: email: dr.santoshsajjan@gmail.com, Tel: +91-8861233410 dr.santoshsajjan@gmail.com, santoshsajjan@rediffmail.com **Abstract** A study was conducted to evaluate the efficacy of some commonly used sanitizers in the food processing industries viz. benzalkonium chloride, hydrogen peroxide with per acetic acid and chlorine water for surface sanitation of raw shelled eggs by artificially challenging with *Salmonella* Enteritidis and *Listeria monocytogenes* MTCC 1135under clean and dirty conditions by *in-vitro* trials. Minimum Inhibitory Concentration (MIC) of the selected sanitizers was determined according to the modified Rideal-Walkar test by tube dilution technique and capacity of sanitizers under clean and dirty conditions by Kelsey-Sykes test. The study revealed that, the MIC of benzalkonium chloride, hydrogen peroxide with per acetic acid and chlorine water was 25 ppm, 0.25% and 50 ppm, respectively for both the test organisms. But, the capacity of above sanitizers against selected test organisms was found to be 50 ppm, 0.5% and 100 ppm, respectively for clean raw shelled eggs sanitation but ineffective for dirty raw shelled eggs. Hence, it was concluded that, the efficacy of sanitizers was reduced in the presence of organic matter on the shell surface even though the concentration of sanitizers used in determining the performance criteria was two times higher than the MIC concentration. Therefore, sanitation alone could not eliminate *Listeria monocytogenes* and *Salmonella* Enteritidis from the surface of shelled eggs under dirty conditions. Hence, clean egg productions practices must be followed in poultry for egg safety.
9.	**ABST. No. PS-1-18** **Risk assessment of *Salmonella* spp. in chicken meat production chain considering various farming and processing systems** **Rupesh N. Waghamare[1*]**, Ashish M. Paturkar[2], Vilas. M. Vaidya[2], Ravindra J. Zende[2] and Santosh. D. Moregaonkar[1] 1. College of Veterinary and Animal Sciences Parbhani 431 402 Maharashtra, India 2. Bombay Veterinary College Parel, Mumbai -400012 Maharashtra, India upeshwaghmare@gmail.com **Abstract** India is the world's second largest emerging economy with large and rapidly expanding poultry sector. Shift in the process of traditional poultry supply chain to vertical integration has developed way for poultry meat availability but there is food-borne risk for human health which includes microbiological risks wherein, *Salmonella* spp. contamination is important risks. Therefore, the present research work was planned to study risk of *Salmonella* spp.

	in chicken meat production considering various farming and processing systems. A total of 756 samples, comprising of 432 farm origin, 324 poultry processing stage wise and environmental were collected from poultry farms and processing units located in and around Mumbai city with different operational practices for isolation of *Salmonella* spp. The results indicate that, over all occurrences of *Salmonella* spp. in farming and processing system were 6.70% and 11.41%, respectively with, significant difference at 5 % level. Amongst various farm samples litter (20.83%) and faeces (10.41%) were found to be major contaminant whereas, post defeathering (27.77%) and post evisceration stages (33.33%) were major sources of cross contamination at processing stages. Logistic regression model revealed that farming and processing system variables has a significant effect on *Salmonella* occurrence ($P \leq 0.05$). Higher occurrence of *Salmonella* spp. was observed in non-integrated farming systems, compared to partially integrated and complete integrated system, whereas retail shop processing units showed higher occurrence compared to semi-automated and automated processing systems. It is concluded that to reduce *Salmonella* spp. in chicken meat production system use of multiple intervention strategy will be useful, as different farming and processing systems are operated together.
10.	**ABST. No. PS-1-20** **Identification of pathogenic Escherischia coli O157:H7 in street vended foods of Street Food Hawkers in South Delhi** **Anand Dangi1** and Vasudha Sharma2 1School of Agriculture, Indira Gandhi National Open University (IGNOU), New Delhi 2 Department of Food Technology, Jamia Hamdard (Hamdard University), New Delhi dangi.anand153@gmail.com **Abstract** Food poisoning is a major public health concern, according to international health agencies. Food borne diseases are often caused due to lack of hygiene and sanitation during food products preparation and processing. Street foods are more prone to microbiological contaminations due to lack of proper cooking time and are a major cause of food borne disease. Though a wide range of bacterial and viral population is found to be involved in street food contamination, most common contaminants are species of genus Escherichia, Salmonella and Campylobacter. Contamination due to Escherichia leads to several complications including haemorrhagic diarrhoea, kidney failure and death of children and patients whose immune systems are compromised. The food hygiene and sanitation practices of street food vendors were investigated; five samples of street food were collected from different areas of South Delhi and tested for the presence of pathogenic Escherichia coli serotype O157:H7 in the street foods using methylumbelliferyl-β-D-glucuronide (MUG) assay and polymerase chain reaction (PCR) assay. The findings indicate that food samples collected from food vendors at different locations in South Delhi were negative for presence of pathogenic E.coli O157:H7 strain. However, all samples tested positive other strains of E.coli. All samples collected from street food hawkers in South Delhi followed the “zero tolerance” standard for E.coli O157:H7 strain. However, two samples exceeded the Microbiological Guidelines for ready to eat food (Centre for Food Safety, Hong Kong 2014), of E.coli less than 100 CFU/mL considered as acceptable for non-bottled water or drinks. Generally, E.coli represents faecal contamination and should not be present but very low level might be considered as harmless.
11.	**ABST. No. PS-1-21** **Potential of tomato endophytes as biocontrol agents against human pathogens inhabiting food crops** **Himani Chaturvedi**, Nandini Singh, Anil Prakash Department of Microbiology, Barkatullah University, Bhopal, M.P., 462026, India himani8921@gmail.com, dranilprakash98@gmail.com

	Abstract Studies have shown that a number of human pathogens inhabit food crops. The number of outbreaks associated with the consumption of contaminated fresh produce has increased. Irrigation water contaminated with manure or animal waste is a common environmental source for the transmission of microorganisms into fresh produce Members of the family *Enterobacteriaceae* like *Salmonella*, *Shigella*, *Escherichiacoli*, *Klebsiella pneumonia* and opportunistic human pathogen *Pseudomonas aeruginosa* colonize plants like tomato, maize, lettuce etc and may or may not use them as alternative host. Endophytes reside inside plants exerting beneficial effects which include antagonism against pathogens as an indirect mechanism of promoting plant growth. Currently, instead of synthetic chemicals, the use of plant growth promoting endophytes has been considered intriguingly eco-friendly in nature. In this study, Endophytes were isolated from tomato plant and were checked for in-vitro antagonism against human pathogens viz. *Escherichia coli*, *Pseudomonas aeruginosa* and *Klebsiella pneumonia* using dual culture assay. The results obtained showed significant suppression of these human pathogens in-vitro. This suggests endophytes can be used as a possible control not only for plant pathogens but for human pathogens as well.
12.	**ABST. No. PS-1-22** **Antigenic detection of zoonotic pathogens associated with neonatal calf diarrhea** **Angappan Madesh[1*]**, Asha Kumari Verma[1], Sophia Inbaraj[2], R.K.Agarwal[2], Abishek Verma[2], Pallab Chaudhuri[2] [1]Division of Veterinary Public Health, [2]Division of Bacteriology and Mycology, ICAR-Indian Veterinary Research Institute, Izatnagar, Bareilly-243122, Uttar Pradesh angappandr@gmail.com **Abstract** The present study was undertaken to detect antigens of rotavirus, corona virus, *E.coli* F5 attachment factor and *Cryptosporidium* from neonatal calves diarrheal samples. A total of 132 faecal samples from diarrhoeic neonatal calves collected from various places of north India were screened by multiplex ELISA kit (Bio-X Diagnostics, Belgium) for antigenic diagnosis of rotavirus, corona virus, *E.coli* F5 attachment factor and *Cryptosporidium* as per the protocol. Study revealed the antigenic diagnosis of rotavirus in 10 samples (9%), corona virus in 5 samples (4.5%), *E.coli* K5 in 2 samples (1.8%) and Cryptosporidium in 16 samples (13%). Real time PCR based on VP6 genes of rotavirus was done in 15 samples (9 samples-positive for rotavirus; 6 samples negative for rotavirus) which revealed 7 samples positive. Out of 10 samples tested by coronavirus specific RT-PCR, 2 came positive and 2 revealed positive for cryptosporidium by staining. This ELISA technique is simple to use and is particularly well suited for analyzing large number of samples. The test is quick and reliable and can be evaluated by the naked eye even if spectrophotometric equipment is not available. *Presenting author
13.	**ABST. No. PS-1-24** **Development of Iced Tea incorporated with Paneer whey** Nihir Shah, Manvesh Sihag, **Ami Patel** Mansinhbhai Institute of Dairy & Food Technology-MIDFT, Mehsana, Gujarat State, India ami@midft.com **Abstract** Whey, a valuable by-product obtained during the manufacturing of dairy products is highly nutritious and whole-some food as it contains milk protein, fat, minerals, and other minor bioactive components. By realizing the functional properties of whey proteins, numerous products are available in market globally. Tea is a popular refreshing beverage proven to have antioxidant properties due to the presence of polyphenols. Current research project was designed and planned to develop 'whey based iced tea' in which water would replaced with whey. In the first phase, the ratio of whey:water was optimized and was evaluated for the physicochemical, microbiological and sensory parameters as well as antioxidant activity. Based on the statistical analysis of the sensory evaluation of the drinks, final product contained 100% pasteurized whey and no water. The level of other ingredients of the

	including tea, sugar, citric acid and flavour were also optimized based on organoleptic and microbiological characteristics to 1%, 10%, 0.12% and 100 µl, respectively. The newly developed products of paneer whey based iced-tea yields a healthy beverage enriched with polyphenols and further, it may offer consumers to drink whey without changing its original attributes.
14.	**ABST. No. PS-1-25** **Application of Bacteriocins of *Lactobacillus brevis*as biomedicine against dental cavities** **Parul Thapar[1],** R.K. Malik[2], M.K. Salooja[3] 1Research Scholar, Indira Gandhi National Open University, New Delhi 2Emeritus Scientist, National Dairy Research Institute, Karnal 3Professor, Indira Gandhi National Open University, New Delhi **Abstract** Oral health has now been recognized equally important in relation to general health. Numerous studies have shown that the association of *Streptococcus mutans* and *Streptococcus sobrinus*cause higher levels of caries. Bacteriocins are potent protein toxins produced by virtually every bacterial and archeal species.In this study, bacteriocins have been isolated from the species of *Lactobacillus brevis*isolated from curd by centrifugation at 12,000 rpm for 5 min using (RM 12C Microcentrifuge, REMI Motors, Mumbai, India). The isolated bacteriocins were screened for their antibacterial activity against the isolated species of *Streptococcus mutans* and *Streptococcus sobrinus*using spot on lawn assay. The isolated bacteriocins could inhibit the growth of these isolates of dental caries. The bacteriocins were then optimized using different pH, temperature and time combinations for their maximum production. Their purification was done using ammonium sulphate precipitation and centrifugal filteration. The bacteriocins with different concentrations (0.05 ml, 0.1 ml, 0.5 ml and 1 ml) were then induced in 1ml of skim milk (Experimental Dairy section, NDRI, Karnal). These were subjected for antibacterial activity against the isolates of dental caries using agar well diffusion assay. They were incubated at 37°C for 24 h to observe for the presence or absence of zone. As a result, the bacteriocin induced milk showed inhibition against caries causing organisms. Thus, bacteriocin induced skim milk can act as a potent in strengthening of oral health.
15.	**ABST. No. PS-2-1** **Molecular detection of *Coxiella burnetii* in milk samples from organized and unorganized dairy farms in India** **Pankaj Dhaka[1*]**, S.V.S. Malik[2], Jay Prakash Yadav[2], Deepak B. Rawool[2] [1] School of Public Health and Zoonoses, Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana, India- 141004. [2] Division of Veterinary Public Health, Indian Veterinary Research Institute, Izatnagar, India- 243122 pankaj.dhaka2@gmail.com **Abstract** Q fever, caused by bacterium *Coxiella burnetii,* is highly contagious disease of public health importance. Farm ruminants are the best known reservoir of *C. burnetii*. The pathogen is often shed through aborted materials, milk and feces of infected animals. In Indian context, the disease is grossly under reported and the present study appears to be first of its kind, wherein milk samples of cattle from 02 organized farms (n=245) and 02 unorganized cattle herds (n=95) were screened for *C. burnetii*. The molecular detection of *C. burnetii* was attempted by using trans-PCR targeting *IS1111* gene (multi-copies) and com1-PCR targeting *com1* gene (single copy) of *C. burnetii*. Besides this, the milk samples were also screened for antibodies against *C. burnetii* by employing commercial ELISA kit. Molecular detection of pathogen revealed overall 4.12% (14/340) positivity for milk samples bytrans-PCR and 1.48% (05/340) by com1-PCR, whereas with commercial ELISA kit, 21.76% (74/340) of milk samples were tested positive for antibodies against *C. burnetii.* Overall, the apparent prevalence of *C. burnetii* infection was marginally higher in organized farm settings [4.90% (12/245) by PCR and 24.49% (60/245) by ELISA] when compared with unorganized farm settings [2.10% (2/95) by PCR and 14.74% (14/95) by ELISA].

	The presence of *C. burnetii* and their antibodies in milk samples warrants a major public health risk particularly in those rural areas where raw milk consumption is widely practiced.
16.	**ABST. No. PS-2-2** **Lectin based detection of *Listeria monocytogenes* in milk using Surface Plasmon Resonance** **Raghu H V**. and Naresh Kumar National Referral centre, Dairy Microbiology Division, ICAR-National Dairy Research Institute, Karnal-132001. Haryana, India 4rvsy.dmndri@gmail.com **Abstract** The present study was aimed to investigate the potential application of Surface Plasmon resonance (SPR) in detection of *Listeria monocytogenes* using lectins. From the previous study conducted in our laboratory, WGA lectin had shown high specific selectivity for *L.monocytogenes* and selected for binding interaction study using Biacore SPR system after immobilizing on CM5 chip by amine coupling chemistry. Further WGA immobilized chip was evaluated with different strains of *L. monocytogenes and other contaminating microflora (bother G+ve and G-ve bacteria). L.monocytogenes* 19115 generated the highest response of 479±49 RU at 7.4 log cfu/100µl with least cross reactivity. Further, the WGA immobilized chip was evaluated for sensitivity with the different number of *L.monocytogenes* 19115 cells (2.3 to 8.0 log CFU/ 100 µl) in broth system. The sensitivity of the WGA lectin immobilized chip was found 3.25 log CFU/ 100µl *L.monocytogenes.* Then, the WGA immobilized chip was evaluated with milk samples enriched in in LSEM and the response (RU) was again found to be significant up to 3.0 log CFU/ 100 µl. The outcome of the aforesaid study is that selected WGA lectin may be further used for the development of a lateral flow strip based assay for the detection of *L. monocytogenes*.
17.	**ABST. No. PS-2-3** **MALDI-TOF assessment for presence of *Salmonella* and *Escherichia coli* in poultry: A potential food safety threat** **S. L. Moon,** R. N. Teppawar, S. P. Chaudhari, S. V. Shinde, W. A. Khan and A. R. Patil Centre for Zoonoses, Department of Veterinary Public Health & Epidemiology, Nagpur Veterinary College, Maharashtra Animal and Fishery Sciences University, Nagpur, India shilpa2moon@gmail.com **Abstract** In a cross-sectional study conducted to evaluate *Salmonella* and *Escherichia coli* in poultry from different retail shops at Nagpur , Maharashtra ; a total of 90 samples (45 chicken and 45 cloacal swabs) were processed for isolation and identification of *Salmonella* and *E. coli* subsequently followed by *in vitro* pathogenicity assessment by hemolysin production and Congo red dye binding assay. Molecular confirmation by targeting *invA* gene for *Salmonella;* and *cvi* and *tsh* genes for avian pathogenic *E.coli* was attempted. Further isolates were subjected to matrix-assisted laser desorption ionization–time of flight (MALDI-TOF) mass spectrometry. Of the 90 samples, 6.6% (3/45) chicken meat and 2.2% (1/45) cloacal swab were positive for *Salmonella*. Similarly, 4.4% (2/45) chicken samples and 11.1% (5/45) cloacal swabs revealed positivity for *E. coli* based on biochemical and molecular characterization. The MALDI-TOF analysis of the isolates detected accuracy at species level as 99.9% for *E.coli* and 86.3% for *Salmonella*. The isolates of *Salmonella* were identified upto the serovar level (02) as Salmonella *Typhimurium*. The antibiogram study revealed the presence of multiple drug resistant patternamong all the isolates and signifies entry of residues in the food chain ; a matter of concern from public heath point of view.
18.	**ABST. No. PS-2-4** **Enzyme based assay(s) for rapid detection of hygiene and safety indicators in milk** **Naresh Kumar***, Pradip Kumar Sharma, AvinashJaswal, Harsimran Kaur and Raghu, H.V NRC, ICAR-National Dairy Research Institute, Karnal, Haryana -132001

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Abstract

Monitoring of indicator organisms has become the index of hygiene programs in industry and regulatory agencies while safety indicators suggest the presence of conditions associated with increased risk of consumer's exposure to a pathogen in food matrices. The current legislation on hygiene / safety indicators in milk and milk products has been uploaded in gazette by FSSAIwith test methods based on ISO procedures which are time consuming and laborious in nature.In view of globalization of food safety standards, food business operators are looking forward for novel rapid tests to meet consumer's demands without violating FSSAI standards. Research group at ICAR- NDRI has developed rapid and novel two-stage enzyme based assay (s) for detection of hygiene and safety indicators in milk which includes *L. monocytogenesE. coli* / coliforms and *Enterococci*in milk. The technologies are based on specific enzymatic reaction in selective medium followed by marker enzyme(s) involved in unique biochemical pathways of specific bacterial genera or strain, which hydrolyse chromogenic substrate complex and release free chromogendetectable visually by color change. Rapid assay(s) were developed by enriching the sample in selective medium as presumptive detection (stage-I) followed by confirmation (stage-II) employing specific marker enzymes. Confirmatory detection of *Enterococci* can be achieved in 20 hrsbased on black color development in stage-I while yellow and orange color in stage-II(Patent 119/DEL/2012). Confirmatory detection of*L. monocytogenes* is achieved in 26 hrs as against 7 days protocol adopted in ISO method based on black color in stage-Iand yellow and green color in stage-II(Patent 1357/DEL/2013).*E. coli* is detected in 15 hrsbased on blue color in both stages,while yellow color confirms coliform in coliform selective media after 12 hrs (Patent 2214/DEL/2014). These assay(s) are cost effective, portable in nature and thus, would be a great asset for food industryfor routine detection of *L.monocytogenes /*Enterococci, *E. coli / coliforms and* in milk products for regulatory compliance and all other relevant stakeholders pertaining to food supply chain. The concepts were validated from NABL accredited labs and technologies were commercialised to entrepreneurs in India and cleared by Sigma-Aldrich, USA for licensing of *Listeria*technology at global level.

19.

ABST. No. PS-2-5

Development and Evaluation of Isothermal Amplification Assays for Rapid Detection of *Salmonella* spp. and *Clostridium perfringens* in Meat

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Abstract

The present study was undertaken to develop loop mediated isothermal amplification (LAMP) assays for rapid detection of *Clostridium perfringens* and *Salmonella* in meat. LAMP primers were designed targeting *cpa* gene of *C. perfringens* and *inv*A gene of *Salmonella*. LAMP assays were standardized following standard procedure. The detection limit of LAMP with purified DNA was 3.4 pg for *C. perfringens* and 60 pg for *Salmonella*. In meat spiking studies, the detection limit of the LAMP was 1.2×10^5 CFU/g and 9×10^7 CFU/g, respectively for *C. perfringens* and *Salmonella,* however, a brief enrichment of 6 h enhanced the detection limit to 1.2×10^2 CFU/g and 9 CFU/g. Detection limit was further enhanced to 12 CFU/g for *C. perfringens* after 12 h enrichment, but, no further enhancement in detection limit for *Salmonella* was obtained. The developed LAMP assays were found to be specific as no cross reactivity was observed with other bacterial genera. The results of the study indicate that LAMP assays are more sensitive and faster than conventional methods. Since, developed LAMP assays does not require sophisticated instrument and post-PCR processing, may be utilized for rapid detection of *C. perfringens* and *Salmonella* in meat under field conditions.

20.

ABST. No. PS-2-8

Incidence of *Aeromonas* species in ready-to-eat foods, beverages and water from different tourist destinations of north western Himalayas, Himachal Pradesh, India

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Abstract

The present study was designed to determine the incidence of *Aeromonas* species in ready-to-eat (RTE) foods, beverages and water from different tourist destinations in north-western Himalayas, Himachal Pradesh, India. A total of 220 samples comprising RTE milk products, RTE meat/fish products, beverages and water were collected from 12 different tourist places. In addition, 50 stool samples from hospitalized patients were also screened. *Aeromonas* isolates were characterized by cultural and biochemical methods and reconfirmed by amplifying 16S rRNA (953 bp) through polymerase chain reaction (PCR). Enterotoxin genes *alt* (encoding heat-labile cytotonic enterotoxin), *ast* (encoding heat-stable cytotonic enterotoxin) and *act/hlyA/aer* (encoding cytotoxic/haemolysin/aerolysin) complex present in characterized *Aeromonas* isolates were detected by multiplex PCR. A total of 20 *Aeromonas* spp. isolates were recovered from tested samples; 16 (7.3%) from food and 4 (8.0%) from stool samples. RTE milk products had highest level of contamination (15%) followed by beverages (7.5%) and water (1.7%). These isolates were identified as *A. hydrophila* (35.0%, n=7/20), *A. sobria* (30.0%, n=6/20), *A. schubertii* (20.0%, n=4/20) and *A. veronii* (15.0%, n=3/20). All *Aeromonas* isolates carried *alt* and 25.0% were positive for *act/hlyA/aer* complex. None of the isolates was carrying *ast*.

21.

ABST. No. PS-2-11

Prevalence of virulent genes in Verotoxic *Escherichia coli* Isolates of poultry farms and poultry products

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Abstract

The purpose of study was to determine vriulent genes in VTEC isolates of poultry, farms and poultry products. Out of total 350 samples (200 cloacal swabs, 90 environmental samples & 60 from poultry products), 202 *E.coli* isolates were obtained. Out of 202 *E.coli* isolates from various sources, 27 pathogenic *E. coli* (only VTEC, no EPEC) were obtained, which was 13.37% of the total *E.coli* and 7.71% of the total samples collected. Percentage of pathogenic *E.coli* (VTEC) from poultry farms (cloacal swab, environmental samples) & poultry product were 13.72% (11.5%, 2.22%) & 3.33%, respectively. From cloacal swab % pathogenic *E.coli* (VTEC) in Turkey, Quail, Chabro and broiler species were 14%, 12%, 12% & 8%, respectively. From environmental samples 6.67% positivity for pathogenic *E.coli* (VTEC) was found in utensil swab and litter sample, each. No pathogenic *E.coli* was found in hand swab, surface swab, feed and water. Among poultry products, 10% raw meat samples were positive for pathogenic *E.coli* (VTEC). Egg and ready to eat product were negative for VTEC.

Molecular detection of isolates through mPCR revealed 25.93% isolates positive for the *stx1* gene alone and 7.4% for *stx2* alone while all the other isolates were found carrying two or more VTEC genes. Also, the combinations found were *stx1*&*stx2, stx1*&*hlyA, stx2*&*hlyA* with a percentage of 3.7%, 18.5% and 44.4%, respectively. In 27 pathogenic *E.coli* (VTEC) positives, 7 *stx1* (4, 2 and 1 from cloacal swabs, environmental samples and poultry products, respectively), 2 *stx2*, 1 *stx1*&*stx2* and 5 *stx1*&*hlyA* (all from cloacal swabs only) and 12 *stx2*&*hlyA* (11 from

	cloacal swabs and 1 from poultry products) were found. No samples were found positive for *eaeA, hlyA* (single), *saa*, *rfb O111*, *rfb O157* and *fliC H7* gene. Poultry feces are potential source of pathogenic *E. coli*. Highest prevalence of VTEC was found in Turkey, so there are more chances of infection to the persons working with them. It is possible to prevent VTEC contamination by applying appropriate hygiene and sanitation methods in poultry farm and also by creating awareness.
22.	**ABST. No. PS-2-12** **Evaluation of microbiological quality of goat raw milk collected from different regions of Mathura** **Ojha, S**., Pathak, V., Goswami, M., Bharti, S.K., Singh, V.P., Singh, T. Department of Livestock Products Technology, College of Veterinary Sciences and Animal Husbandry, DUVASU, Mathura drsadhanaojha@gmail.com **Abstract** The present study was carried out to assess the microbiological quality of goat milk samples collected from different regions of Mathura viz. Holigate (S), Sadar (S), Aurangabad (A), Chungi (C), and Township (T) were evaluated for various parameters like Standard Plate Count (SPC), *Coliform* Count and *Staphylococcus* Count by following standards. The mean SPC (log_{10}cfu/ml) for raw milk samples collected from Holigate, Sadar, Aurangabad, Chungi and Township were 7.980±0.20, 7.933±0.19, 8.393±0.19, 7.862±0.22 and 8.054±0.16 respectively. The mean *Coliform* count (log_{10}cfu/ml) for raw milk samples collected from Holigate, Sadar, Aurangabad, Chungi and Township were 5.306±0.15, 5.145±0.17, 5.451±0.19, 4.888±0.21 and 5.073±0.22 respectively. The mean *Staphylococcus* count(log_{10}cfu/ml) for raw milk samples collected from Holigate, Sadar, Aurangabad, Chungi and Township were 4.794±0.13, 4.815±0.16, 5.078±0.14, 5.267±0.25 and 4.909±0.20 respectively. There was no significance difference in SPC, *Coliform* count and *Staphylococcus* count of milk samples collected from different regions. All the samples had higher microbial load than the prescribed limit.
23.	**ABST. No. PS-2-13** **Assessment of microbiological quality of cow raw milk collected from different regions of Mathura city** **Ojha, S**., Pathak, V., Goswami, M., Bharti, S.K., Singh, V.P., Singh, T. Department of Livestock Products Technology, College of Veterinary Sciences and Animal Husbandry, DUVASU, Mathura drsadhanaojha@gmail.com **Abstract** The present study was carried out to assess the microbiological quality of cow milk samples collected from different regions of Mathura city viz. Holigate (S), Sadar (S), Aurangabad (A), Chungi (C), and Township (T) were evaluated for various parameters like Standard Plate Count (SPC), *Coliform* Count and *Staphylococcus* Count by following standards. The mean SPC (log_{10}cfu/ml) for raw milk samples collected from Holigate, Sadar, Aurangabad, Chungi and Township were 7.980±0.20, 7.933±0.19, 8.393±0.19, 7.862±0.22 and 8.054±0.16 respectively. The mean *Coliform* count (log_{10}cfu/ml) for raw milk samples collected from Holigate, Sadar, Aurangabad, Chungi and Township were 5.306±0.15, 5.145±0.17, 5.451±0.19, 4.888±0.21 and 5.073±0.22 respectively. The mean *Staphylococcus* count(log_{10}cfu/ml) for raw milk samples collected from Holigate, Sadar, Aurangabad, Chungi and Township were 4.794±0.13, 4.815±0.16, 5.078±0.14, 5.267±0.25 and 4.909±0.20 respectively. There was no significant difference in Standard Plate Count and *Staphylococcus count*, however *Coliform* count had significant ($P<0.05$) difference between milk samples collected from different regions of Mathura city. The microbial load of all milk samples was higher than normal prescribed limit in terms of SPC, *Coliform* count as well as *Staphylococcus* count.

24.

ABST. No. PS-2-14

Emergence of Ciprofloxacin resistant *Salmonella* enterica serotype Kentucky in retail chicken meat shops in India

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Abstract

The objective of this study was to determine the prevalence of antimicrobial resistant (AMR) *Salmonella* circulating in 39 retail chicken meat shops. Seventy *Salmonella* isolates were recovered from 742 samples (9.43%). Highest *Salmonella* prevalence was observed in chicken meat (40%) followed by poultry feces (20%), knife (15.71%), utensils (11.43%), chopping board (5.71%), rinsing water (4.29%) and cutting surface (2.86%). Chicken shops located in Lalkuan showed the highest prevalence (20.99%) followed by Pantnagar (15.60%), Nainital (10.83%), Rudrapur (9.78%), Bareilly (5.83%), Haldwani (5.66%) and Kiccha (0.88%). Three serotypes of *Salmonella* were identified, *Salmonella* Kentucky (74.29%), S. Virchow (17.14%) and S. Typhimurium (7.14%). All isolates were multidrug resistant (MDR) with most frequent resistance to Tetracycline (70/70, 100%), Erythromycin (70/70, 100%), Nalidixic Acid (69/70;98.57%), Ampicillin (67/70;95.71%), Ciprofloxacin (58/70;82.86%), Gatifloxacin (57/70;81.43%), Cefazolin (53/70;75.71%), Cefotaxime (36/70; 51.43%) and Levofloxacin (35/70;50%). Fifty-one (51/52, 98.08%) *S.* Kentucky isolates were resistant to ciprofloxacin. Of these, 49 *S.* Kentucky isolates showed MIC values for fluoroquinolones and ciprofloxacin in the range of 3 to >256µg/ml. Twenty-nine (29/70, 41.43%) Salmonella isolates were identified as co-resistant to ciprofloxacin and cefotaxime by disk-diffusion. The *tetA* gene was detected in all isolates and the *blaTEM* was the most predominant (25.37%) β-lactam gene. Multiple virulence genes such as *sip*A (94.29%), *mgt*C (74.29%), *sop*E1 (37.14%), *stn* (34.29%), *sop*B (12.86%), *fli*C (2.86%) and *spv*C and *gip*A (1.43%) were also detected.

25.

ABST. No. PS-2-15

Prevalence of *Trichinella* in pork and pork products in Goa

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Abstract

Trichinellosis is a food borne zoonoses caused by the consumption raw or uncooked meat containing larvae of the nematode, *Trichinella*. Prevalence of *Trichinella* has been reported in rodents, civet cats, domestic pigs, wild animals and also humans in India. Although prevalence of *Trichinella* in domestic pigs has been studied in different parts of India, no studies were available from Goa, which is a small state in the west coast of India. The present study was taken up with an aim to elucidate the prevalence of *Trichinella* in pork and pork products. Between December 2015 and May 2018, we examined a total of 406 samples comprising of 55 pork sausages, 57 pig tongue and 294 pig diaphragm samples sold in local market of Goa. We used artificial digestion assay as described in Commission Regulation (EC) No 2015/1375 to identify the larvae. It was found that one diaphragm sample was positive for *Trichinella* larvae leading to the overall prevalence of 0.24%. The study warrants proper cooking of fresh pork and pork products to an internal temperature of 71 °C before consumption. Further good swine farming practices and proper inspection of pork is also necessary in prevention and control of human trichinellosis.

26.

ABST. No. PS-2-16

Current Scenario of Echinococcosis/Hydatidosis and Cysticercosis/Taeniasis in Maharashtra state, India

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Abstract

Echinococcosis/hydatidosis and cysticercosis/taeniasis are the two important neglected parasitic zoonoses in India. A study was conducted for a period of eight years from April, 2010 to March, 2018 to determine current scenario of echinococcosis/hydatidosis in slaughtered animals (9,464 cattle (male), 3,661 buffalo, 47,189 sheep, 33,350 goats and 13,579 pigs) by scientific examination during post mortem (PM) at slaughterhouses for detection of hydatid cysts, 438 dogs and 1,253 humans as well as cysticercosis/taeniasis in 13,596 pigs and 1,238 humans. Study revealed that percent positivity of hydatidosis in cattle (3.00%) was highest followed by buffalo (2.05%), pig (1.28%), sheep (0.09%) and goat (0.01%), by PM whereas cysticercosis in pigs was found to be 0.88% by PM and 0.9% by PCR assay. The prevalence of echinococcosis in dogs was 4.34% by sedimentation, PCR and sequencing, whereas in high risk human, 11.09% sera were found to be positive for echinococcosis. The positivity of taeniasis in humans was 3.15% by ELISA and 2.04% by PCR. Results of this study indicated that these zoonoses are present in both humans and animals in study areas which attracts serious attention from veterinary and public health authority to reduce economic burden and in designing strategies for prevention and control.

27.

ABST. No. PS-2-17

***In vitro* efficacy of bacteriocin released by *Lactococcus* and *Lactobacillus* to improve shelf life of meat**

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Abstract

Biopreservation has been extensively targeted as an alternative technique of food preservation. Of the 62 isolates confirmed by PCR (1498bp) as lactic acid bacteria; 45 were identified as *Lactococcus* and17 as *Lactobacillus.* Among the isolates of *Lactococcus;* 13 revealed presence of *nis*A gene, 12 for *nis*Z ,five for nisin gene and none of the isolates was positive for *nis*R . All the 17 isolates of *Lactobacillus* were negative for Lactocin S gene , *pln*A and *pla*A. Whereas all 62 isolates were non plasmid bearing. The isolates with antimicrobial activity were further processed for protein extraction and characterization using SDS PAGE. The proteins were subjected to study the effect of pH, temperature and enzymes wherein it was observed that the cell free supernatant (CFS) produced remained active against indicator strains at high pH of 8 and even at 80^{o}C while it declined on exposure to the proteolytic enzymes. Accordingly the CFS were further used for spiking study wherein it was found effective in preserving the chicken meat up to three days at refrigerated temperature. The overall results revealed that direct application of bacteriocins alone in the meat yield might not have preservative effect while use of lactic acid bacteria may be a better choice over a longer period of time.

28.

ABST. No. PS-2-18

Antimicrobial activity of *in vitro* enzymatically digested *Gaddi* goat milk

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Abstract

Gaddi goat is a native of the Western Himalayas with its true home tract in Himachal Pradesh, however distribution extends to the adjoining states of Jammu and Kashmir and Uttrakhand. Its milk plays a very important part of life in the higher hills where bovine species are difficult to manage owing to the harsh climatic conditions, scarcity of fodder and small landholdings. The antimicrobial effect of *Gaddi* goat milk and its protein fractions was evaluated by disc diffusion method, in 10 samples of raw/boiled milk, its protein fractions, and their hydrolysates against *Bacillus cereus*, *Escherichia coli*, *Rhodococcus equi*, *Shigella flexneri* and *Staphylococcus aureus*. It was observed that

	gastric hydrolysates showed greater antimicrobial activity among other digests however the extent varies with boiled milk casein pepsin digest showing the largest zone of inhibition against *Staphylococcus aureus* among all other micro-organisms tested. Heat treatment does not seem to affect the antimicrobial activity to an appreciable extent. Further investigations are required to exploit the full potential of *Gaddi* goat milk and its protein fractions on an industrial scale.
29.	**ABST. No. PS-2-20** **Reduction of bacterial load and nutritive enrichment of a popular street food of India: Panipuri through fortification with *Moringa oleifera* leaves and *Citrus limon* leaves.** Safal Asati, Sonal Tripathi, **Ritika Samanta** AKS University, Satna, M.P. ritika7.samanta@gmail.com **Abstract** This research highlights a novel strategy to make Panipuri (P) healthy in terms of microbiological content and nutritional value. Twelve samples of Panipuri water (PW) collected from different vendors of Satna, M.P showed a total viable count of 10.5X 10^2cfu/100mlof PW. Eosine Methylene blue Agar was used to confirm the presence of coliforms. The major strains identifiedthrough staining were *Escherichia coli and Salmonella typhi.* PW was mixed with powdered Moringa oleifera (PMO) leaves and powdered Citrus limon (PCO) leaves individually and in amalgamated form (AF) and stored at room temperature for two days to produce fortified-nutritionally enriched PW (FNEPW). FNEPW subjected to antibiogram pattern study proved 87% antibiotic resistance index. FNEPW containing PMO, PCO and AF showed a total viable count of 4X10^2cfu/100ml of PW, 4.5X10^2 cfu/100ml of PW and 1.5X10^2 cfu/100ml of PW respectively. The total flavonoid content, total phenolic content, ascorbic acid content and total antioxidant activity of FNEPW proved an increase of 95% in AF than 80% and 82% in PMO and PCO respectively. 9-point Hedonic scale testing of FNEPW was found to be 6.5±0.5, 7±0.2 and 8±0.5 for PMO, PCO and AF respectively thereby suggesting fortification with low-cost, easily-available AF an efficient methodology.
30.	**ABST. No. PS-2-21** **Microbiological stability of nut incorporated mutton nuggets in different packaging system under refrigerated storage (4±1°c).** **R.R.Kumar**, B.D.Sharma, S.K.Mendiratta Deepali Sakunde, Dhananjay Kumar Pranav Chauhan and Mukesh Kumar Division of Livestock Products Technology, ICAR-Indian Veterinary Research Institute, Izatngar-243122 dr_rajivranjan@yahoo.com **Abstract** Microbial counts are the important criteria other than physico-chemical and sensorial qualities, while determining the storage life of convenience, ready to eat comminuted meat products. Depending upon the intended shelf life both aerobic and anaerobic packaging of products are in practice which governs the changes during storage. The present study was carried out to determine the storage life of mutton nuggets incorporated with pre-optimized levels of nut pastes viz. 20% peanut, 15% almond and 8% pine nut, differently packaged aerobically in low density polyethylene pouches (200 gauge) and vacuum packaged in impermeable nylon pouches (150 gauge) and stored under refrigerated temperature (4±1°C). The stored samples were analyzed for quality attributes including microbial at regular interval of 5 days for 15 days in case of aerobically packaged and at regular interval of 15 days for 60 days for vacuum packaged products. Total plate counts in all categories of products increased significantly ($P<0.05$) at each subsequent interval. TPC in case of aerobically packaged products on day 15^{th} and on day 60^{th} in case of vacuum packaged products were in range of log 3.14-3.26 cfu/gm. Psychrophiles were not detectable in early phase of storage but after appearance, increased significantly at subsequent storage interval and were in range of 1.62-2.18 $\log_{10}$ cfu/gm in last of storage periods. Coliforms were not detected in either category of products throughout storage period. Lactic acid bacteria appeared in all categories of vacuum packaged products only on day 45 and their counts on day 60 were around 2.2 $\log_{10}$ cfu/gm. Anaerobes were detectable on day 30, after which the counts increased significantly ($P<0.05$) at each subsequent storage interval. Among the treatments, anaerobic counts were comparable among themselves on corresponding day during entire period of storage and

	were in range of 2.86-3.01 log_{10} cfu/gm. The microbiological count in the products followed almond > peanut > pine nut > control pattern. Compared to aerobic package, vacuum packages products were microbially more stable. These observations indicated that premium mutton nuggets enriched with nut based functional components viz. 20% peanut, 15% almond and 8% pine nuts in paste under refrigeration (4±1°C) storage had microbiologically acceptable counts even on day 15th in aerobic and day 60th in vacuum pouches.
31.	**ABST. No. PS-2-22** **To study the combined effect of environmental conditions, phytochemicals on the growth of *E. coli* in Paneer** **Aman Sharma**, Dr. Neetu Kumra Taneja Department of Basic Applied Science, National Institute of Food Technology Entrepreneurship & Management, Kundli, Sonipat sharma.aman@outlook.in **Abstract** The objective of this study was to analyse the combined effects of environmental condition (vacuum packaging), temperature, phytochemicals for the growth and survival of E.coli in paneer. Milk was inoculated with 100 µg/ml of phytochemicals (Gallic acid, Quercetin, Piperine, Eugenol, Menthol) and was used for paneer manufacturing, during curd pressing it was spiked up with 1000000 (10(6)) cfu/g of E.coli and was stored at 5º and 30ºC. Survival and growth of E.coli in paneer samples was determined after every 6 h for up to 48 h. It was found that 5ºC storage restricted the growth of E.coli as compared to room temperature (30ºC). Vaccum alone did not show any effect on growth or survival of E.coli at low temperature. Among various phytochemicals tested Gallic acid exhibited highest activity against E.coli followed by Eugenol and Quercetin inhibiting the growth of E.coli at both 5˚C and 30˚C. Combined hurdles imposed on E.coli in paneer i.e. phytochemicals (Gallic acid, Quercetin, Piperine, Eugenol and Menthol) along with vaccum and low temperature significantly reduced its growth by 2 logs at 30˚C.
32.	**ABST. No. PS-2-23** **Effect of packaging on shelf life and quality of custard apple pulp powder** **Arpit Shrivastava**, Virendra Kumar Pandey Dept. of Food Technology AKS university Satna arpitfoodtech@gmail.com, pandeyvirendra193@gmail.com **Abstract** Custard apple is a fruit from the small tree named *Annona squamosa* which belongs to the Family Annonaceae of the order Magnoliales. Among the various Anonnaceous fruits the Custard apple (*Annona squamosa* L.) known as Sitaphal is the most important commercially cultivated fruit crop of tropical and subtropical areas of the world. The present research deals in microbial aspects of custard apple spray dried pulp powder in different packaging materials. The changes in Total plate count and coliform count were studied in four packaging materials LDPE, MDPE, Metal pouches and Biodegradable packaging materials period of storage was 180 days. The results showed that the shelf life of custard apple powder can be limited to 120 days cause after 120 days the changes in microbiological and physicochemical properties were observed at 120 days. The total plate count was found to be 3.45 log cfu/g at 120 days. Best results were found on Metal pouches and biodegradable packages.
33.	**ABST. No. PS-2-25** **Spore as Biosensor- An innovative concept(s) for detection of antibiotics/pesticides residues in milk** **Naresh Kumar***Karanpriya, SoniyaRanveer, PrasantGoel, Pradip Kumar Sharma and Suman NRC, ICAR-National Dairy Research Institute, Karnal, Haryana (132001) nkg6825@gmail.com **Abstract** The presence of veterinary drugs, agrochemicals and other environmental pollutants in milk has immense public health concerns like allergic reactions, development of drug resistance among gut micro-flora, starter failure in fermented milk,cancers, anatomical deformity, defective births etc. Recently, FSSAI has specified the MRLs for these contaminants in milk with test methods involving conventional techniques like LC-MS, GC-MS, AAS which

	requires complex sample processing steps, analytical procedure and skilled manpower for operation. Our research group at ICAR-NDRI has developed rapid, novel spore based concepts /assays for detection of antibiotics and pesticide residues in milk. DPAkit is working on spore germinationinhibition principle and detection of antimicrobial residues is based on development of yellow color,while presence is indicated by persistence of purple color after incubation for 3hrs at 64°C (Patent264145). This test was further , transformed on paper stripfor detection of antimicrobials based on release of marker enzyme after spore germination and development of blue color on strip was indicative of absence of antimicrobialswhen incubated for 60min at 64°C (Patent: 2213/DEL/2014). Paper strip for rapid detection of pesticide residues in milkwas also developed based on "spore-enzyme inhibition"concept working in two stage(s).Stage-I ensures extraction of pesticide(s) from food matrices and stage-II is run on paper strip for detection of pesticide(s) employing specific marker enzymes detected in prokaryotic spore producing organism (Patent:3819/DEL/2015).The developed concepts are superior over existing prior-art in terms of sensitivity, selectivity, shelf-stability, detection time, cost, portable nature and requires minimal setup for testing.The concepts were validated from NABL accredited labs and technologies were commercialisedto entrepreneurs in India. The technologies can be used in mobile food testing laboratory as well as for routine monitoring of milk for regulatory compliance in India and abroad.
34.	**ABST. No. PS-2-26** **Effect of nature of frying vessel and storage conditions on trans fat content of groundnut oil** **A. Jain1**, S.J. Passi2, W. Selvamurthy1, A. Singh3 1Amity University, Noida, Uttar Pradesh, India; 2Univeristy of Delhi, Delhi, India; 3All India Institute of Medical Science, New Delhi, India jainakanksha24@gmail.com **Abstract** Objectives: Study aimed to investigate the effect of frying temperatures, type of frying-vessel and storage conditions on *trans*-fat content of used oils. Methods: Potato-strips were fried in groundnut-oil at 160ºC, 180ºC, 200ºC, 220ºC and 230ºC upto 32 frying-cycles in an iron-frying-vessel. In each case, oil samples drawn after 32nd frying cycle were stored at –20ºC, 4ºC and room-temperature (RT) for 30-days. For type of vessel, frying was carried out at 180ºC in iron vs. Teflon-coated non-stick vessel and oil-samples drawn at 1st, 4th, 8th, 16th, 24th and 32nd frying-cycles were analysed for TFA (gas-chromatography). Results: Significant difference was observed in TFA content of the oils drawn after 32nd frying-cycle and post 30-day storage at RT ($p<0.05$). Stored oil samples (32nd frying-cycle; 30 days) indicated a non-significant decrease in TFA concentrations with lowering down of temperatures (RT >4ºC>minus 20ºC). Significant difference was observed between oils stored for 30-days at RT and –20ºC ($p<0.05$). Teflon-coated vessel resulted in lower TFA formation across frying-cycles ($p<0.05$). Conclusions: There was a decreasing trend in TFA content at all storage-conditions. It is proposed to store oils (post-frying) at –20ºC or at least in refrigerator; or use it by absorption-method. TFA formation accelerates with rising temperatures indicating that frying should be carried at lower-temperatures.