



## School of Life Sciences, Sambalpur University Evaluative Report for the period 2010-11 to 2014-15

1. **Name of the Department:** School of Life Sciences
2. **Year of Establishment:** 1969
3. **Is the department is part of School/ faculty of the University?:** Yes, Faculty of Science
4. **Names of the Programme offered:**

Programme	Name	Intake per annum
PG	M.Sc. Life Sciences	32
	M.Sc. Biotechnology (Self financing)	16
M.Phil.	M.Phil. in Life Sciences	18
Ph.D.	Ph. D in Life Sciences/ Botany/Zoology /Biotechnology/Microbiology	Varies from year to year depending on vacancy of teachers (Avg. 08 per year)

5. **Interdisciplinary programmes and departments involved:** Nil
6. **Courses in collaboration with other universities, industries, foreign institutions, etc.:** NIL
7. **Details of the programmes discontinued, if any, with reason:**

The M.Sc. Bioinformatics (Self financing) programme has been discontinued from the School of Life Sciences from the academic session 2011-12 and this course is running under the umbrella of Sambalpur University Institute of Information and Technology (SUIIT) at present.

8. **Examination System:** Course Credit semester system with continuous evaluation through home assignments, internal assessment and end term examination.
9. **Participation of the department in the courses offered by other departments:**

Name of the programme	Departments involved
M.Tech in Food Science and Technology	Department of Home Sciences, School of Life Sciences, School of Chemistry
M.Sc. in Food Sciences & Nutrition	

**10. Number of teaching posts sanctioned, filled and actual (Professors/Associate professors/ Asst. Professors/Others)**

	Sanctioned	Filled	Actual (including CAS & MPS)	Post Advertised
Professor	3	00	00	02
Associate Professors (Readers)	5	04	04 +02* (* CAS)	00
Assistant Professors (Lecturers)	9	06	04	03

**11. Faculty profile with name, qualification, designation, area of specialization, experience and research under guidance:**

Name of the Faculty	Qualification	Designation	Specialization	No. of years of Experience	No. of Ph.D/ M.Phil students guided for the last 5 years	
					Ph.D.	M.Phil.
Dr. (Mrs) Binata Nayak	M.Sc., M. Phil., Ph.D.	Reader	Plant Biochemistry and Algal Biotechnology	Teaching:22 Research:22	01*	05
Dr. Ekamber Kariali	M.Sc., M. Phil., Ph.D.	Reader	Plant Physiology and Plant Molecular Biology	Teaching: 18 Research: 20	00	05
Dr. Jogeswar Panigrahi	M.Sc., M. Phil., Ph.D.	Reader	Molecular Genetics and Plant Biotechnology	Teaching: 14 Research: 18	03 01*	10
Dr. Satyendra Prasad Mishra	M.Sc., M. Phil., Ph.D.	Reader	Forest Ecology	Teaching: 22 Research: 22	01	06
Dr. Rajendra K. Behera	M.Sc., M. Phil., Ph.D.	Reader	Biochemistry	Teaching: 10 Research: 12	00	07
Dr. Amiya K. Patel	M.Sc., M. Phil., M.Tech., Ph.D.	Reader	Metagenomics and Microbiology	Teaching: 12 Research: 06	01	08
Dr. (Mrs) Sunanda Sahoo	M.Sc., M. Phil., Ph.D.	Lecturer	Environmental Biology	Teaching: 16 Research: 04	01	10
Dr. Jagnyeswar Ratha	M.Sc., M. Phil., Ph.D.	Lecturer	Biochemistry & Cell Biology	Teaching: 8 Research: 13	01*	02
Dr. (Mrs) Smaranika Pattanaik	M.Sc., Ph.D.	Lecturer	Medical Microbiology	Teaching: 14 Research: 05	01	08
Dr. (Mrs) Aliva Pattanaik	M.Sc., M. Phil., Ph.D.	Lecturer	Molecular Ecology	Teaching: 10 Research: 10	00	02

*\*Thesis submitted; During 2010-15, three Professors (Prof. T. V. Rao, Prof. B. Biswal, Prof. N. Behera) got superannuated from this school.*

**12. List of Senior visiting fellows, Adjunct faculty, emeritus professors:**

- a) Prof. P. K. Mohapatra, CSIR-Emeritus Scientist (2008-2013)  
UGC- Emeritus Fellow (2014- Continuing)
- b) Prof. (Mrs) Basanti Biswal, CSIR-Emeritus Scientist (2013-Continuing)

**13. Percentage of classes taken by temporary faculty- programme wise information**

Programme	Percentage of classes taken by temporary (guest) faculty				
	2010-11	2011-12	2012-13	2013-14	2014-15
M.Sc. Life Sciences	7.1 %	10.3 %	10.0 %	9.8 %	9.7 %
M.Sc. Biotechnology (Self financing)	72.7 %	60.9 %	65.2 %	65.2 %	65.2 %
M.Phil. Life Sciences & Ph.D Course work	Nil	Nil	25.0%	18.75%	18.75%

**14. Programme wise Student Teacher Ratio:**

Programme	Student to Teacher ratio				
	2010-11	2011-12	2012-13	2013-14	2014-15
M.Sc. Life Sciences	5.17	5.33	5.81	6.4	6.4
M.Sc. Biotechnology (Self financing)	2.17	2.42	2.72	3.0	2.9
M.Phil. Life Sciences & Ph. D Course work	2.83	3.25	3.63	3.7	3.5
	---	---	2.4	1.0	1.1

**15. Number of academic support staff (technical) and administrative staff: Sanctioned, filled and actual:**

Supporting Staff (Category)	2010-11			2011-12			2012-13			2013-14			2014-15		
	S	F	A	S	F	A	S	F	A	S	F	A	S	F	A
Group-C (Technical)	15	--	09	15	--	08	15	--	08	15	--	05	15	01	06
Group-C (Admn)	03	--	02	03	--	02	03	--	02	03	--	02	03	--	01
Group-D (Technical)	20	--	07	20	--	07	20	--	07	20	--	05	20	--	05
Group-D (Admn.)	02	--	01	02	--	01	02	--	01	02	--	01	02	--	01

S: Sanctioned, F: Filled, A: Actual

**16. Research Thrust areas as recognised by major funding agencies:**

- a. Stress Biology
- b. Photo Biology (Photosynthetic research)
- c. Molecular Physiology
- d. Molecular mapping and Marker assisted breeding
- e. Forest Ecology and Molecular Ecology
- f. Algal Biotechnology
- g. Metagenomics of Extremophiles
- h. Medical Microbiology
- i. Cancer Cell Biology

**17. Number of faculty with ongoing projects from (a) national, (b) international funding agencies and total grants received. Give the names of the funding agencies, project title and grants received project wise:****(a)National**

Name of the faculty members as Investigators	Title of the Project	Funding agency	Amount (Rs. In Lakhs) Sanctioned /Received	Duration (Present status)
Prof. T. V. Rao	Molecular diversity studies and ..... Silk worm production	DST, Govt. Of Odisha	2.52	2008-2011 (Completed)
Prof. N. Behera & Dr. S. P. Mishra	Standardization of gum tapping technique for the tribal of Orissa	DST, Govt. Of Odisha	6.5	2010-2012 (Completed)
	Evaluation of Ecosystem services of sacred groves of Odisha	MoEF, Govt. Of India	30.7	2012-2016 (Ongoing)
Prof. B. Biswal & Dr. B. Nayak	The Cyanobacteria in rice fields of Western Orissa: Diversity, distribution and their response to pesticides	DST, Govt. Of Odisha	6.51	2008-2011 (Completed)
Prof. B. Biswal & Dr. J. Panigrahi	Mitigation of climatic change through introduction of suitable Cyanobacterial species	DRDO, Govt. Of India	10.0	2011-2014 (Extended upto 2015)
Dr. B. Nayak	Cyanobacteria in the wetlands of Sambalpur Districts: Diversity, Distribution and their role in Phytoremediation	UGC, New Delhi	8.12	2010-2013 (Completed)
Prof. P. K. Mohapatra & Dr. E. Kariali	Temporal and spatial expression pattern of ethylene and starch synthesizing genes during development of rice kernels contrast for grain weight	DBT, Govt. Of India	59.06	2011-2014 (Completed)
Dr. E. Kariali	Mechanism of UV-B resistance in the traditional rice varieties of western Odisha: Photo-protective role of non- photosynthetic pigments and pubescence acting as light screens	UGC, New Delhi	12.2	2012-2015 (Ongoing)

Dr. J. Panigrahi	Molecular Mapping and Manipulation of genes controlling some Agro-economic traits in pigeonpea with special emphasis on pod borer and pod fly resistance.	UGC , New Delhi	11.56	2010-2013 (Completed)
	Construction of Genetic Linkage Map in Pigeonpea based on interspecific F <sub>2</sub> population using RAPD, AFLP markers and simple inherited trait loci (SITLs).	DST, Govt. Of India	16.82	2011-2014 (Extended upto 2015) Ongoing
Dr. J. Panigrahi & Dr. S.P. Mishra	Genetic linkage mapping and marker assisted breeding in pigeonpea with special emphasis on resistance to pod borer complex and seed protein content	DBT, Govt. Of India	41.60	2011-2015 (Completed)
Dr. A.K. Patel	Exploration of Microbial Diversity associated with Coal mine overburden spoil through meta-genomic studies	DST, Govt. Of India	20.6	2012-2015 (ongoing)
Dr. S. Sahoo	Heavy metals in the environmental segments of sponge iron industry and screening of plants suitable as bio indicator	UGC, New Delhi	1.0	2010-2012 (Completed)
Dr. J. Ratha	Evaluation of Apoptosis induction potential of bioactive alkaloids isolated from <i>Lycopodium clavatum</i>	DST, Govt. Of India	20.0	2012-2015 (Ongoing)
Dr. S. Pattanaik	Identification and Characterisation of secondary metabolites of Actinomycetes sp. isolated from Hirakud Dyke soil and "Gene mining " study for the putative genes	DST, Govt. Of Odisha	7.01	2014-2017 (Ongoing)

**(b) International: NIL****18. Inter institutional collaborative projects and associated grants received:****(a) National Collaboration**

Title of the Project	Name of the faculty involved	Collaborating Institute and the Faculty/ Scientist involved	Total Cost (Rs. in Lakhs)	Associated grant received (Rs. in Lakhs)
Temporal and spatial expression pattern of ethylene and starch synthesizing genes during development of rice kernels contrast for grain weight (DBT, Govt. Of India)	Prof. P.K. Mohapatra & Dr. E. Kariali	Institute of Life Sciences, Bhubaneswar Dr. B. P. Shaw	59.06	35.55
Evaluation of Ecosystem services of sacred groves of Odisha	Prof. N. Behera & Dr. S.P. Mishra	NEHU, Sillong Prof. S. K. Barik	492.8	30.7

**(b) International Collaboration: Nil**

**19. Departmental projects funded by DST-FIST; UGC-SAP/CAS, DPE; DBT, ICSSR, AICTE, etc.; total grants received.**

Sponsoring agency	Scheme	Total grants (In Lakhs)	Duration
DST, Govt. Of India	DST-FIST	67.5	2011-2015

**20. Research facility/ Centre with recognition**

Research Facility	Level of recognition		
	State level	National	International
Ethylene Estimation by GLC			✓
Development of DNA markers for MAS		✓	
Estimation of taraxerol content by spectrophotometry		✓	
Multiplex PCR based diagnosis of Enteric <i>E. coli</i> strains		✓	
Vermitechnology			✓

**21. Special research laboratories sponsored by/ created by industry or corporate bodies: NIL**

**22. Publications: (Annexure)**

Type	No. of publications* (Refer Annexure-I to V)					
	2010-11	2011-12	2012-13	2013-14	2014-15	
Research papers published in peer reviewed journals <b>(International)</b>	22 (10 SCI)	13 (08 SCI)	32 (08 SCI)	17 (06 SCI)	24 (12 SCI)	
Research papers published in peer reviewed journals <b>(National)</b>	08 (05 SCI)	04 (02 SCI)	02 (01 SCI)	07 (02 SCI)	03 (01 SCI)	
Monographs published	Nil	Nil	NIL	NIL	NIL	
Chapters in Books	Two	Five	Six	One	One	
Books Edited	NIL		NIL		NIL	
Title of the Book:	NIL		Plastid Development in Leaves During Growth and Sene-scence, Vol.36, Advances in Photosynthesis and Respiration including Bioenergy and Related Processes		NIL	
ISBN No.:	NIL		987-94-007-5723-3		NIL	
Publisher Details:	NIL		Springer, Dordrecht, The Netherlands		NIL	
Authors:	NIL		Biswal B, Krupinska K and Biswal UC		NIL	

Number listed in international data bases (eg. SCOPUS, Web of Science etc.)		26	13	25	20	22
		<b>2010-11</b>	<b>2011-12</b>	<b>2012-13</b>	<b>2013-14</b>	<b>2014-15</b>
Citation Index	Total:	21.64	10.07	9.24	14.12	16.98
	Range:	0.41-3.61	0.14-3.73	0.37-2.76	0.47-6.65	0.18-3.01
	Average:	1.441	1.007	1.026	1.765	1.306
SNIP	Total:	12.421	6.379	7.451	7.967	9.893
	Range:	0.192-1.941	0.132-1.477	0.62-1.652	0.537-1.919	0.245-1.25
	Average:	0.827	0.638	0.827	0.996	0.761
SJR	Total:	8.48	4.416	3.655	7.472	6.213
	Range:	0.125-1.47	0.134-1.460	0.17-0.903	0.234-3.42	0.16-1.14
	Average:	0.565	0.442	0.402	0.934	0.477
Impact factor (JCR of Thompson Reuter only)	Total:	20.824	6.289	4.726	12.97	14.595
	Range:	0.386-3.893	0.386-3.607	0.386-2.756	0.386-6.841	0.56-3.145
	Average:	1.388	0.629	0.525	1.621	1.122
H-index of journals	Total:	709	308	178	413	412
	Range:	2-151	3-97	3-77	11-213	3-82
	Average:	47.26	30.8	19.77	49.937	31.69
h-index of faculty members	Total: <b>52</b>					
	Last five years: <b>52</b>					

**23. Details of patents and Income generated: Nil**

**24. Areas of consultancy and Income generated: Nil**

**25. Faculty selected nationally/ internationally to visit other laboratories/ institutions/ industries in India and abroad.**

- i. Prof. (Mrs) B.Biswal visited the Department of Plant Biology, University of Alcalá, Madrid, Spain during 2011 under Govt. Council of Alcalá University Fellowship.
- ii. Dr J. Ratha visited the MD Anderson Cancer Centre, Texas, USA during 2013-14 under the Post-doctoral Raman Fellowship.
- iii. Dr R.K.Behera visited the Institute of Nuclear medicine and allied Science, New Delhi during 2014-15 under the Summer Research Fellowship programme of Indian Academy of Sciences, Bangalore.

## 26. Faculty serving in

Name of the faculty	Service provide in			
	National committees	International committees	Editorial Boards	Any other
Dr. (Mrs) Binata Nayak	Nil	Nil	Nil	Nil
Dr. Ekamber Kariali	Nil	Nil	Nil	Nil
Dr. Jogeswar Panigrahi	Nil	Nil	Nil	Reviewer of 04 SCI Journals of Springer, Elsevier, NISCAIR
Dr. Satyendra Prasad Mishra	Nil	Nil	Nil	Nil
Dr. Rajendra K. Behera	Nil	Nil	Nil	Nil
Dr. Amiya K. Patel	Nil	Nil	Nil	Nil
Dr. (Mrs) Sunanda Sahoo	Nil	Nil	Nil	Nil
Dr. Jagnyeswar Ratha	Nil	Nil	Nil	Nil
Dr. (Mrs) Smaranika Pattanaik	Nil	Nil	Nil	Nil
Dr. (Mrs) Aliva Pattanaik	Nil	Nil	Nil	Nil

## 27. Faculty recharging strategies (UGC, ASC, Refresher/ Orientation programs, workshops, training programs and similar programs)

## A. Participation by the Faculties: (Number)

Name of the faculties undergone faculty recharging programmes	2010-11	2011-12	2012-13	2013-14	2014-15
Training	02	02	--	01	02
Orientation Programme	--	01	--	01	--
Workshop	--	--	--	--	02
Refresher course	--	--	01	01	01

## B. Organised by the Department:

Programmes	2010-11	2011-12	2012-13	2013-14	2014-15
Conference/ Seminar/ Workshop	01	Nil	01	01	Nil
Refresher course	01	01	01	01	01
Orientation Course	Nil	Nil	01	01	Nil



**28. Student projects**

	Programme	2010-11	2011-12	2012-13	2013-14	2014-15
Percentage of students who have done in house projects including inter-departmental projects	M.Sc. Life Sciences	100%	100%	100%	100%	100%
	M.Sc. Biotechnology	57.15%	23.08%	31.25%	7.7%	Yet to start
	M.Phil. Life Sciences	100%	100%	100%	100%	100%
Percentage of students doing projects in collaboration with other universities/ industry/ institute	M.Sc. Life Sciences	Nil	Nil	Nil	Nil	Nil
	M.Sc. Biotechnology	42.85%	76.98%	68.75%	92.3%	Yet to start
	M.Phil. Life Sciences	Nil	Nil	Nil	Nil	Nil

**29. Awards/ recognitions received at the national and international level****Faculty:**

- Prof. (Mrs) B. Biswal visited the Department of Plant Biology, University of Alcalá, Madrid, Spain during 2011 under Govt. Council of Alcalá University Fellowship.
- Dr. J. Ratha availed Raman postdoctoral fellowship in MD ANDERSON CANCER CENTER, TEXAS, USA funded by UGC, Govt. Of India during March 2014 to March 2015.
- Dr R.K.Behera visited the Institute of Nuclear medicine and allied Science, New Delhi during 2014-15 under the Summer Research Fellowship programme of Indian Academy of Sciences, Bangalore.
- **Doctoral/Post-doctoral fellow:** Nil
- **Students:** Nil.

**30. Seminars/ Conferences/Workshops organized and the source of funding (national/ international) with details of outstanding participants, if any**

Sl.	Title of the Conference/ Seminar	Sponsoring agency	Date	Outstanding participants
1	International conference on "Plant Science in post-genomic era"	DBT, DST, UGC, CSIR, BRNS, IACS	17-19 Feb. 2011	1. Masamitsu Wada (Japan) 2. Bartolome Sabater (Spain) 3. Mercedes Martin (Spain) 4. Karin Krupinska (Germany) 5. Stefan Hortensteiner (Switzerland) 6. Govindjee (USA) 7. Prasanna Mohanty (India) 8. A. L. Majumdar (India)
2	National conference on "Biodiversity and its conservation"	UGC	16-17 Feb. 2013	1. M.C. Dash (SLS-SU) 2. S. P. Adhikari (Santiniketan) 3. S.R. Dash (OUAT) 4. B. N. Hota (DFO) 5. P. K. Mohapatra (CSIR Emeritus, Scientist)
3	National Conference on "Current trends in Life Sciences research and challenges ahead"	UGC, BRNS, DST (O)	28 <sup>th</sup> Feb to 2 <sup>nd</sup> March 2014	1. Rabi Nayak (IISc.) 2. K. P. Gopinathan (IISc.) 3. A. Bhattacharya (BU) 4. Palok Aich (NISER) 5. Santosh Ku. Kar (JNU) 6. GBN Chainy (UU)

**31. Code of ethics for research followed by the departments:**

- Increase in understanding of biological systems
- Promoting responsible use of biomedical technologies
- Reassessment of the ethnocentric debate in light of new ecological insights and IP policy
- Due Approval procedure adopted during research
- Proper citation is being given to earlier contributors
- Confidentiality and Secrecy is maintained with integrity
- Authorship in the publication is being given on reality

**32. Student profile programme wise:**

Year	Name of the programme (Refer to Question. No.4)	Application received	Selected (appeared)		Pass percentage	
			Male	Female	Male	Female
2010-11	M.Sc. Life Sciences	210	9(7)	23(23)	85.7	91.3
	M.Sc. Biotechnology	51	5(5)	10(10)	100	100
	M.Phil. Life Sciences (2010)	130	7(5)	11(11)	100	90.9
2011-12	M.Sc. Life Sciences	260	5(4)	27(24)	50.0	95.83
	M.Sc. Biotechnology	48	6 (6)	8 (7)	100	100
	M.Phil. Life Sciences (2011)	42	10(8)	8(8)	62.5	75.0
2012-13	M.Sc. Life Sciences	382	8(8)	24(20)	100	100
	M.Sc. Biotechnology	53	5(5)	11(11)	100	100
	M.Phil. Life Sciences (2012)	53	2(1)	19(17)	100	100
2013-14	M.Sc. Life Sciences	375	9(7)	23(23)	85.7	100
	M.Sc. Biotechnology	39	3(3)	11(10)	100	100
	M.Phil. Life Sciences (2013)	73	7(6)	12(10)	100	100
2014-15	M.Sc. Life Sciences	539	9	23	Yet to appear	
	M.Sc. Biotechnology	55	3	12	Yet to appear	
	M.Phil. Life Sciences (2014)	74	6(6)	12(7)	100	85.7

## 33. Diversity of students:

Year	Name of the programme (refer q.4)	% of students from the same university	% of students from other universities within the state	% of students from the universities outside the state	% of students from other countries
2010-11	M.Sc. Life Sciences	96.9	---	3.1	--
	M.Sc. Biotechnology	35.7	64.3	--	--
	M.Phil. Life Sciences	61.11	38.89		--
2011-12	M.Sc. Life Sciences	71.9	28.1	--	--
	M.Sc. Biotechnology	14.3	85.7	--	--
	M.Phil. Life Sciences	66.7	27.8	5.5	--
2012-13	M.Sc. Life Sciences	68.7	28.2	3.1	--
	M.Sc. Biotechnology	33.3	66.7	--	--
	M.Phil. Life Sciences	61.9	33.3	4.8	--
2013-14	M.Sc. Life Sciences	87.5	12.5	--	--
	M.Sc. Biotechnology	53.8	30.8	15.4	--
	M.Phil. Life Sciences	68.4	26.3	5.3	--
2014-15	M.Sc. Life Sciences	90.6	9.4	--	--
	M.Sc. Biotechnology	20.0	80.0	--	--
	M.Phil. Life Sciences	66.7	22.2	11.1	--

## 34. How many students have cleared Civil services and Defence Services examinations, NET, SET, GATE and other competitive examinations? Give details category wise

	2010-11	2011-12	2012-13	2013-14	2014-15
Civil services examinations	--	--	--	--	--
Defence services examinations	--	--	--	--	--
NET	04	03	01	03	03
SET	--	--	--	--	--
GATE	04	03	02	04	01
Other competitive examinations	02	---	05	---	---

**35. Student progression**

Student progression	Percentage against enrolled				
	2010-11	2011-12	2012-13	2013-14	2014-15
UG to PG	--	--	--	--	-
PG to M.Phil.	61.11	66.7	61.9	68.4	66.7
PG/M.Phil to Ph. D	--	--	66.67	50.0	63.6
Ph.D to Post Doctoral	--	--	--	--	--
Employed • Campus selection • Other than campus recruitment	Data not recorded	Data not recorded	Data not recorded	Data not recorded	Data not recorded
Entrepreneurs	Nil	Nil	Nil	Nil	Nil

**36. Diversity of staff**

Percentage of faculty who are graduates	
of the same university	80% (08)
from other Universities within the state	20% (02)
from universities from other states	nil
from universities outside of the country	nil

37. Number of faculty who are awarded M.Phil., Ph.D, D.Sc. and D.Litt. during the assessment period : Nil

38. Present details of departmental infrastructural facilities with regard to

(a) Library: Total books- 2349; No. of journal on subscription: 08

(b) Internet facilities for staff and students: Internet facility through e-governance has been provided to Teachers and two computer laboratories with internet facility through BSNL broad band connection are available to the staff and students.

(c) Total number of class rooms: Two class room and One Seminar Hall

(d) Class rooms with ICT facilities: 02

(e) Students laboratories: 06

(f) Research laboratories: 10 lab and 02 CIF

39. List of Doctoral, Postdoctoral students and Research Associates:

A. Doctoral Students:

Year	From host institution/ Universities	From other institutions/ Universities
2010-11	Bandana Kulu	Ms Monty Kujur
	Kamala Haripal	Khulana Sethi
	N.J. Ekka	Pratibha Rani Deep
	Santanu Bhattacharya	Priti Pragyna Ray
	Bindu Sahu	---
	Alok Ranjan Sahu	---

Year	From host institution/ Universities	From other institutions/ Universities
2011-12	Kausik Das	Sidharth Kumar Dash
	Saswati Subasini Sahoo	Khulana Sethi
	Jayanta Kumar Barik	Ramya Ranjan Mishra
	Snehalata Tudu	Pratibha Rani Deep
	Sen Seth	---
	Kamala Haripal	---
	N.J. Ekka	---
	Sobha Chandra Rath	---
	Alok Ranjan Sahu	---
	Ms A. Minz	--
	Ms Monty Kujur	---
2012-13	Kausik Das	Sidharth Kumar Dash
	Saswati Subasini Sahoo	Ramya Ranjan Mishra
	Jolly Pradhan	Debadatta Bhoi
	Sujit Kumar Mishra	Pratibha Rani Deep
	Antaryami Pradhan	--
	Tapas Paramanik	--
	Annada Padhi	--
	Jitesh Kumar Maharana	--
	Jayanta Kumar Barik	--
	Snehalata Tudu	--
	Jyotimanjari Kusum	--
	Kamala Haripal	--
	Sen Seth	--
	Chumkijini Chhatria	--
	Sobha Chandra Rath	--
	Alok Ranjan Sahu	--
Omprakash Pradhan	--	
2013-14	Jolly Pradhan	Sidharth Kumar Dash
	Sujit Kumar Mishra	Monty Kujur
	Antaryami Pradhan	Ramya Ranjan Mishra
	Tapas Paramanik	Manorama Mohanty
	Jitesh Kumar Maharana	Debadatta Bhoi
	Kausik Das	Supriya Routray
	Saswati subasini Sahoo	--
	Jayanta Kumar Barik	--
	Kamala Haripal	--
	Sen Seth	--
	Chumkijini Chhatria	--
	Sobha Chandra Rath	--
	Omprakash Pradhan	--

2014-15	Monalisha Pradhan	Umesh Prasad Sahu
	Jolly Pradhan	Sidharth Kumar Dash
	Sujit Kumar Mishra	Anisetti Sivashankar
	Antaryami Pradhan	Ramya Ranjan Mishra
	Tapas Paramanik	Manorama Mohanty
	Jitesh Kumar Maharana	--
	Jayanta Kumar Barik	--
	Kamala Haripal	--
	Sen Seth	--
	Chumkijini Chhatria	--
	Sobha Chandra Rath	--
	Omprakash Pradhan	--
	Asit Kumar Behera	--

#### B. Post-Doctoral Students:

Year	From host institution/ Universities	From other institutions/ Universities
2014-15	-----	Dr N.J.Estelle (1.3.2015-306.2015) Universite Nangui Abrogoua (Cote d'Ivoire) Africa.

#### 40. Number of post graduate students getting financial assistance from the university:

	2010-11	2011-12	2012-13	2013-14	2014-15
<b>M.Sc. Life Sciences</b>	02* + 01 ** ( 40,000/- + 4,800/-)	02* + 01 ** ( 40,000/- + 4,800/-)	02** + 04*** ( 9,600/- + 96,000/-)	02** + 10*** (9,600/- + 2,40,000/- )	02**+10*** (13,600/- + 2,40,000/- )
<b>M.Sc. Biotechnology</b>	----	----	----	----	06**** (94,452/-)

\* P.G. Merit Scholarship

\*\* Swami Sivananda Memorial Fellowship.

\*\*\*P.G.Scholarship of Institute of Mathematics and Applications, Govt. of Odisha.

\*\*\*\* Meritorious Scholarship of Science and Technology Department, Govt. of Odisha.

41. Was any need assessment exercise undertaken before the development of new programme(s)? If so, highlight the methodology: New programme not developed.

42. Does the department obtain feedback from

a. Faculty on curriculum as well as teaching learning evaluation? If yes, how does the department utilize the feedback?	NO
b. Students on staff, curriculum and teaching-learning-evaluation and how does the department utilize the feedback?	NO
c. Alumni and employers on the programmes offered and how does the department utilize the feedback	Manual. The suggestions/feedback was discussed in TC meeting and often incorporated in the programme.

**43. List of distinguished alumni of the department (maximum 10)**

Sl.	Name	Designation	Institute	Batch
1	Dr Bikas R.Pattnaik	Professor	University of Wisconsin, Madison, USA	1987-89
2	Dr Bipin Ch.Dash	Professor	Yale University, USA	1982-84
3	Dr Jayashree Mishra	Asst. Professor	A&M Rangel college of Pharmacy, Texas, USA	1995-97
4	Dr Naresh Ch. Bal	Asst. Professor	Ohio state University, Columbus, USA	1995-97
5	Dr Kali Charan Patra	Asst. Professor	Uppsala University, Sweden	1999-01
6	Dr Ashish K. Mohapatra	Professor	University of Calgary, Canada	1990-92
7	Dr Pankaj Ku Mishra	Professor	University of New Jersey, USA	1990-92
8	Prof. P.C.Mishra	Expert member, NGT, Kolkata India	Expert member, NGT, Kolkata India	1973-75
9	Prof. Rintu Banerjee	Professor	IIT, Kharagpur	
10	Dr K.C.Bhainsa	Senior Scientist,	BARC, Mumbai	1990-92

**44. Give details of student enrichment programmes (Special lectures/ Workshops/ Seminars) involving external experts.**

Year	Name of the programme	Details
2010-11	Special lectures	---
	Workshops	---
	Seminars	---
2011-12	Special lectures	---
	Workshops	---
	Seminars	---
2012-13	Special lectures	1. K.Durga Vara Prasad, Former Scientist, ICRISAT. Title: Gene PRO 2000: He Particle acceleration Apparatus for genetic transformation. (08.10.2012) 2. Rajanikanta Mohapatra, School of Biotechnology, KIIT University, Bhubaneswar. Title: Computational study of histo-aspartic protease and Artemosinon-quinone hybrid: Interaction, mechanism and anti-malarial activity on 10.11.2012.

		3. Dr Satya prakash Dash, IIM, Bangalore. Title: "Evolution of Biotechnology industries and their future and What do I do with my Life Science degree" on 07.12.2012 4. Prof. Pramod W. Ramteke, Sam Higginbottom Institute of Agriculture and Sciences, Allahabad. Title: "Antarctica-the amazing continent" on 21.01.2013.
	Workshops	Nil
	Seminars	Nil
2013-14	Special lectures	1. Dr Pawan Kumar Agrawal, Scientist E, INMAS, New Delhi. Title: " Radiation Counter measure: present, past and future" on 08.08.2013. 2. Dr Giridhari Lal, Scientist, NCCS, Pune. Title: "Life Sciences and Immunology" on 17.08.2013. 3. Dr Adweta Prasad Parida, Scientist, NCCS, Pune. Title: "Functional Characterisation of methylated DNA-binding proteins" On 17.08.2013. 4. Dr Palok Aich, NISER, Bhubaneswar. Title: "System Biology" on 24.08.2013.
	Workshops	Nil
	Seminars	Nil
2014-15	Special lectures	1. Dr KCS Panigrahi, NISER, Bhubaneswar. Title: " Light signalling and flowering time control in <i>Arabidopsis</i> " on 29.10.2014. 2. Dr Chandan Goswami, NISER, Bhubaneswar. Title: " Thermo-sensitive ion channels" on 30.10.2014. 3. Dr Ranjan Kumar Nanda, Title: "Applications of Proteomic tools in understanding Biology" on 14.11.2014.
	Workshops	Nil
	Seminars	Nil

45. **List the teaching methods adopted by the faculty for different programmes.** MS-Power point, ICT, SPSS Statistical package, Computer Internet based teaching methodology adopted for all teaching works

46. **How does the department ensure that programme objectives are constantly met and learning outcomes are monitored?**

The syllabus of all the programmes are updated at regular interval by considering the NET and GATE syllabus, Specialization of faculty members and curriculum of other national level institutions.

The changes of the curriculum and its impact on students performance in NET and GATE syllabus has been monitored.



47. **Highlight the participation of students and faculty in extension activities:** Nil
48. **Give details of “beyond syllabus scholarly activities” of the department.**  
 Industrial and Institutional (R &D) Visit  
 Field Trips  
 Study tours  
 R&D involvement (during Final semester)
49. **State whether the programme/ department is accredited/ graded by other agencies? If, yes, give details :** No
50. **Briefly highlight the contribution of the department in generating knowledge, basic or applied:**  
 (a) Publication of many research papers in the areas of basic sciences in impact factor journals of International repute.  
 (b) Creation of infrastructure in Biological sciences in the underdeveloped belt of western Odisha and motivating the students to pursue their career in Life sciences.
51. **Details of five major Strengths, Weaknesses, Opportunities and Challenges (SWOC) of the department.**
- Strength:**
- i. Highly qualified, optimist and dedicated faculty members including two Emeritus Scientists.
  - ii. Good numbers of international publications.
  - iii. Availability of relatively good infrastructure.
  - iv. Academic Autonomy.
  - v. Good Academic Curriculum and success of students in NET, GATE.
- Weakness:**
- i. Lack of space for housing the equipments.
  - ii. Lack of funds for maintenance of infrastructure and repairing of sophisticated and expensive equipments.
  - iii. Lack of scope and funds for interaction of teachers and students with the public and extension activities.
  - iv. Lack of uninterrupted power supply.
  - v. Non-availability of student’s and staff’s common room and space for parking vehicles.
- Opportunity:**
- i. Development of research programmes to address the local problems through sustainable exploitation of mineral, water and biodiversity resources available at western Odisha.
  - ii. Availability of Human resources (highly motivated, hard working and enthusiastic students from low income group of the society).
  - iii. Scope for study of diversified rice-based agro-ecosystem.
  - iv. Institutions-industries collaborations.
- Challenges:**
- i. Financially Poor students.
  - ii. Dilapidated condition of the building
  - iii. Non-recruitment of supporting staff.
  - iv. Development of advance laboratories and maintenance of sophisticated equipments.
  - v. Development of Animal house, glass house and e-library etc.

**52. Future plans of the department.**

- To act as a nodal centre to facilitate and promote research in Life Sciences in the eastern region of the country.
- Deliver genetic handles for MAS and diagnostic endeavours particularly by establishing plant and animal health clinic.
- To address the local problems, especially in environmental management in collaboration with Industries.
- To convert the M.Sc. Biotechnology (SF) in to a Regular course.
- To open a separate M.Sc. Industrial Microbiology programme.
- To establish a Biodiversity conservation Centre.
- To convert the School into Centre of Excellence in Life Science Research.

### Research Publication of School of Life Sciences (2010-2015)

#### 1. Research Papers in Peer reviewed Journals of (2010-2015):

- Mohapatra PK, Patro L, Raval MK, Biswal UC, **Biswal B** (2010) Senescence induced loss in photosynthesis enhances activity of cell wall  $\beta$ -glucosidase, *Physiologia Plantarum* 138:346-355
- Kuanar S, Panigrahi R, **Kariali E**, and **Mohapatra PK** (2010) Apoplasmic assimilates and grain growth of contrasting rice cultivars differing in grain dry mass and size. *Plant Growth Regulation*, 61: 135-151. Springer, ISSN: 0167-6903.
- Behera M, Mishra RR, **Panigrahi J**, Rath SP (2010) Micropropagation in *Asteracantha longifolia* (L.) NEES- a herb of therapeutical significance. *International Journal of Genetic Engineering and Biotechnology* 1 (1): 141-148 (ISSN: 0974-3073)
- Behera M, Mishra RR, Bindhani B and **Panigrahi J** (2010) Cytological analysis in *Asteracantha longifolia* L. (NEES)-a medicinal herb. *International Journal of Botany* 6 (2): 132-135 (ISSN: 1811-9700)
- Sahu AR, Behera N and **Mishra SP** (2010) Use of Ethnomedicinal Plants by Natives of Bargarh District of Orissa, India. *Ethnobotanical Leaflets* 14: 889-910
- Sethy K and **Behera N** (2010) Growth curve analysis of bacteria isolates from fresh coal mine spoil. *The Bioscan* 5(2):185-187.
- Ekka NJ and **Behera N** (2010) A Study of the mycorrhizal association with vegetation on coal mine spoil. *The Bioscan* 5(3):369-372.
- Pattnaik S, Das SN and **Behera N** (2010) Characterization of the air borne bacteria to different environmental parameters. *Research Journal of Pharmacognosy and Photochemistry* 2(4):297-300.
- Bhagel KK, Behera R, Behera MK and **Patnaik A** (2010) Copper accumulation in some selected tissues of a fresh water fish, *Oreochromis massambicus* (Peters) *Journal of Applied Zoological Researches*, 21 (2): 169-173, (ISSN:0970-9304)
- Bhagel KK, Behera R, Behera MK and **Patnaik A** (2010) Copper induced biochemical changes in the gonads of fresh water fish, *Oreochromis massambicus* (Peters) *Journal of Applied Zoological Researches*, 21 (2): 175-180, (ISSN:0970-9304).
- Kariali E**, Patel S, Panigrahi R and **Mohapatra, P.K.** (2010) Change of adaptive plasticity of *Oryza rufipogon* Griff. In response to variation of growth habitats. *Indian Journal of Plant Physiology* 15(3): 288-292. ISSN: 0019-5502.
- Pattnaik S**, Jana GK, Subudhi PSK and Mohapatra SK ( 2010) Evaluation and Screening of Antagonistic Effect of Microbes. *Drug Invention Today*, 2 (1): 89-91. ISSN 09757619
- Pattnaik S**, Padhan DK and Jana GK (2010) Evaluation of Cinnamon Oil, Peppermint Oil, Cardamom Oil and Orange Oil as Antimicrobial Agents, *Journal of Pharmacy Research* 3 (2):414-416, ISSN: 0974-6943
- Pattnaik S** and Pattnaik B (2010) A study of *Lantana camara* Linn. Aromatic oil as an antibacterial agent, *International Research Journal of Pharma. Sci* 1(2) :32-35.ISSN 09765700
- Pattnaik S**, Das, SN and Behera, N. (2010) Resistance pattern shown by a Gram positive *Bacillus*. sp. *Research Journal of Pharmacy and Phytochemistry*, 2 (3): 297-300, 0975-2331.
- Ekka NJ, **Behera N** (2011) Species composition and diversity of vegetation developing on an age series of coal mine spoil in an open cast coal field in Orissa. *Tropical Ecology* 52(3): 335-341
- Kullu B, **Behera N** (2011) Vegetation succession on different age series sponge iron solid waste dumps with respect to top soil applications. *Research J of Environment and Earth Sciences*, 3(1): 38-45

- Panda M, Patro TK and **Behera N** (2011) An antimicrobial property of bark extracts of *Mimusops elengi* for the control of dental plaque forming pathogen *Streptococcus mutans*. *Ethnobotany*. Vol.23: 74-77.
- Bhattacharyya S, **Nayak B**, Choudhury NK (2011) Response of diazotrophic cyanobacterium *Nostoc carneum* under Pesticide and UV-B stress. *Chemosphere* 44:131-135
- Yamada K, Sasakura A, Nishiwaki K, El-Shemy HA, **Mohapatra PK**, Nguyen NT, Kurosaki H, Kanai S, Ito J, Fujita K (2011). Effect of terminal location of pods on biomass production and <sup>13</sup>C partitioning in a fasciated stem soybean. *Journal of Zhejiang University Science B* 12, 72-82.
- Mohapatra P K**, Panigrahi R, Turner N C (2011). Physiology of spikelet development in rice: is manipulation of apical dominance crucial for grain yield. *Advances in Agronomy*, 110, 333-359.
- Kanai S, Moghaieb RE, El-Shemy HA, Panigrahi R, **Mohapatra PK**, Ito J, Nguyen NT, Saneoka H, Fujita K. (2011). Potassium deficiency affects water status and photosynthetic rate of the vegetative sink in green house tomato prior to its effects on source activity. *Plant Science* 180,368-374.
- Mohapatra PK**, Panda BB and **Kariali, E.** (2011) Plasticity of tiller dynamics in wild rice *Oryza rufipogon* Griff. : A strategy for resilience in sub-optimal environments. *International Journal of Agronomy*, Hindawi Publishing Corporation, USA, Vol. 2011: 1-9. doi: 10.1155/2011/543237.
- Ghosh S, Guru R, Behera R, Bajpayee A, Satapathy R, **Panigrahi J** (2011) *In-silico* comparative study and 2-D QSAR analysis of some structural and physiochemical descriptors of Levetiracetam analogs. *J. Computational Intelligence in Bioinformatics*, 4 (1): 151-155 (ISSN: 0973-385X)
- Panigrahi J**, Kole P and Kole C (2011) RFLP mapping of a gene controlling self incompatibility in *Brassica campestris* (Syn. *Rapa*) and their comparative mapping to *B. napus* and *B. oleracea*. *Biologia Plantarum* 55 (1): 54-60 (ISSN: 0006-3134)
- Guru RK, Behera R, Ghosh S, Bajpayee A, **Panigrahi J**, **Patel AK**, Satapathy R (2011) A comparative 2D QSAR analysis of Levetiracetam and its analogs, the inhibitor of Glioblastoma, by different statistical techniques: MLR,PLS,SVM and ANN. *J Global Pharma Technology*, 3(4): 1-13(ISSN: 0975-8542)
- Haripal K, **Sahoo S** (2011) Vegetational dynamics in some tropical abandoned rice fields in the western part of Orissa, India, *African Journal of Environmental Science and Technology*, 5 (1): 37-44. ISSN 1991-637
- Biswal B**, Joshi PN, Raval MK, Biswal UC (2011) Photosynthesis, a global sensor of environmental stress in green plants: Stress signalling and adaptation, *Current Science* 101: 47-56.
- Patel AK**, **Behera N** (2011) Genetic diversity of coal mine spoil metagenome using random amplified polymorphic DNA (RAPD) marker. *Indian Journal of Biotechnology*, 10: 90-96
- Joshi PN, Gartia S, Pradhan MK, **Biswal B** (2011) Photosynthetic response of cluster bean chloroplasts to UV-B radiation: Energy imbalance and loss in redox homeostasis between Q<sub>A</sub> and Q<sub>B</sub> of photosystem II, *Plant Science* 181: 90-95 .
- Mishra PC, Behera N, **Mishra SP** and Meher K (2011) Ecological Enumeration of tree vegetation in removal of atmospheric pollution load: A case study in an Industrial complex of Western Orissa, India. *Asian Journal of Water, Environment and Pollution*, 8 (3): 19-28.
- Pani A, Mahapatra RK, **Behera N** and Naik PK (2011) Computational Identification of Sweet Wormwood (*Artemisia annua*) micro RNA and Their mRNA Targets. *Genomics Proteomics Bioinformatics*. 9(6):200-210.
- Minj AK and **Behera N** (2011) Antimicrobial action of yogurt against some pathogenic microorganisms. *Biohelica*. Vol.2 (1 & 2): 67-71.
- Mishra RR, Sahu AR, Rath SC, Mishra SP, **Panigrahi J** (2012) Cyto-morphological and molecular characterization of *Cajanus cajan* x *C. scarabaeoides* F<sub>1</sub> Hybrid. *The Nucleus*, 55: 27-35.

- Panigrahi J** and Mishra RR (2012) Identification of sex in *Momordica dioica* (spiny gourd) using RAPD marker analysis and its validation in  $F_1$  progenies. *Journal of Horticultural Science and Biotechnology* 87 (2):107-112 (ISSN1462 0316).
- Kariali E**, Sarangi S, Panigrahi R, Panda BB and **Mohapatra PK** (2012) Variation in senescence pattern of different classes of rice tillers and its effect on panicle biomass growth and grain yield. , *American Journal of Plant Sciences*. 3: 1047-1057.
- Panda BB, Sharma SG, **Mohapatra PK**, Das A (2012) Iron stress induces primary and secondary micro-nutrient stresses in high yielding rice. *Journal of Plant Nutrition* 35, 1359-1373.
- Panda BB, **Mohapatra PK**, Sharma SG, Das A (2012) Application of excess nitrogen, phosphorus and potassium fertilizers leads to lowering of grain iron content in high yielding tropical rice. *Communications in Soil Science and Plant Analysis* 43, 2590-2602.
- Mishra SP, **Behera N**, and Parmanik T (2012). Comparative assessment of gum yielding capacities of *Boswellia Serrata* Roxb. and *Sterculia Urens* Roxb. In relation to their girth sizes. *The Ecoscan: Special issue*, 1: 327-330.
- Patel AK** (2012). Dose-dependent interactions between Estradiol-17 $\beta$  and Tri-iodothyronine ( $T_3$ ) with reference to different physiological and biochemical parameters on liver tissue of common Indian Toad (*Bufo melanostictus*). *South Asian Journal of Experimental Biology*; 2(3): 79-89.
- Kujur M and **Patel AK** (2012). Comparative assessment of microbial biomass and soil enzyme activities as potential indicators of soil quality in different mine spoil, Odisha. *Journal of Environment*; 1(2): 64-74.
- Pattnaik S** (2012) Susceptibility of *Klebsiella* sp. isolated from septicemia patients to water soluble pigments of *Pseudomonas* sp. and *Staphylococcus* sp. isolated from hospital campus soil. *Journal of Pharmacy Research*, 5(2) :1088-1090
- Mishra N, Mohapatra PK, Raval MK, **Biswal B**, Biswal UC (2012) A molecular model of artificial photosynthesis: Mn-Ca binuclear complex for photosynthetic oxidation of water, *Indian Journal of Biochemistry and Biophysics* 49: 246 -249.
- Behera M, **Panigrahi J**, Mishra RR, Rath SP (2012) Analysis of EMS induced *in vitro* mutants of *Asteracantha longifolia* (L.) NEES using RAPD markers. *Indian Journal of Biotechnology* 11: 39-47 (ISSN: 0972-5849)
- Sahu JK, **Nayak B**, Bhattacharyya S (2012) Epilithic cyanobacteria on temples of Western Odisha. *Biohelica.*, 47-50.
- Mishra SP** and Behera N (2012) Impact of anthropo-genic disturbance on population structure of some important tree species in a tropical dry deciduous forest patch of Odisha. *Journal of Ecobiotechnology*, 4(2):96-99.
- Mahapatra RK, **Behera N** and Naik PK (2012) Molecular modeling and evaluation of binding mode and affinity of aetemisnin-quinine hybrid and its congeners with Fe-protoporphyrin-IX as a putative receptor. *Bioinformation*. 8(8): ISSN: 0973-2063 (online) 0973-8894.
- Sahu RC, Sahu A, Padhi S, Pattanaik L, Mishra RR, **Panigrahi J** (2012) *In vitro* regeneration of plantlets from nodal explants of *Nyctanthes arbor-tristis* Linn. And evaluation of genetic fidelity through RAPD analysis. *Bioscan* 7(4): 563-569 (ISSN 0973-7049)
- Sethy K, **Behera N** (2012) Antimicrobial activity of thermo-tolerant bacterial isolate from coal mine spoil. *African journal of Microbiology Research*, vol. 6(26): 5459-5463.
- Kullu B and **Behera N** (2012) Status and diversity of vesicular arbuscular mycorrhiza in different age series sponge iron solid waste dumps with respect to reclamation. *The Bioscan*. 7(3): 539-542.
- Mishra M, Patel AK and **Behera N** (2012) An assessment of coliform bacteria in the river Mahanadi system of sambalpur. *The Bioscan* 7(3): 463-467.
- Minj AK and **Behera N** (2012) A comparative microbiological quality assessment of rural and urban milk samples. *African Journal of Food Science*, 6(21): 519-523.
- Mishra M, **Patel AK** and **Behera N** (2012).An assessment of coli form bacteria in the river Mahanadi system of Sambalpur. *The Bioscan*. 7(3): 463-467.

- Padhan DK, **Pattnaik S**, Behera AK and Padhan J (2012) Comparative phytochemical study of *Desmostachya bipinnata* and *Tephrosia. Purpurea*. *International Journal of research in pharmaceutical and Biomedical Sciences*, 3 (1), 196-200, ISSN: 2229-3701
- Kujur M and **Patel AK** (2012). Quantifying the contribution of different soil properties on microbial biomass C, N and P in dry tropical ecosystem. *International Journal of Environmental Sciences*; 2(3): 2272-2284.
- Patel AK** (2012). Predicting binding affinities of Fosmidomycin analogues as DOXP-reductoisomerase inhibitors based on structure-centric approaches. *International J. of Pharma and Bio Sci.*; 3(4): (B) 72-91.
- Pattnaik S** (2012) Susceptibility of *Klebsiella* sp. isolated from septicemia patients to water soluble pigments of *Pseudomonas* sp. and *Staphylococcus* sp. isolated from hospital campus soil, *Journal of Pharmacy Research*, 5(2) :1088-1090, ISSN: 0974-6943
- Kujur M, Gartia SK and **Patel AK** (2012). Quantifying the contribution of different soil properties on enzyme activities in dry tropical ecosystem. *APRN J. of Agricultural and Biological Sciences*; 7(9): 763-772.
- Patel AK** (2012). Study of binding affinities of FabZ inhibitors: NAS-21 and NAS-91 analogues based on receptor-centric computational methods. *International J. of Pharma and Bio Sci.*, 3(4): (B) 902-913.
- Maharana SB, Mahato V, Behera ML, Mishra RR, **Panigrahi J** (2012) *In vitro* regeneration of plantlets from node and leaf explants of *Jatropha curcas* (L.) and evaluation of genetic fidelity through RAPD markers *Indian Journal of Biotechnology* 11: **280-287**(ISSN: 0972-5849)
- Joshi PN, Gartia S, Pradhan MK, Panigrahi S, Nayak L, **Biswal B** (2013) Acclimation of clusterbean cotyledon to UV-B radiation in the presence of UV-A: partial restoration of photosynthetic energy balance and redox homeostasis. *Acta Physiologia Plantarum* DOI10.1007/s11738-013-1245-6 (Springer, I.F.- 1.584)
- Mohapatra PK, Joshi PN, Ramaswamy NK, Raval MK, Biswal UC and **Biswal B** (2013) Damage of photosynthetic apparatus in the senescing basal leaf of *Arabidopsis thaliana*: a plausible mechanism of inactivation of reaction centre II, *Plant Physiology and Biochem.* 62: 116-121(Elsevier, I.F.- 2.756)
- Mishra RR, Behera B and **Panigrahi J** (2013) Elucidation of Genetic relationships in the genus *Cajanus* using Random Amplified Polymorphic DNA marker analysis. *J Phylogenetics and Evolutionary Biology* 1-1: 100-107 (ISSN-JPGEB-OPEN ACCESS)
- Mishra RR, Sahu AR, Rath SC, Behera B, **Panigrahi J** (2013) Molecular mapping of locus controlling resistance to *Helicoverpa armigera* (Hubner) in *Cajanus cajan* L. (Millsbaugh) using Interspecific Mapping Population. *The NUCLEUS* 56: 91-97 (Springer, ISSN: 0029-568x(P), 0976-7975 (e)
- Mishra M, **Patel AK and Behera N** (2013) Prevalence of multidrug resistant *E. coli* in the river of Mahanadi of Sambalpur. *Current Research in Microbiology & Biotechnology.* 1(5):239-244.
- Deep PR, Bhattacharyya S, **Nayak B** (2013) Cyanobacteria in the wetland of industrialised Sambalpur District of India” *Aquatic Biosystem* (Biomed. Central) 9:14
- Bhattacharyya S, Deep PR, **Nayak B**, Panigrahi M, Mohapatra (2013) Antimicrobial activity of two diazotropic cyanobacteria against *Staphylococcus aureus*”. *Int. J. Med. Arom. Plants.* Vol 3, No 2 pp:283-292
- Tandon S, Ekka NJ, Mishra SP, **Behera N** and Mishra PC (2013). Ecological enumeration of vegetation on ash mound and their contribution to wasteland reclamation and carbon sequestration. *The Ecoscan: Special issue*, 3:75-81.
- Dash MC and **Behera N** (2013) Carbon sequestration and role of earthworms in Indian land uses: a review. *The Ecoscan.*7(1&2).1-7.

- Maharana JK and **Patel AK** (2013). Physico-chemical characterization and mine soil genesis in age series coal mine overburden spoil in chronosequence in a dry tropical environment. *Journal of Phylogenetics and Evolutionary Biology*; 1(1): 101-107.
- Hansa J, Chakraborty B, Laskar BA, Behera SK and **Patel AK** (2013). *Pteris vittata* propagation through different exposure of chromium concentration: an experiment to comprehend phytoremediation properties. *Advances in BioResearch* 4(1): 43-49.
- Kujur M and **Patel AK** (2013) Comparative assessment of physico-chemical properties influencing microbial biomass as biomarker in monitoring soil status on chronosequences of iron mine overburden spoil. *International Journal of Environmental Sciences*; 3(5): 1656-1670.
- Maharana JK and **Patel AK** (2013) Characterization of physico-chemical properties and their impact on enzyme activities in a chronosequence of coal mine overburden spoil as biomarker of reclamation process. *J. of Bacteriology and Parasitology*; 4(4): 174-183.
- Mishra M, **Patel AK** and Behera N (2013) Prevalence of multi-drug resistant *E. coli* in the river Mahanadi of Sambalpur. *Current Research in Microbiology and Biotechnology* 1(5): 239-244.
- Maharana JK and **Patel AK** (2013) Microbial communities and enzyme kinetics used as index of reclamation in a chronosequence coal mine overburden spoil. *International J. of Pharma and Bio Sciences* 4(4): 1171-1186.
- Maharana JK and **Patel AK** (2013) Microbial biomass, microbial respiration and organic carbon indicate nutrient cycling in a chronosequence coal mine overburden spoil. *International Journal of Environmental Sciences* 4(2): 171-184.
- Baboo M, Pasayat M, Samal A, Kujur M, Maharana, JK and **Patel AK** (2013) Effect of four herbicides on soil organic carbon, microbial biomass-C, enzyme activity and microbial populations in agricultural soil. *International J. of Res. in Environmental Sci. and Technology*; 3(4): 100-112.
- Patnaik A** (2013) Sublethal impact of nickel on survival and soil metabolism of an anecic earthworm. *International Journal of Scientific Research*, 2(12):19-22, (ISSN:2277-8179)
- Mall G, Priyadarsini N, Samal A, Kujur M, Maharana JK and **Patel AK** (2013) Effects of four different pesticides on microbial populations, organic carbon, microbial biomass-C, enzyme activities in agricultural soil. *Journal of Environmental Science, Computer Science and Engineering & Technology*; 2(4):1213-1229
- Srivastava P, **Ratha J**, Shah NK, Mishra N, Anvikar AR, Sharma SK, Das MK, Srivastava B, Valecha N (2013) A clinical and molecular study of artesunate + sulphadoxine-pyrimethamine in three districts of central and eastern India. *Malaria Journal* 12:247
- Panigrahi J, Pattnaik S and Mohapatra S (2013) Attenuation of whole cells of *Salmonella* spp. isolated from a rural community pond water and its appliances in pond water: A preliminary study, *Journal of Applied Pharmaceutical Sciences*, 4 (4): 518-522, ISSN: 0975-7538
- Sahoo S, Pattanayak SK, Sethi JR, Haripal K, Panda AR (2013) Heavy metal content and physico-chemical characteristics of soils in open forest and crop fields near Bhusan sponge iron plant in Sambalpur district of Odisha, *International Journal of Scientific Research*, 2(8): 206-210, ISSN: 2277 – 8179.
- Chhattria C, Rao TV and Sahoo S (2013) Effect of UV-B on pupa of Eri silkworm *Philosamia ricini* (H). *The Ecoscan* , 3: 339-343, ISSN: 0974-037.
- Pattanayak C, Sahoo S, Sethy JR, Haripal K (2013) Growth and metabolic response of the tropical earthworm *Octochaetona surensis* (Michaelsen) to chromium and nickel exposure. *The Ecoscan*, 3: 331-337, ISSN: 0974-037
- Haripal K, Sahoo S (2013) Physico-chemical and biochemical reclamation of soil through secondary succession, *Open Journal of Soil Sciences*, 3(5): 235-243. ISSN:2162-5360
- Sahu A, Rath SC, Panigrahi J (2013) In vitro organogenesis in *Aerva lanata*. *Indian Journal of Biotechnology* 12: 260-264 (ISSN:0972-5849)

- Pattnaik S, Pradhan M and Narayani M (2013) Resistance Pattern acquired by nosocomial pathogens: a plasmid profile study, *Journal of Applied Pharmaceutical Science*, 3 (09) : 057-059. ISSN 2231-3354.
- Sharma S, Kharshing E, Srinivas A, Zikihara K, Tokutomi S, Nagatani A, Fukayama H, Bodanapu R, **Behera RK**, Sreelakshmi, Y and Sharma R (2014) A Dominant Mutation in the Light-Oxygen and Voltage2 Domain Vicinity Impairs phototropin1 Signaling in Tomato. *Plant Physiol.* 164: 2030 – 44, 2014. (ASPB, ISSN: 0032-0889, online 1532-2548)
- Kujur M and **Patel AK** (2014) Microbial soil respiration and it's dependency on soil microbial communities, carbon inputs and moisture in different dry tropical ecosystems. *International Journal of Pharma and Bio Sciences (B)* 5(1): 31-36.
- Kujur M and **Patel AK** (2014) PLFA profiling of soil microbial community structure and diversity in different dry tropical ecosystems of Jharkhand. *International Journal of Current Microbiology and Applied Sciences*, 3(3): 556-575.
- Kujur M and **Patel AK** (2014) Kinetics of soil enzyme activities under different ecosystems: An index of soil quality. *Chilean Journal of Agricultural Research*, 74(1): 96-104.
- Maharana JK and **Patel AK** (2014) Microbial community PLFA responses to ecosystem restoration in a chronosequence coal mine overburden spoil and implications of soil quality. *International Journal of Current Microbiology and Applied Sciences*, 3(6): 45-71.
- Sahoo TK, Jena PK, **Patel AK** and Seshadri S (2014) Bacteriocins and their applications for the treatment of bacterial diseases in aquaculture: a review. *Aquaculture Research*; 1-15.
- Patel AK**, Kujur M, Soren K, Baxla E and Mishra S (2014) Characterization of *Bacillus* strain isolated from agricultural soil using PCR amplified gene coding for 16s rDNA and optimization of amyolytic activity. *International Journal of Current Life Sciences* 4(7): 3433-3443.
- Mishra A, Maharana JK and **Patel AK** (2014) Dose dependent response of carbendazim-mancozeb fungicidal mixture on microbial populations and enzymatic activities in agricultural soil. *Asian Journal of Biological and Pharmaceutical Research* 4(4): 168-187.
- Kariali E** (2014) Environmental factors under-mine genetic expression of tiller dynamics in wild rice *Oryza nivara* and *Oryza rufipogon*. *American Journal of Plant Sciences*, 5: 2617-2622. ISSN Print: 2158-2742 ISSN Online: 2158-2750.
- Panda BB, Sharma S, **Mohapatra PK**, Das A (2014) Iron nutrition *vis-à-vis* aconitase activity and ferritin accumulation in tropical indica rice cultivars differing in grain iron concentration. *American Journal of Plant Science*, 5: 2829-2841.
- Bhattacharyya S, Deep PR, **Nayak B**, Sahu JK (2014) Methyl parathion induced changes in primary photochemistry of a natural nitrogen engineer *Nostoc punctiformae*, *International Journal of Applied Research*, 4:7,53-56
- Maharana JK, Naik B and **Patel AK** (2014) Isolation and characterization of a chemolitho-trophic, thiosulfate oxidizing *Bacillus* sp. from coal mine overburden spoil. *Journal of Chemical, Biological and Physical Sciences*, 4(4): 3385-3397.
- Haldar D, **Sahoo S**, and Mishra PC (2014) Adsorption of As (III) from aqueous solution by ground nut shell, *Indian Journal of Applied Research* 4,(1) : 270-273, ISSN 2249- 555X
- Biswas CK, **Mishra SP** and Mukherjee A (2014) Diversity and composition of vegetation on aged coalmine overburden dumps (OBDs) in Sonepur Bazari area, Raniganj, West Bengal. *Journal of Environmental Biology*, 35(1): 173-177.
- Fujita K, Nomura Y, Sawajiri M, **Mohapatra PK**, El-Shemy HA, Nguyen NT, Hosokawa M, Miyashita K, Maeda T, Saneoka H, Fujita S, Fujita T (2014). The extracts of Japanese willow tree species are effect in for apoptotic desperation or differentiation of acute myeloid leukemia cells. *Pharmacognosy Magazine* 10, 125-131.
- Fujita K, Fujita S, Fujita T, Konishi S, Vollmann J, **Mohapatra PK**, Hosokawa M, Kuwahara M, Saneoka H, Tadano T (2014). Source sink manipulation of *Camelina sativa* L. related to grain



- yield under stressful environment of Hokkaido, Japan. *Soil Science and Plant Nutrition* 60, 156-161.
- Patro L, Mohapatra PK, Biswal UC, **Biswal B** (2014) Dehydration induced loss of photosynthesis in *Arabidopsis* leaves during senescence is accompanied by the reversible enhancement in the activity of cell wall  $\beta$ -glucosidase, *J.Photochem.Photobiol.B.Biol.* 137: 49-54 Elsevier.
- Satpathy R, Konkimalla VB, **Ratha J** (2014) IPFP: An Integrated Software Package for Automated Protein Feature Prediction. *International J. Applied Research on Information Technology and Computing.* 5(3): 223-227.
- Padhan DK and **Pattnaik S** (2014) *In vivo* antifungal activity of *Acmella* essential oil on a dermatomycotic strain *Trichophyton mentagrophytes* (MTCC-7687). *Der Pharmacia Sinica*, 5(1): 40-44. ISSN: 0976-8688.
- Haripal K, **Sahoo S** (2014) Microbial biomass Carbon, Nitrogen, and Phosphorus dynamics along a chronosequence of abandoned tropical agroecosystems. *International Journal of Current Microbiology and Applied Sciences*, 3 (9): 956-970 ISSN: 2319-7706.
- Sahoo S**, Pattanayak SK, Chand S (2014). The effect of heavy metals on enzyme activities in sponge iron industry polluted soil. *International Journal of Plant, Animal and Environmental Sciences*, 4 (4): 185-190. ISSN: 2231-4490
- Satpathy R, Konkimalla VB, **Ratha J** (2014) Application of Bioinformatics Tools and Databases in Microbial Dehalogenation Research: a Review (2014). *Applied Biochemistry and Microbiology* 51 (1): 11-20. ISSN: 0003-6838
- Pradhan S and **Pattnaik S** (2014) *Acmella* Essential Oil: A Potent Antibacterial Agent against a Clinical Isolate of *Moraxella* sp., *Journal of applied Microbiology (India)* 1 (4) 2014: 233 – 240, ISSN 2349-7785.
- Sekhar S, Panda BB, Mohapatra T, Das K, Shaw BP, **Kariali E** and **Mohapatra PK** (2015) Spikelet-specific variation in ethylene production and constitutive expression of ethylene receptors and signal transducers during grain filling of compact- and lax-panicle rice (*Oryza sativa*) cultivars. 179: 21-34. ISSN: 0176-1617.
- Panda BB, Badoghar A, Das K, Panigrahi R, **Kariali E**, Das SR, Dash SK, Shaw BP and **Mohapatra PK** (2015) Compact panicle architecture is detrimental for growth as well as sucrose synthase activity of developing rice kernels. *Functional Plant Biology.* (Appeared online)
- Seth S, Rath SC, **Panigrahi J** (2015) Somatic embryogenesis in *Abutilon indicum* (L.) Sweet and assessment of genetic homogeneity using SCoT markers. *Plant Biosystem* (ACCEPTED) ISSN 1126-3504 (Print), 1724-5575 (Online)
- Rath SC, Mishra A, Mishra RR, Sahu AR, **Panigrahi J** (2015) Inheritance and mapping of protein markers detecting polymorphism among *Cajanus cajan* and *C. scarabaeoides* genotypes with contrasting host response to pod borer (*Helicoverpa armigera*) *Caryologia* 68(3): 217-224. ISSN: 0008-7114
- Sahu AR, Mishra RR, Rath SC, **Panigrahi J** (2015) Construction of interspecific genetic linkage map of pigeonpea using SCoT, RAPD, ISSR markers and simple inherited trait loci. *The NUCLEUS* 58(1):23-31 (Springer, ISSN: 0029-568x(P), 0976-7975 (e)
- Sahu JK, Bhattacharya S, Deep PR, Nayak B (2015) Relative toleranace and nitrogenise activity of several heterocystous cyanbacteria to herbicide hiltachlor, 50EC. *International Journal of Toxicological and pharmacological Research*, 7(1): 17-22
- Patial K, Rohil V, Ratra SK, Patial B and **Behera RK** (2015) Obstructive sleep apnoea syndrome related morbidities and their treatment: A matter of mandate. *World Journal of Pharmaceutical Sciences*, 3: 971 – 980. (Atom and Cell Publisher, ISSN: 2321-3310, online 2321-3086)
- Maharana JK, Das N and **Patel AK** (2015) Isolation and characterization of a mesophilic bacterium capable of chemo-lithotrophic growth on ferric iron using PCR amplified gene coding for 16s rDNA in iron mine overburden spoil. *Research Journal of Pharmaceutical, Biological and Chemical Sci.*; 6(1): 155-166.

- Sahoo TK, Jena PK, Nagar N, **Patel AK** and Seshadri S (2015) *In vitro* evaluation of probiotics properties of lactic acid bacteria from the gut of *Labeo rohita* and *Catla catla*. *Probiotics and Antimicrobial Proteins*, 7: 126-136.
- Maharana JK and **Patel AK** (2015) Assessment of microbial diversity associated with the chronosequence coal mine overburden spoil using random amplified polymorphic DNA markers. *International Journal Recent Scientific Research*, 6(5): 4291-4301.
- Pasayat M and **Patel AK** (2015) Assessment of physico-chemical properties influencing mine spoil genesis in chronosequence iron mine overburden spoil and implications of soil quality. *International Journal of Current Microbiology and Applied Sciences*, 4(6): 1095-1110.
- Satpathy R, Konkimalla V B, **Ratha J** (2015) In-silico gene co-expression network analysis in *Paracoccidioides brasiliensis* with reference to haloacid dehalogenase superfamily hydrolase gene. *Journal of Pharmaceutical and Bio-Allied Sciences*. 7(3): 212-217 ISSN : 0976-4879
- Maharana JK, Dakua C and **Patel AK** (2015) Isolation and characterization of a chemo-lithotrophic bacterial strain from fresh coal mine overburden spoil. *International Journal of Advanced Research in Biological Sciences*, 2(7): 28-39.
- Patnaik A** (2015) Impact of pesticides on soil microbial biomass. *Indian Journal of Applied Research*, 5 (1) : 197-199, (ISSN:2249-555X)
- Bhattacharyya S, Deep PR, **Nayak B**, (2015). Diversity Of Rice Field Cyanobacteria From Tropical Rice Field of Western Odisha, *International Journal of Science and research* 4(8): 121-125
- Estelle NJ, Bhattacharyya S, Deep PR, **Nayak B** (2015). Cyanobacteria and Cyanotoxins of the world: review, *International Journal of Applied Research* 1(8): 563-569.
- Estelle NJ, Bhattacharyya S, Deep PR, **Nayak B**, (2015). Bloom forming toxic cyanobacteria from Mahanadi river near Hirakud reservoir, *International J. of Recent Scientific Research*. 6(7): 5036-5039.

## 2. Book Chapters:

- Panigrahi J**, Achary P, Roy S, Mishra S and Mishra RR (2011) *Genotypic Characterization of Escherichia coli isolates associated with Paediatric enteric diseases by using RAPD analysis*. In: *Microbial Biotechnology: Methods and Applications*, Mishra B and Thatoi HN (Ed.), Narosa Publishing House, New Delhi, India- 252-267 (ISBN: 978-81-8487-131-9)
- Mohapatra P K**, Panigrahi R (2011). Ethylene control of grain development in the inferior spikelets of rice panicle. In *Advances in Plant Physiology, An international treatise series*, vol. 12, Ed. Hemantaranjan A., Scientific Publishers (India) Jodhpur, pp. 79-89. ISSN-0972-9917.
- Mohapatra PK, Kariali E**, Panda BB and Das A (2012) Change in Global climatic pattern and the perils of grain yield loss and iron stress of rice plant. In: *Advances in Plant Physiology, An International Treatise Series. Nutrio-physiological and molecular intervention for Crop improvement under changing climate*. (Ed.) A. Hemantaranjan. Chapter-5, Vol.13, Pp.177-193. ISBN: 978-81-7233-798-8.
- Biswal B**, Mohapatra PK, Biswal UC, Raval MK (2012) Leaf Senescence and Transformation of Chloroplasts to Gerontoplasts. In: *Photosynthesis: Plastid Biology, Energy Conversion and Carbon Assimilation*, Eaton-Rye JJ, Tripathy BC and Sharkey TD (Eds.), *Advances in Photosynthesis and Respiration Vol 34*, Springer, Dordrecht, The Netherlands : pp. 217-230.
- Biswal B**, Mohapatra PK, Raval MK, Biswal UC (2012) Photosynthetic Regulation of Senescence in Green Leaves: Involvement of Sugar Signalling. In: *Photosynthesis-overviews on Recent Progress and Future Perspectives*, Itoh S, Mohanty P and Guruprasad KN (Eds.), IK International Publishing House Pvt, Ltd., New Delhi, India: pp.245-260.
- Nayak B**, Bhattacharyya S, Sahu JK (2012) Photosynthetic response of two rice field cyanobacteria to pesticides. In: *Pesticide*, InTech, chapter 7; pp 151-168

- Mohapatra P K** (2012). Sucrose metabolism and grain development of contrasting spikelets located at different positions of the rice panicle. In *Progress in Food Science and Technology*, Vol. I (Ed. A J Greco). Nova Science Publishers, Inc. New York, pp. 231-241. ISBN-978-1-61122-314-9.
- Joshi PN, Nayak L, .Misra AN, **Biswal B** (2013) Response of Developing, Mature and Senescing Chloroplasts to Environmental Stress. In: *Plastid Development in Leaves During Growth and Senescence*, Biswal B, Krupinska K and Biswal UC (Eds.), *Advances in Photosynthesis and Respiration Vol 36*, Springer, Dordrecht, The Netherlands : pp. 641-668.
- Krupinska K, Biswal UC, **Biswal B** (2013) The Dynamic Role of Chloroplasts in Integrating Plant Growth and Development. In: *Plastid Development in Leaves During Growth and Senescence*, Biswal B, Krupinska K and Biswal UC (Eds.), *Advances in Photosynthesis and Respiration Vol 36*, Springer, Dordrecht, The Netherlands: pp. 3-16.
- Raval MK, Mishra BK, **Biswal B**, .Biswal UC (2013) Chloroplast Development: Time, Dissipative Structure, and Fluctuations. In: *Plastid Development in Leaves During Growth and Senescence*, Biswal B, Krupinska K and Biswal UC (Eds.), *Advances in Photosynthesis and Respiration Vol 36*, Springer, Dordrecht, The Netherlands: pp. 17-35.
- Panigrahi J**, Mishra RR, Sahu AR, Rath SC and Kole C (2013) *Marker-Assisted Breeding (MAB) for Stress Resistance in Crop Plants*. In: *Molecular Stress Physiology of Plants*, Rout G R and Das AB (Ed.), Springer-verlag (International): **387-426** (ISBN978-81-322-0806-8)
- Kariali E** and **Mohapatra PK** (2013) Designing tiller dynamics of rice suitable for high grain yield. In: *International dialogue on perception and prospects of designer rice*. (Eds.) Muralidharan, K. and Siddiq, E.A. Society for Advancement of Rice Research, Directorate of Rice Research, Hyderabad, India. Pp. 266-267. ISBN 978-81-926809-0-3.
- Mohapatra P K** (2013). A physiological approach to design panicle architecture in the quest for high grain yield. In Muralidharan K and Siddiq E A eds. *International Dialogue on Designer Rice*. Society for Advancement of Rice Research, Hyderabad (India), pp. 131-142. ISBN- 987-61-936809-0-3.
- Rout GR and **Panigrahi J** (2014) *Analysis of signaling pathways during heavy metal toxicity: A functional genomic perspective*. In: *Elucidation of Abiotic Stress Signaling in Plants*, Pandey GK (Ed.), Springer-verlag (International): **pp. 295-322** (ISBN 978-1-4939-2539)
- Panigrahi J\*** and Mishra RR (2014) *Development and applications of DNA markers in pigeonpea: The present status and Future prospects*. In: *Applications of molecular markers in plant genome analysis and breeding*, Taski-Ajdukovic K.. (Ed.), Research Signpost, Trivendrum, Kerala: **Chapter-4pp. 1-26**, (ISBN: 978-81-308-0560-3).
- Shinjini Singh, Amit Kumar Tyagi, Sasha Raman, Jiamin Huang, Lokesh Deb, Qaisar Manzoor, Arfaa Sajid, LiXin Yang, **Jagnyeswar Ratha**, Sahdeo Prasad, Bharat B Aggarwal. *Genome-Based Multi-targeting of Cancer: Hype or Hope? Book: Multi-Targeted Approach to Treatment of Cancer*. Publisher: Springer International Publishing. Year 2015. Pages : 19-56.

### 3. Books Edited/ Published:

**Title of the Book:** *Plastid Development in Leaves During Growth and Senescence*, Vol.36, *Advances in Photosynthesis and Respiration including Bioenergy and Related Processes* (2013)

**Authors:** Biswal B, Karin Krupinska and Biswal UC ; ISBN No.: 987-94-007-5723-3

**Publisher Details:** Springer, Dordrecht, The Netherlands

### *Snapshots of Departmental Activities*



**International Conference ICPSPE-2011**



**Alumni Meet 2014**



**National Conference 2013**



**Plant Biotechnology Laboratory**



**National Conference 2014**



**Computational Biology Laboratory**