# Proceedings

# 6th International Conference on Advancement of Science and Technology for Environment, Society and People (ICASTESP-VI)

## (27-28 June 2025)

## Organised by

Society for Technology, Environment, Science& People, Kozhikode, India

(https://www.societytesp.org/)

# Proceedings

# of the

## 6h International Conference

On

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# Enhancing paddy productivity and soil health through zinc supplementation: A field-based study

Sahaja Deva*, Prasanna Lakshmi Ravuri, Ganesh Kumar Perneti and M.K. Jyosthna
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**ABSTRACT:** A field-based investigation was carried out during the Kharif seasons of 2019–20 and 2020–21 across twelve farmer-managed sites in four villages to determine the role of zinc sulphate in enhancing paddy productivity, profitability, and soil zinc availability. The study included four treatment regimes: basal application of zinc sulphate at 25 kg/ha, no zinc application (control), residual plots from the previous zinc application, and plots with repeated annual zinc application. The paddy variety RNR 15048 was cultivated on clay soils characterized by neutral pH and varying fertility levels. Findings revealed that zinc-treated plots consistently outperformed control plots in terms of grain yield. In 2019–20, zinc application resulted in an average yield of 6,339 kg/ha, compared to 5,790 kg/ha in untreated plots. During the 2020–21 season, plots that received continuous zinc supplementation produced the highest yield (6,511 kg/ha), followed by residual plots (6,352 kg/ha) and control plots (5,922 kg/ha). Economic evaluation indicated higher profitability in zinc-treated fields. In the first season, treated plots achieved net returns of Rs.94,577/ha with a benefit-cost ratio of 2.64, compared to Rs.85,948/ha and 2.62 in untreated fields. In the subsequent year, continuous zinc application yielded Rs.98,691/ha with a benefit-cost ratio of 2.71. Soil analysis showed a positive shift in zinc availability under zinc treatment, rising from an initial average of 0.992 ppm to 1.325 ppm by the second year, whereas control plots declined to 0.848 ppm. The study concludes that consistent zinc application not only improves crop yield and economic gains but also enhances soil nutrient status, contributing to more sustainable rice production systems.

**Key words**: Zinc sulphate, Paddy yield, Economic analysis, Soil zinc status, Residual effect

# Targeted nutrient delivery in agriculture: A nano-enabled approach

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**ABSTRACT:** Targeted nutrient delivery is a promising application of nanotechnology in agriculture, enabling precise and efficient delivery of essential nutrients to crops. By leveraging nanoencapsulation and controlled release mechanisms, nanoparticles can be designed to deliver nutrients in response to specific environmental stimuli, optimizing nutrient uptake and reducing waste. This approach has the potential to improve crop yields, reduce environmental impact, and promote sustainable agricultural practices. This review highlights recent advances in targeted nutrient delivery using nanotechnology, emphasizing its potential benefits and challenges in agricultural applications.

**Keywords:** Nanotechnology, Targeted nutrient delivery, Precision agriculture, Nanoencapsulation, Controlled release, Sustainable agriculture

# Optimizing cauliflower cultivation: A study on reduced chemical inputs and natural farming techniques

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**ABSTRACT:** A field experiment was conducted at sub-humid, sub-temperate mid-hill conditions of Himachal Pradesh during rabi, 2021-23 to evaluate the effect of inorganic fertilizers and natural farming formulations on the growth, yield, and quality of cauliflower cv. PSBK-1. The treatments comprised two levels of inorganic fertilizer (80% and 60% RDN) and three levels of Jeevamrit (5%, 10%, and 15%) and Ghanjeevamrit (90%, 100%,

and 110%), along with the control (100% RDN). The experiment was conducted in a Randomized Block Design with three replicates. Application of 80% RDN + Jeevamrit 15% (soil drenching at 21 days intervals) exhibited maximum values for plant height (52.93 cm), number of leaves per plant (29.87), leaf size (1,178.00 cm2), stalk length (5.07 cm), curd size (135.00 cm2), gross curd weight (1.87 kg), net curd weight (751.07 g), and marketable curd yield (268.39 q ha-1). The same treatment also demonstrated the highest TSS (7.94°Brix), vitamin A (23.93 µg/100 g), and vitamin C (73.34 mg/100 g) content in curds. The results indicate that the application of 80% RDN in conjunction with soil drenching of Jeevamrit at 15% at 21 days interval can be recommended for maximizing the growth, yield, and quality of cauliflower under the sub-humid, sub-temperate mid-hill conditions of Himachal Pradesh.

**Keywords:** Beejamrit, Ghanjeevamrit, Jeevamrit, TSS, Vitamin-A

# Morbidity due to caprine pneumonia in Jamunapari, Barbari, and Jakhrana goat breeds reared under semi-intensive farming system

Anil Kumar Mishra*, Anjali Singh, Ashish Kumar Churamani, Ashok Kumar, K Gururaj and Nitika Sharma

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**ABSTRACT:** Pneumonia affects goats and sheep of all ages and is one of the most common respiratory problems in small ruminants throughout the world, including India. It is responsible for a very high morbidity and mortality in lambs and kids, leading to severe economic losses to goat farmers. The present study aimed to assess the morbidity associated with pneumonia in Jamunapari, Barbari, and Jakhrana goat breeds reared under a semi-intensive farming system at ICAR-CIRG, Makhdoom, Mathura (Uttar Pradesh), with respect

to breed, age, sex, and season. Morbidity data spanning 14 years, from April 1, 2010, to March 31, 2024, were compiled and analyzed.The overall morbidity rate due to pneumonia in the goats during the periodwas found to be 4.16% (1,106 cases out of 26,608 goats). The highest morbidity rate due to pneumonia was observed in Jamunapari goats (5.75%; 484/8,421), followed by Jakhrana goats (5.64%; 179/3,173) and Barbari goats (2.95%; 443/15,014). The morbidity rate was higher in male goats (5.83%; 550/9,442) compared to female goats (3.24%; 556/17,166). The morbidity rate was higher in kids (6.12%; 963/15,736) compared to adults (1.32%; 143/10,872). Among the total pneumonia cases, the highest occurrence was recorded in the winter season (56.78%; 628/1,106), followed by summer (33.91%; 375/1,106) and the rainy season (9.31%; 103/1,106). Thus, the study concludes that the maximum morbidity due to caprine pneumonia was seen in the younger kids, male goats and in the winter season.

**Keywords:** Caprine pneumonia, Morbidity rate, Goat breeds (Jamunapari, Barbari, Jakhrana), Semi-intensive farming, Seasonal variation

# Molecular detection of Mycoplasmainfections in Goats & Sheep

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**ABSTRACT:** The current study was carried out to assess the presence of Mycoplasma infections in goats and sheep from both organized farms and field settings. The animals included in the investigation were sourced from the ICAR-CIRG herds and surrounding areas in Mathura and Agra districts of Uttar Pradesh, as well as from Bharatpur in Rajasthan. A total of 354 DNA samples were processed for analysis, which included 58 samples from

nasal discharges and pneumonic lung tissues, and 296 samples derived from reproductive tract secretions, placental tissues, and fetal stomach contents. To detect Mycoplasmaat genus and species level, genus-specific PCR assay was first employed, followed by species-specific PCR targeting M. agalactiae, M. capricolum subsp. capripneumoniae (causative agent of CCPP), M. mycoides subsp. capri, M. capricolum subsp. capricolum, M. putrefaciens, M. conjunctivae, M. arginini, and M. ovipneumoniae. Among the respiratory samples, 14 tested positive for Mycoplasmaat the genus level, with one sample each confirmed as M. agalactiae and M. capricolum subsp. capripneumoniae. From the 296 reproductive and fetal samples, 84 were positive for Mycoplasma at the genus level; however, none were found positive for the specific speciestargeted. The findings highlight a notable presence of Mycoplasmain small ruminants at the genus level, though species-level identification was limited. The study underscores the value of integrating molecular techniques for the surveillance and control of Mycoplasma infections in both goats and sheep.

**Keywords:** Mycoplasma infections, PCR detection, Small ruminants (goats and sheep), Reproductive and respiratory samples, Genus and species-level identification

# Antibiogram Profiles of *Staphylococcus aureus* and *Escherichia coli* isolates of animal origin

Ashish Kumar Churamani*, Anil Kumar Mishra, Manish Kushwah, K. Gururaj, Nitika Sharma and Ashok Kumar

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**ABSTRACT:** The study was aimed to assess the pattern of antibiotic resistance in *Escherichia coli* and *Staphylococcus aureus* (S. aureus) isolated from milk samples taken from dairy animals (goats, sheep, cows, and buffalo) in the Mathura district of Uttar Pradesh. For isolation of S. aureus, 509 milk samples were collected from goats (n=458), cows (n=21), buffaloes (n=24), andsheep (n=6),out of which 50 *S. aureus* isolates were identified. Similarly, A total of 482 milk

samples were collected from goats (n=436),cows (n=17), buffaloes (n=19), and sheep (n=10), and 28 E. coliisolates were obtained from these milk samples. To assess the pattern of antibiotic resistance, antibiotic sensitivity test was doneas per the standard Kirby-Bauer disc diffusion method. For Staphylococcus aureus, the antibiotics (n=8) used included enrofloxacin, cefoxitin, tetracycline, gentamicin, penicillin, chloramphenicol, trimethoprim-sulfamethoxazole, and erythromycin. In the case of *E. coli*, the antibiotics (n=10) tested were amikacin, amoxiclav, ampicillin, chloramphenicol, enrofloxacin, imipenem, nalidixic acid, tetracycline, trimethoprim-sulfamethoxazole, and cefoxitin. *S. aureus* isolates (n=50) showed high resistance to penicillin and erythromycin. They were more sensitive to cefoxitin and gentamicin, while a moderate level of sensitivity was observed against chloramphenicol and enrofloxacin. On the other hand, E. coli isolates showed strong resistance to ampicillin and nalidixic acid, but were mostly sensitive to imipenem and amikacin, while a moderate level of sensitivity was observed against chloramphenicol and amoxiclav. Overall, the findings suggest that both bacterial species show signs of growing resistance to commonly used antibiotics, which could be a matter of concern for both veterinary and human health.

Key words: Antibiotic resistance, *Staphylococcus aureus*, *Escherichia coli*, Milk samples (dairy animals), Kirby-Bauer disc diffusion

# Development of Recombinase Polymerase Amplification for the Rapid detection of Salmonella Typhimurium from food samples

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**ABSTRACT:** Globally, *Salmonella* is a major pathogen causingFoodbornedisease. Recombinase polymerase amplification (RPA) based assay was developed for rapid and robust detection of

SalmonellaTyphimurium frommilk and chicken meat. To validate the assay, Salmonella Typhimurium (n=354), *Salmonella* Enteritidis (n=83) field isolates from various sources, other Salmonella serotypes (n=12), non-*Salmonella* strains (n=26) were subjected to RPA and PCR. The results were consistent in RPA and PCR-based detection using crude DNA obtained by a simple thermal lysiswithout any purification step. The optimum results were obtained at 370C and 5 to 10 min temperature-time combination, and have good specificity and a sensitivity of 10 pg DNA per reaction of 15µL volume. It showed high sensitivity when artificially inoculated in fresh chicken samples even at 10-9 fold dilutions containing 1.46x 101 to 1.85x 105 cfu/mL.These results indicate that the developed RPA assay is simple, rapid, reliable and reproducible that will aid in the surveillance of this pathogen from milk and chicken meat samples.

**Key words:** Recombinase polymerase amplification, *Salmonella* Typhimurium, Food samples, PCR, DNA.

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## ABOUT THE BOOK

This book consists of compilation of abstracts and papers presented in the 6th International Conference on Advancement of Science and Technology for Environment, Society and People (ICASTESP-VI), Organised by the Society for Technology, Environment, Science & People, Kozhikode, Kerala during 27-28 June 2025. A number of topics covering natural resource management, crop production, post-harvest handling, farm empowerment and social science were some of the major highlights in the conference.

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