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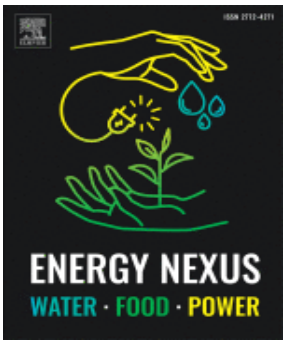
Journal Name: Energy Nexus **IF: 8.2**

Title: Anthropogenic metal loading in Yamuna-Irrigated soils and vegetables: Environmental and human health risks in a rapidly urbanizing nexus system

Author: Kumar D.; Sahoo S.; Agrawal S.; Sahoo D.

Details: Volume-24, December 2026

Abstract: Rapid urbanization and the discharge of untreated wastewater into the Yamuna River have intensified heavy metal contamination in peri-urban agricultural systems, posing serious risks to the urban water-soil-food nexus. This study investigates the concentrations, transfer dynamics, enrichment patterns, and associated health risks of Al, Cr, Co, Ni, Zn, Mo, Cd, Pb, and As in agricultural soils and commonly consumed vegetables cultivated in JJ Colony, Madanpur Khadar (Kalindi Kunj), Delhi, where wastewater irrigation is widely practiced. Metal concentrations were determined using ICP-MS, and pollution and risk were evaluated using transfer factor (TF), enrichment factor (EF), daily intake of metals (DIM), health risk index (HRI), hazard index (HI), and carcinogenic risk (CR). Soils from the Kalindi Kunj stretch exhibited severe contamination, with elevated levels of molybdenum (389.53 mg/kg), aluminum (323.78 mg/kg), zinc (159.45 mg/kg), nickel (72.41 mg/kg), chromium (72.05 mg/kg), and lead (27.21 mg/kg). Vegetable samples showed substantial bioaccumulation, with maximum concentrations observed for molybdenum in red radish, aluminum in cauliflower, zinc in fenugreek, nickel and cadmium in coriander, lead in mustard, arsenic and chromium in red radish, and cobalt in fennel, indicating strong soil-to-plant transfer and pronounced anthropogenic influence. Health risk assessment revealed that HRI values exceeded unity and carcinogenic risks ranged between 10^{-6} and 10^{-4}, indicating potential non-carcinogenic and carcinogenic health hazards. Multivariate analysis identified wastewater irrigation as the dominant source of contamination. The findings highlight a severe disruption of the urban water–soil–food nexus and underscore the urgent need for effective wastewater treatment, soil remediation, and continuous monitoring to ensure food safety and sustainable urban agriculture.



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Journal Name: Biomass and Bioenergy **IF: 7.0**

Title: Food waste valorisation for biohydrogen production: Technologies, kinetic modelling, techno-economic aspects and scale-up perspectives

Author: Nayak J.K.; Chand S.; Al-Mamun A.; Samal K.; Gautam R.; Mishra S.

Details: Volume-217, February 2027

Abstract: Food waste (FW) is an abundant organic resource that is often underutilised in conventional treatment systems, which mainly focus on stabilisation or volume reduction and therefore lead to loss of recoverable energy. As a result, conventional disposal routes generate low-value outputs and limited recovery of biogenic energy. In this context, biohydrogen production provides an alternative pathway to recover part of this energy by converting FW into renewable hydrogen through acidogenic fermentation processes. This review examines the potential of FW as a feedstock for biohydrogen production and evaluates how different biological pathways can be integrated to improve energy recovery. The performance of dark fermentation, photo-fermentation, and microbial electrolysis cells is critically discussed, with emphasis on their roles in sequential hydrogen production, associated process losses, and operational limitations under heterogeneous waste conditions. The review also examines kinetic modelling approaches used to describe microbial growth, substrate conversion, and inhibition behaviour in complex fermentation systems. These models are assessed in terms of their ability to represent non-ideal behaviour in FW digestion systems and their usefulness for process interpretation. In addition, techno-economic aspects are discussed to identify the influence of feedstock variability, reactor configuration, and co-product recovery on process feasibility. The findings provide a structured understanding of key bottlenecks and integration opportunities for FW-to-biohydrogen systems. The insights from this review are intended for wide audiences including environmental engineers, researchers and waste management stakeholders involved in the development of bioenergy systems.



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Journal Name: Next Sustainability **IF: 6.0**

Title: Assessing the impact of modal shift and electric vehicles (EV) adoption on air pollution: A case study

Author: Samal R.R.; Samal K.; Pattanayak D.; Rout N.; Jena A.; Samal S.R.; Mohanty M.

Details: Volume-8, December 2026

Abstract: Global increase in motorization and rapid urbanization has made this sector, a significant contributor to the air pollution and developing countries like India follow the same trend with a higher intensity. The present study attempts a detailed assessment of vehicular emission trends in India with studies conducted in Bhubaneswar, a Tier - II smart city. The study involves questionnaire survey, videography techniques along with a bottom-up activity-based framework incorporating empirical fleet age distributions and Bharat Stage (BS) standards to encompass local field traffic conditions. Questionnaire survey was conducted to examine vehicle age and emission-standards of vehicles. Using IPCC guidelines and the field based framework, the emission parameters - Average Fuel Usage, Fuel Consumption, and Total Pollutant Emission were estimated, by considering traffic volume, mileage, and emission standards. Results showcased that real-world emissions are characterized by vehicle type, occupancy, and fuel efficiency. Two-wheelers despite exhibiting lower per-capita emission, contribute to the second highest emission among private vehicles (11.98 g of CO and 7.18 g of HC+NOx). 4Ws exhibit the highest Per-Passenger Emission Intensity (g/person-km), due to low occupancy and higher space. Heavy vehicles (buses) emit lowest Per-Passenger Emission Intensity (g/person-km) (0.11 g CO and 0.05 g HC+NOx). Multi-model time-series forecasting indicates that the EV traffic share in Bhubaneswar is projected to rise from 7% to a range of 10.5% - 13.8% over the next five years. For every 1% increase in the EV fleet share, an average of 43.4 g of combined criteria pollutants is saved per kilometer traveled across city corridors. While a complete modal shift to high-occupancy buses provides the highest per-passenger efficiency (>99% reduction), even a shift of 10%-25% from private vehicles to buses will lead to pollutant savings of 7.4–18.5%. The study reflects the requirement of strategic planning for EV adoption and shifts to public transportation for sustainable future.



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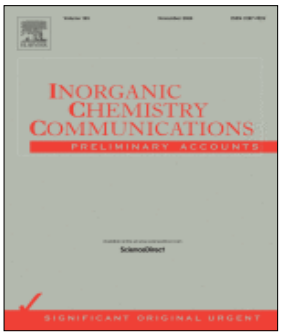
Journal Name: Inorganic Chemistry Communications **IF: 5.9**

Title: Spin-resolved electronic structure and thermoelectric performance of Aâ,,RuBrâ,† (AÂ =Â Cs, Rb) double perovskites

Author: Behera D.; Amar A.; Rozale H.; Sahoo K.; Mukherjee S.K.

Details: Volume-194, December 2026

Abstract: Using first-principles density functional theory calculations, the structural, mechanical, electronic, optical, thermoelectric, and thermodynamic properties of vacancy-ordered double perovskites Cs_2RuBr_6 and Rb_2RuBr_6 were investigated. Negative formation energies of Cs_2RuBr_6 and Rb_2RuBr_6 of 1.0087 eV and 0.9532 eV, respectively, and tolerance factor values of 0.99 and 0.95 further validate their structural and thermodynamic stability. Both compounds have mechanically stable and ductile properties. Electronic calculations show half-metallicity and a magnetic moment of ∼1.99 μB per formula unit for Cs_2RuBr_6 and semiconducting spin-channel band gaps of 1.44 eV and 1.22 eV for Cs_2RuBr_6 and Rb_2RuBr_6, respectively. The optical response reveals it to be a strong dielectric polarization and light–matter interaction. Based on the thermoelectric calculations, an enhanced performance is observed at high temperature, Cs_2RuBr_6 exhibiting a relatively high power factor and figure of merit. The calculated thermodynamic properties also indicate their stability in the investigated temperature and pressure ranges. The unique properties of these compounds make Cs_2RuBr_6 and Rb_2RuBr_6 attractive multifunctional materials for spintronic, optoelectronic, photocatalytic, and thermoelectric applications.



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Journal Name: Discover Sustainability **IF: 5.2**

Title: Runoff simulation in the Rana ungauged watershed of Mahanadi river basin using regionalization and transposition techniques in HEC-HMS model

Author: Chanchala; Padhi J.; Das B.

Details: Volume-7, Issue-1, December 2026

Abstract: Accurate estimation of runoff in ungauged watersheds remains a major challenge, particularly in data-scarce regions such as India. HEC-HMS model used for simulating rainfall-runoff processes in dendritic watersheds across diverse geographic regions, from large river basins to smaller urban and natural watersheds. In this study, HEC-HMS was calibrated and validated for the gauged Brutang watershed using daily observed runoff data across four time periods (1997–2001, 2002–2006, 2007–2011, and 2012–2016) and subsequently applied regionalization and transposition techniques to simulate runoff in the ungauged Rana watershed of the Mahanadi river basin. Model performance varied across periods, with the best simulation during 2007–2011 (R2 = 0.78, NSE = 0.73) and the weakest during 1997–2001 (R2 = 0.73, NSE = 0.69). Calibration showed highest efficiency in 2007–2009 (R2 = 0.86, NSE = 0.83, PBIAS = 6.1%). Validation results indicated strong agreement during 2010–2011 (R2 = 0.86, NSE = 0.82), but lower reliability in 2000–2001. Improved validation performance may be attributed to relatively stable hydro-climatic conditions and smoother runoff response. Comparison of regionalized and transposed simulations in the Rana watershed yielded high reliability (R2 = 0.91–0.93, NSE = 0.90–0.91, RMSE = 5.25–6.68 m3/s), demonstrating the suitability of both methods for ungauged watershed modelling. The comparison between regionalized and transposed runoff simulations showed strong methodological consistency between two transfer methods; however, due to the absence of observed runoff, these statistics should not be interpreted as evidence of direct predictive validation.



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Journal Name: Next Nanotechnology **IF: 3.7**

Title: Recent advances in green-synthesized nanoparticles: Mechanisms, environmental and pharmaceutical applications, challenges, and future perspectives

Author: Samal K.

Details: Volume-10, December 2026

Abstract: Nanotechnology has emerged as a promising field for developing sustainable materials with wide-ranging environmental and pharmaceutical applications. Among various approaches, green-synthesized nanoparticles (GSNPs) has gained significant attention as an eco-friendly, cost-effective, and bio-compatible alternative to physical and chemical synthesis methods. GSNPs utilize biological entities such as plant extracts, bacteria, fungi, algae, and biomolecules as reducing and stabilizing agents, eliminating the need for toxic chemicals. This review critically discusses recent development in the synthesis mechanisms, influencing factors, and characterization techniques of GSNPs. Special emphasis is given to the role of parameters such as pH, temperature, reaction time, extract concentration, and metal ion concentration in controlling NPs size, morphology, crystallinity, and stability. Furthermore, the review highlights major environmental applications including wastewater treatment, air pollution control, and soil remediation, where green NPs exhibit excellent adsorption, photocatalytic, and pollutants degradation properties. In addition, pharmaceutical applications such as drug delivery, antimicrobial activity, anticancer therapy, antioxidant, anti-inflammatory activity, and biosensing are comprehensively summarized. Despite remarkable advancements, challenges related to scalability, toxicity assessment, and long-term environmental impact remain critical. Overall, this review provides valuable insights into the recent advancement and future perspectives of GSNPs for sustainable environmental and biomedical technologies.



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Journal Name: Advances in Space Research **IF: 3.2**

Title: Simulating the furnace: investigating the meteorological drivers behind the worldâ€™s hottest city event in Northern Odisha, India

Author: Beuria R.; Nandi D.; Roy S.K.; Thakur R.R.; Das S.

Details: Volume-78, Issue-9, 1st November, 2026

Abstract: Heatwaves are severely increasing due to climate change, significantly impacting public health and ecosystems. In April 2023, Baripada, a town in North Odisha, recorded the highest reported near-surface air temperature globally on 14 April 2023, according to global weather observations, which were widely reported by national and international weather monitoring platforms. This study investigates the dynamics behind this heatwave using the Weather Research and Forecasting (WRF) model to simulate atmospheric conditions, focusing on the interplay between upper-level convergence, subsiding air masses, and dry north-westerly winds. Land Surface Temperature (LST) analysis from satellite data like LANDSAT, validated the extreme temperatures, aligning with the model simulations. Results revealed a combination of synoptic and local meteorological factors, including low relative humidity, anti-cyclonic circulation, and soil dryness, as key drivers of this event. By integrating the advanced modelling and observational data, this study highlights the urgent need for robust meteorological early warning systems and adaptive heat-health preparedness strategies to mitigate the impacts of extreme heat events in vulnerable regions. The findings contribute to a deeper understanding of heatwave mechanisms, with broader implications for global climate resilience.



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