



Brief Report on Journal Club Presentation by Department of Agriculture, IIAST, Integral University, Lucknow

The Department of Agriculture, Integral Institute of Agricultural Science and Technology (IIAST) organized the Journal Club for the month of August to provide valuable insights into the latest trends and advancements in agricultural research.

The Journal Club was held on 30th August, 2025 at 10:00 AM in the Seminar Hall of the Department of Agriculture. Mr. Bhanu, Research Scholar, Department of Agriculture, IIAST, presented a research paper entitled: “Conjoint application of nano-urea with conventional fertilizers: An energy efficient and environmentally robust approach for sustainable crop production” published in *PLOS ONE* (Impact Factor: 3.7) in 2023.

The paper discussed that one of the major challenges in global agriculture is the low nitrogen use efficiency, often below 40%. Excessive dependence on urea not only increases production costs but also contributes to greenhouse gas emissions, water consumption, and soil degradation. The study assessed the conjoint application of nano-urea with conventional fertilizers in two predominant cropping systems, maize–wheat and pearl millet–mustard, under semi-arid regions of India. Results demonstrated that applying 75% of the recommended nitrogen (N) through conventional fertilizers supplemented with two sprays of nano-urea reduced overall energy requirement by ~8–11% and enhanced energy use efficiency by 6–9% compared with full nitrogen application through prilled urea. The integrated approach also improved soil biological activity, with dehydrogenase activity values under nano-urea treatments being statistically comparable to full nitrogen fertilization.

Two foliar sprays of nano-urea curtailed nitrogen load by 25% without compromising yield, while also reducing greenhouse gas emissions by 164–416 kg CO₂-eq per hectare across crops. Grain and seed nitrogen uptake in treatments with 75% N + nano-urea remained at par with conventional 100% N treatments, proving its efficiency in nutrient delivery. Crop-wise results revealed that maize yields (~5.9 t/ha) and wheat yields (~4.9 t/ha) under 75% N + nano-urea were statistically comparable to yields achieved under 100% N application. In pearl millet (~3.3 t/ha) and mustard (~2.2–2.3 t/ha) too, similar trends were observed. Energy use efficiency improved, profitability was enhanced, and environmental impacts were mitigated.

The study concluded that integrating nano-urea with conventional fertilizers not only improves nutrient use efficiency but also reduces dependency on high nitrogen doses. This innovation contributes to sustainable crop production, resource conservation, and environmental protection. By allowing a 25% reduction in nitrogen use without yield penalty, nano-urea demonstrates its potential to reshape fertilizer practices in India and globally.

The presentation concluded with a vote of thanks. The program was efficiently coordinated by Dr. Faria Fatima (Associate Professor, IIAST), Dr. Suhail Ahmad Khan (Assistant Professor, IIAST), and Dr. Muzeev Ahmad (Assistant Professor, IIAST), the Journal Club Coordinators. The entire event was organized under the esteemed guidance of Professor (Dr.) Mohd Haris Siddiqui, Dean, Faculty of Agricultural Science and Technology, and Prof. Saba Siddiqui, Head, Department of Agriculture, IIAST.

Glimpses



