



RESEARCH NEWS LETTER

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NORTH ORISSA UNIVERSITY

Inside the Issue

Research Collaboration	1
Research Highlights	2
Patents/Awards/	4
Publications/Ph. D	
Events	4
Research Grants Received	5
Training/Workshop Organized	6

International Research Collaboration



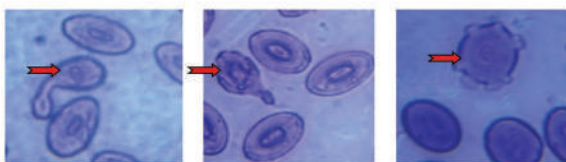
North Orissa University is a part of multilateral project for the development of scientific collaboration and innovation among BRICS (Brazil, Russia, India, China and South Africa) countries. Dr. Inga Hitzeorth, the Principal Investigator of the collaborative project, Deputy Director and Chief Research Officer, Biopharming Research Unit, Department of Molecular and Cell Biology, University of Cape Town, South Africa visited North Orissa University on 18th September 2018 to discuss the progress of their collaborative project with Dr. Priya Ranjan Debata, Co-Investigator of the project, Assistant Professor of Zoology. During her stay at NOU, She had also delivered a seminar talk on "Expression of Human Papilloma Virus Gene in Plants for Development of Vaccine". Besides, she also discussed about the importance of collaboration in developing scientific innovation and research and shared her views on the research opportunities in South Africa to the students, scholars and faculties of NOU.

Research Highlights

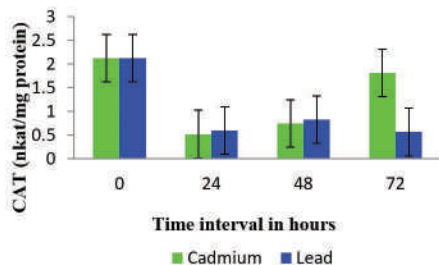
Title : **Assessment of chemical toxicity in animals**

Investigator : **Dr Puspanjali Parida, Reader, Department of Zoology**

Findings : Toxicity of different chemicals such as Malathion, cypermethrin, Furadan, Lead, Cadmium chloride, Nickel Chloride, Zinc chloride, Iron chloride etc., was studied in different animals like fish, tadpole larva (aquatic), earthworm (soil swelling), lizard, toad, chicken (terrestrial) with respect to concentration/dose, different stages of life cycle. While marked adverse effects were demonstrated not only on external morphology and behavior but also pronounced histological, biochemical & haematological changes were demonstrated in different animal model system.



Abnormal RBCs of toad in response to toxic chemicals



Catalase activity of the *Psammophilusmus-*
cle treated with Cadmium and Lead

Title : **Developing Hispolon-based novel anti-cancer therapeutics against human**

Investigator : **Prof H.N Thatoi, Department of Biotechnology**

Findings : In an in-silico approach, using modeling, docking and protein dynamics Prof. Thatoi along with his research scholars have developed about 10 derivatives of hispolon based on pharmacophore-design and investigated their inhibitory effect on cancer-promoting NF- κ B complex.

Title : **SUSY Quantum Mechanics for PT Symmetric Systems**

Investigator : **Dr P Mallick, Department of Physics**

Findings : Dr. Mallick in collaboration with Quantum Physics Research Group, Institute of Fundamental Studies, Hanthana Road, Kandy, Sri Lanka and Physics Department, Utkal University, Bhubaneswar, Odisha propose a new way of constructing SUSY partner potentials with PT symmetry. The authors have shown that if a PT symmetric Hamiltonian has zero energy eigenstate, then a PT symmetric superpotential can be constructed and it generates a super partner Hamiltonian which is also PT symmetric. The authors suggest that the zero ground state energy referring to iso-spectral models may find new perspective in Quantum Cosmology.

DOI : <https://doi.org/10.1007/s40010-017-0415-0>

Title : **Spectral Analysis on Swanson's Hamiltonian**

Investigator : **Dr P Mallick, Department of Physics**

Findings : The study shows that the Swanson Hamiltonian reflects both positive as well as negative energy under the same condition against the usual condition to get positive energy eigenvalue (DOI: 10.5506/APhysPolB.49.1813)

Title : **Tree species composition and carbon stocks assessment in different forest types of Similipal Biosphere Reserve, Odisha**

Investigator : **Dr S. C. Sahu, Department of Botany**

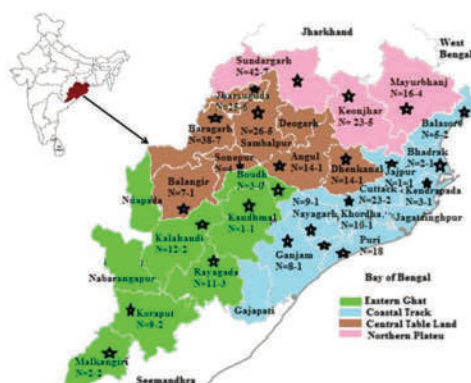
Funded By : **Science & Technology Department, Govt. of Odisha**

Findings : Phytogeographical affinities of tree species of Similipal Biosphere Reserve (SBR) and compiled their counterparts in different countries. They claim SBR has strong affinity with Sri-Lanka (46.66%) and Myanmar (45.83%) followed by China, Malaysia, Thailand, Australia and Africa (DOI: <https://doi.org/10.15835/nsb10310216>)

Title : Epidemiology of HRP2/HRP3 deletion variant of *Plasmodium falciparum* in Odisha

Investigator: Dr G Dhangadamajhi, Department of Biotechnology

Findings : Suspected malaria patients from different parts of Odisha (Shown in Figure) were screened by both conventional diagnostic methods (microscopy and RDTs) and PCR method. The study showed high prevalence of parasites with pfhrp2 deletion including dual deletions (pfhrp2 and pfhrp3), which is a serious cause of concern, as these patients could not be given a correct diagnosis and treatment. Therefore, HRP2- based RDT for diagnosing *P. falciparum* infection in Odisha is non-reliable and must be performed in addition to or replaced by other appropriate diagnostic tools for clinical management of the disease (doi: 10.1186/s12936-018-2502-3).



Title : Population status, spatial distribution and conservation of small carnivores in Similipal Tiger Reserve, Mayurbhanj, Odisha

Investigator: Dr H. K. Sahu, Department of Zoology
Funded By : Similipal Tiger Reserve, Forest Dept. Govt. of Odisha.

Findings : A check list has been made on small carnivora species along with their distribution in different regions of the STR. Some of the common carnivora species like small clawed otter (diurnal), jungle cat (nocturnal), rusty spotted cat (nocturnal), stripe necked mongoose (diurnal), Indian grey mongoose (diurnal), common palm civet (nocturnal), small Indian civet (nocturnal), leopard cat (nocturnal) and honey badger (diurnal) are frequently cited during the field survey and their feeding habits were observed periodically.

Title : Pharmacological activities of leaf and bark extracts of a medicinal mangrove plant *Avicennia officinalis*

Investigator : Prof H.N Thatoi and R.N Munda, Department of Biotechnology

Findings : The pharmacological activities of ethanol extract of a medicinally important mangrove plant *Avicennia officinalis* as a potential inhibitor of carbohydrate metabolizing enzymes. The study revealed that *A. officinalis* bark extract inhibited the activity of α -amylase and α -glucosidase in a dose dependent manner with an IC₅₀ value of 0.66 and 0.71 mg/ml respectively. The leaf extract also demonstrated inhibition potential against α -amylase and α -glucosidase with an IC₅₀ value of 0.29 and 1.19 mg/ml respectively. The ethanol bark extract also exhibited scavenging potential against DPPH, ABTS and superoxide radicals in a dose dependent manner with IC₅₀ values of 112, 114 and 82 μ g/ml respectively and ethanol leaf extract with IC₅₀ values of 200, 41.9 and 207.6 μ g/ml respectively. Both leaf and bark extracts exhibited dose dependent antiproliferative activity on TC1 murine cell lines. Both leaf and bark extracts exhibited antimicrobial activity against bacteria (*Bacillus subtilis*, *Escherichia coli*, *Pseudomonas aeruginosa*) and fungi (*Candida albicans*, *C. krusei*). The results suggest that ethanol leaf and bark extracts of *A. officinalis* were effective in inhibiting α -amylase and α -glucosidase and also have antioxidant, antimicrobial potentials which justify the ethnobotanical use of this plant.

Title : Therapeutic application of TriCurin to treat HPV infections and cervical cancer

Investigator: Dr. P. R. Debata, Department of Zoology

Findings : TriCurin a combination of three natural polyphenol compounds such as curcumin, resveratrol and epicatechin in 4:1:12.5 ratio named as TrCurin was shown to exhibit synergistic effect in suppressing HPV E6, eliminating HPV positive cancer cells and inhibiting tumor progression. TriCurin and its appropriate formulations come as a relatively inexpensive but highly promising therapeutic approach to treat HPV infections and cervical cancer (doi: 10.18632/oncotarget.16648)

RESEARCH NEWS LETTER

Title : Evaluation of biotechnological potential of novel mercury tolerant strain of *Klebsiella pneumoniae*

Investigator : Dr S.K. Sahu, Department of Biotechnology

Findings : A novel high-mercury tolerant *Klebsiella pneumoniae* strain isolated from the soil of a metallurgical dump yard in Odisha was found to be ampicillin tolerant along with secretion of EPS upon exposure to increasing concentration of mercury. Further, the strain exhibited high catalase, alkaline phosphatase, mercuric reductase, amylase and lipase activity. Its high biotechnological potential for simultaneous bioremediation of mercury and production of industrially important enzymes

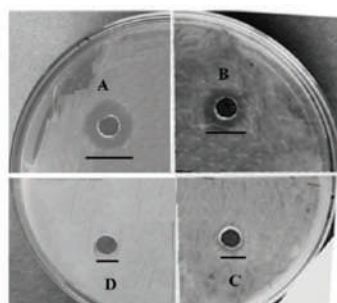


Figure 1. Effect of $HgCl_2$ in growth medium of *K. pneumoniae* on ampicillin resistance. (A) Plate assay showing resistance of the *K. pneumoniae* isolate grown in LB containing increasing concentration of $HgCl_2$ to 250 $\mu g/ml$ ampicillin. Amount of $HgCl_2$ used in growth medium: clock-wise from upper left are: (A) 0 μM , (B) 50 μM , (C) 100 μM and (D) 150 μM respectively. (B) Dose-dependence of Hg^{2+} in growth medium on resistance to ampicillin. Inset: the numbers (250, 500, 750 and 1000) indicate concentration of ampicillin (in $\mu g/ml$) used in assay to determine ampicillin resistance (DOI: 10.21767/2576-1412.100027)

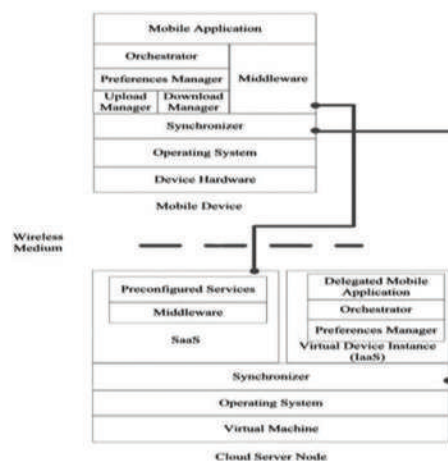
Patents/Awards/Publications/Ph. D

Ph.D	: 12
<u>Publications</u>	
Research articles (UGC care enlisted)	: 72
Book/Book Chapters	: 59
Patent	: 1
MoU	: 0
Awards (Research)	: 21

Title : Management of Resource Usage in Mobile Cloud Computing

Investigator : Dr. Sujata Dash, Department of Computer Application

Findings : This paper presents different approaches used for managing cloud resources at infrastructure and platform levels and then, those approaches are compared with each other and provide a criticism on the techniques along with the future direction and some suggestions for energy efficiency in the cloud centres.



Energy Efficient Computational Offloading Framework Architecture

Events

BOOK RELEASE

Release of Edited book on Facets Similipal edited by H.N. Thatoi, H.K. Sahu, A.K. Bastia, A.K. Patra, A.K. Biswal and C. Mahapatra.



Published by North Orissa University, Odisha:
258pp
ISBN: 978-81-933281-2-5

Events

BOOK RELEASE

Biodiversity and Wildlife Management. Edited by H.N. Thatoi, H.K. Sahu, R.K. Mishra, and S.D. Rout published by North Orissa University, Odisha: ISBN: 978-81-933261-1-8.



Prof H.N. Thatoi speaking on career opportunities in Biotechnology
live telecasted by Odia News Channel



Prof H.N. Thatoi from Department of Biotechnology, North Orissa University being felicitated at District level science exhibition in Mayurbhanj, Odisha

Research Grants Received

DEPARTMENT OF BIOTECHNOLOGY RECEIVES DST -FIST GRANT

The Department of Biotechnology, North Orissa University was started in the year 2002 in self finance mode (Aid on Course). Subsequently M. Sc biotechnology course was converted to a regular course/department in 2012. Department has achieved the distinction of being DST-FIST sponsored during 2018. The Department was granted with Rupees 49 Lakhs only for the purchase of sophisticated instruments like fluorescence spectrophotometer, sonicator, Inverted Microscope, UV-Vis Spectrophotometer and Networking facility.

PI: Dr. Prasanta Kumar Swain, Computer Applications

Title: Water quality monitoring system for fresh water aquaculture using IoT (Internet of Things) and correlation analysis

Funding Agency: DST, Govt. of Odisha

Amount: 8.9

PI: Dr. Sudam Charan Sahu, Botany

Title: Tree species composition and carbon stocks assessment in different forests types of Similipal biosphere reserve, Odisha, (India)

Funding Agency: DST, Odisha

Amount: 6.8 lakhs

PI: Dr. A. K. Dora, Chemistry

Title: Quantum Dynamical Study of Low-energy Electron Collision with Molecules and Radicals having Relevance to Plasma and Astrophysics

Funding Agency: Science and Engineering Research Board (SERB)

Amount: 9.5 lakhs

PI: Dr. P. Debta, Zoology

Title: Identification of key genetic/eigenetic marker(s) in cervical carcinogenesis and development of corresponding molecular therapeutics for precision medicine of cervical cancer

Funding Agency: BRICS

Amount: 2.476

Research Grants Received

PI: Dr. Pratap kumar Jena, Economics

Title: Factor productivity and marketed surplus of non-timber forest products (NTFPs): A study on STs in Similipal area in Mayurbhanj District of Odisha

Funding Agency: ICSSR New Delhi

Amount: 2.1 lakhs

PI: Mr. R. N. Munda, Biotechnology

Title: Screening and characterisation of anticancer agents from sea snake venom from odisha coast and their effect on apoptosis and gene expression in human cancer cell lines

Funding Agency: SERB

Amount: 16 lakhs

Training/Workshop Organized

Department	Level National/ International/ State	Category	Title
Biotechnology	State	Hands on Training	Molecular Biology & Immunology
PG Council In Collaboration with DST Odisha	University	Workshop	Patent Procedure In India