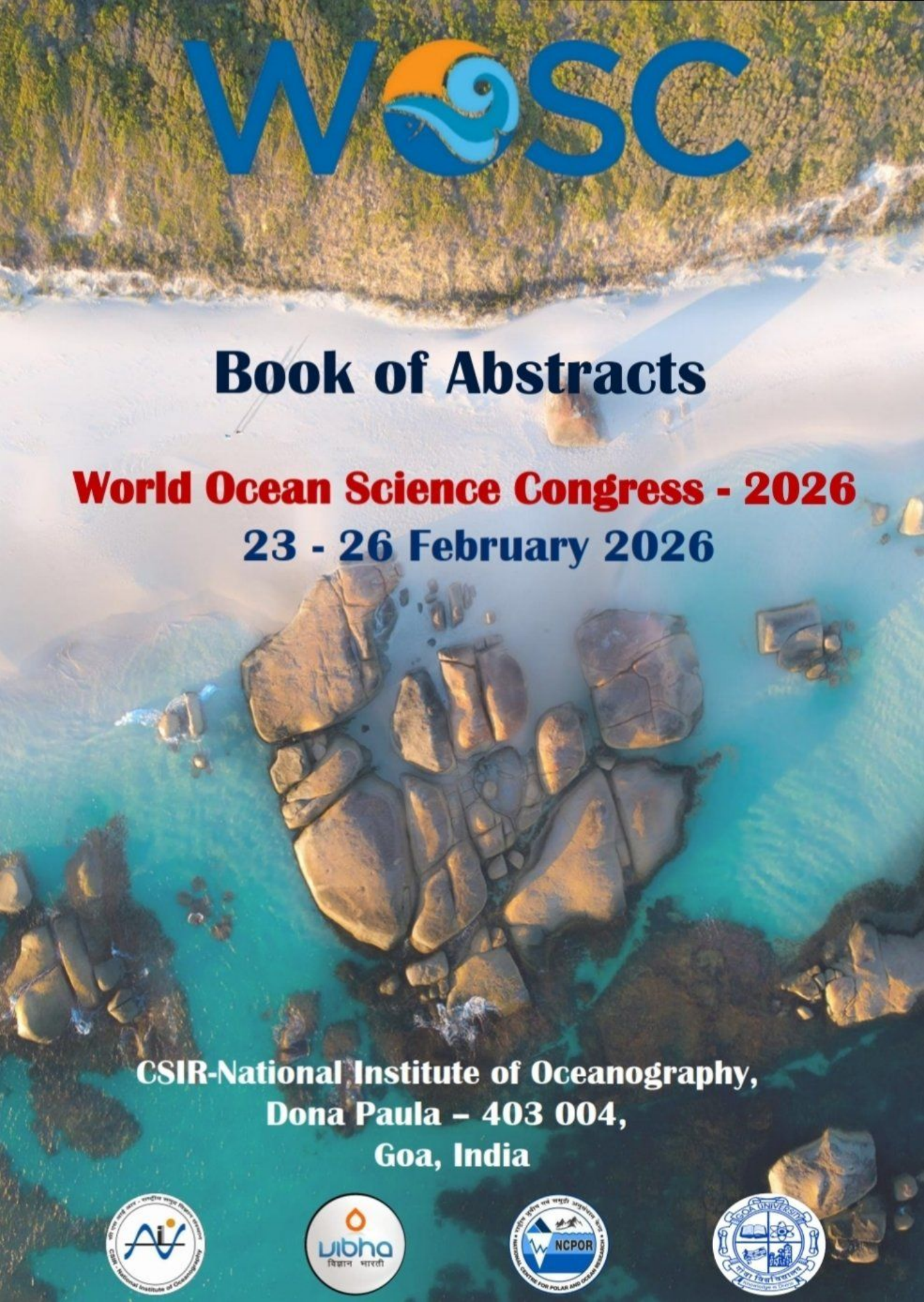

Book of Abstracts

World Ocean Science Congress - 2026

23 - 26 February 2026

CSIR-National Institute of Oceanography,
Dona Paula – 403 004,
Goa, India

World Ocean Science Congress 2026

23 – 26 February 2026
at CSIR-National Institute of Oceanography, Dona Paula, Goa, India

Oxidative Stress Response In Coelomocytes Of The Tropical Seastar Astropecten Indicus Under Polystyrene Microparticle Exposure

Meera Manikandan# 1,2 , Arunodaya Gautam1*

1 Estuarine and Coastal Studies Foundation, Howrah, West Bengal-711101

2 Scottish Church College, Urquhart Square, Kolkata, West Bengal, 700006

*Corresponding Author - arunodayagautam@ecsfindia.org #Presenting Author - manikandanmeera2005@gmail.com

ABSTRACT

Microplastics are pervasive and persistent pollutants in estuarine and coastal ecosystems, with well-documented potential to disrupt the immunophysiological homeostasis of marine organisms. This study examines the oxidative stress responses induced by polystyrene (PS) microparticles in the coelomocytes of the tropical seastar Astropecten indicus, a benthic suspension feeder inhabiting the coastal waters of West Bengal, India. Industrial-grade PS microparticles, a common component of regional marine litter, were characterised using optical microscopy, Fourier transform infrared (FTIR) spectroscopy, and micro-Raman spectroscopy to confirm polymer identity and surface weathering. Sea stars were exposed to environmentally relevant concentrations of PS microparticles (0.25, 0.5, and 1 mg L^{-1}) for 7 and 14 days under controlled laboratory conditions. Immunophysiological responses were evaluated through total coelomocyte count, cell viability, cytotoxicity assays, and quantification of reactive oxygen and nitrogen species. PS exposure resulted in a significant decline in coelomocyte abundance and viability, accompanied by disruption of the antioxidant–prooxidant balance. Prolonged (14-day) exposure further elevated superoxide anion production while suppressing nitric oxide generation, indicating oxidative stress–mediated impairment of coelomocyte cytotoxic function. These responses demonstrate that A. indicus is highly susceptible to microplastic-induced immunotoxicity. Given its benthic, suspension-feeding lifestyle and ecological relevance, this species serves as a promising bioindicator of microplastic contamination in tropical coastal ecosystems. Overall, the findings underscore that escalating microplastic pollution may impose chronic oxidative and immunophysiological stress on marine invertebrates, signalling broader deterioration of environmental health and the ecological integrity of coastal habitats.

Keywords: Microplastics, Polystyrene, Seastars, Oxidative stress, Coastal pollution

Back to Themes