

Madhusmita Nayak

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Home Sector-1, 139, Niladri Vihar, Chandrasekharpur, Bhubaneswar. Pin-751021,
Odisha, India.



PRESENT ASSIGNMENT/POSITION

Post doctoral fellow(NPDF)

PG department of Biotechnology,
Utkal University

Young Professional-II(Post doctoral Research experience)

Fish Nutrition and Physiology Division

ICAR,Central Institute of Freshwater Aquaculture

Kausalyaganga, Bhubaneswar

Odisha, India, 751 002

SERB project Title: “Regulatory roles of kisspeptin and neurokinin B in gonadal maturation of farmed carp *Labeo rohita*.”

RESEARCH EXPERIENCE

1. National Post Doctoral Fellowship (N-PDF) ,2019-2021

PG department of Biotechnology,
Utkal University

2.Young Professional-II: From June- 2018 -2019

FNPD,ICAR,CIFA

SERB project :“Regulatory roles of kisspeptin and neurokinin B in gonadal maturation of farmed carp *Labeo rohita*.”

3.Senior Research Fellow : February 2015-March 2018

FNPD, ICAR,CIFA

ICAR-project “*Outreach activity on Fish Feeds*”.

4.Ph.D., Life Science 2017

FNPD,ICAR,CIFA

Thesis Title: “Screening and dietary regulation of Δ -6 desaturase in selected Indian freshwater fish”

5.DST Women scientist-A(WOS-A) 2011-2014

FNPD,ICAR,CIFA

Project Title: “Screening and characterization of an efficient Δ -6 desaturase among warm freshwater fishes in India”.

Funded by“Department of Science and Technology, Govt. of India”.

1. M.Phil., Biotechnology -2008

Berhampur University, Odisha, India

Thesis title “Effect of salt stress on isozyme pattern of antioxidative enzyme in chlorella”.

(Research work carried out at Institute of Life Science, Bhubaneswar)

EDUCATION

National Post Doctoral Fellowship (N-PDF)

PG department of Biotechnology,
Utkal University

Neonatal hypothyroidism-induced epigenetic plasticity in the brain of adult rat: Implications of DNA methylation machinery and impact of curcumin.

Ph.D., Life Science January 2017

Utkal University, Bhubaneswar, Odisha, India

Thesis entitled “Screening and dietary regulation of Δ -6 desaturase in selected Indian freshwater fish”.(Research work carried out at, FNPDI, ICAR, CIFA Bhubaneswar)

M.Phil., Biotechnology 2008

Berhampur University, Odisha, India

Thesis entitled “Effect of salt stress on isozyme pattern of antioxidative enzyme in chlorella”.

(Research work carried out at Institute of Life Science, Bhubaneswar)

M.Sc., Botany 2006

Berhampur University, Odisha, India

Thesis entitled: “Eco-toxicological assessment of ROGOR-30 EC and effluent of a chlor-alkali industry in the seed biology of a crop plant”.(Research work carried out at Berhampur University)[78%]

B.Sc., Botany 2004

Nayagarh Autonomous College, (Utkal University), Odisha, India Ist Division with Distinction.[73%]

RESEARCH AND TECHNICAL SKILLS

DNA/RNA methodologies:

- ✓ Extraction and purification of genomic and plasmid DNA
- ✓ Polymerase Chain Reaction (PCR)
- ✓ Real-Time PCR
- ✓ Competent cell preparation
- ✓ Ligation, Transformation
- ✓ Gene and recombinant DNA cloning
- ✓ Restriction digestion

- ✓ RNA extraction
- ✓ cDNA synthesis
- ✓ 5' and 3' RACE-PCR
- ✓ Northern hybridization
- ✓ SDS-PAGE
- ✓ Agarose gel electrophoresis

Immunochemical techniques:

- ✓ Western blotting
- ✓ ELISA

Nutritional Techniques:

- ✓ Proximate analysis by using Gel Tech Analyzer, Socs Tech, Fibra Plus and Bomb Calorimeter
- ✓ FAME preparation
- ✓ Fatty acid analysis by Gas Chromatography

Field experience:

- ✓ Wet lab maintenance
- ✓ Rearing of fingerlings in indoor rearing condition

Histological Techniques:

- ✓ Microtome sectioning

Biochemical Techniques:

- ✓ Microsome preparation by Ultracentrifuge
- ✓ Protein estimation

Bioinformatics:

- ✓ Primer designing using FAST PCR
- ✓ Data analysis using bioinformatics tools like SPSS 16.0, BLAST, ORF finder, ClustalOmega
- ✓ Programme, ExPaSY
- ✓ Phylogenetic tree construction using MEGA 5
- ✓ Proficiency in usage of MS office package including MS Word, Excel, Power point, Paint and illustration programs such as Adobe Photoshop and Adobe Illustrator

PUBLICATION IN INDEXED JOURNALS

Madhusmita Nayak, Shiba Shankar Giri , Avinash Pradhan, Mrinal Samanta , Ashis Saha(2020).

Effects of dietary α -linolenic acid/linoleic acid ratio on growth performance, tissue fatty acid profile, serum metabolites and $\Delta 6$ fad and elov15 gene expression in silver barb (*Puntius gonionotus*).

Journal of the Science of Food and Agriculture,VOL.100: 1643 -1652.

DOI: 10.1002/jsfa.10177

Madhusmita Nayak, Ashis Saha, Avinash Pradhan, Tapan Kumar Mohanty, Siba Shankar Giri (2018). Influence of dietary lipid levels on growth, nutrient utilization, tissue fatty acid composition and desaturase gene expression in silver barb (*Puntius gonionotus*) fingerlings. *Comparative Biochemistry and Physiology, Part B*: 226 : 18–25.

DOI:[10.1016/j.aquaculture.2010.09.039](https://doi.org/10.1016/j.aquaculture.2010.09.039)

Avinash Pradhan, **Madhusmita Nayak**, Mrinal Samanta, Rudra Prasanna Panda, Suresh Chandra Rath, Shiba Shankar Giri, Ashis Saha (2018). Gonadotropin receptors of *Labeo rohita*: Cloning and characterization of full-length cDNAs and their expression analysis during annual reproductive cycle *General and Comparative Endocrinology*, 263, 21-31.

DOI: [10.1016/j.yggen.2018.04.014](https://doi.org/10.1016/j.yggen.2018.04.014)

Madhusmita Nayak, Avinash Pradhan, Mrinal Samanta, Shiba Shankar Giri, Ashis Saha (2018). Molecular characterization, tissue distribution and differential nutritional regulation of putative Elov15 elongase in silver barb (*Puntius gonionotus*). *Comparative Biochemistry and Physiology, Part B*: 217, 27-39.

doi: 10.1016/j.cbpb.2017.12.004.

Madhusmita Nayak, Ashis Saha, Avinash Pradhan, Mrinal Samanta, Shiba Shankar Giri(2017). Dietary fish oil replacement by linseed oil: Effect on growth, nutrient utilization, tissue fattyacid composition and desaturase gene expression in silver barb (*Puntius gonionotus*) fingerlings. *Comparative Biochemistry and Physiology, Part B*: 205, 1-12.

doi: 10.1016/j.cbpb.2018.08.005.

Ashis Saha , Avinash Pradhan, Sushmita Sengupta , **Madhusmita Nayak** , Mrinal Samanta, LakshmanSahoo, ShibaShankar Giri (2016). Molecular characterization of two *kiss* genes and their expression in rohu (*Labeo rohita*) during annual reproductive cycle. *Comparative Biochemistry and Physiology, Part B*: 191: 135-145.

doi: 10.1016/j.cbpb.2015.10.008.

Madhusmita Nayak, Ashis Saha, S.S. Giri(2015). Fatty acid profile of fillet and liver and proximate composition of *Puntius gonionotus* and *Puntius sarana*. *Indian J. Anim. Nutr.* 32(4): 433-438. doi: 10.5958/2231- 44.2015.00013.4.

Suryakant Mallik, **Madhusmita Nayak**, Binod B. Sahu, Ashok K. Panigrahi, Birendra P. Shaw(2011). Response of antioxidant enzymes to high Na⁺ concentration in taxonomically and morphologically diverse salt-tolerant plants. *Biologia Plantarum*, 55 (1): 191-195.

Chapter in Edited Book

Ashis Saha, Madhusmita Nayak, S.S. Giri .2020. Nutrigenomics Studies in Fishes. A. S. Ninawe, J. R. Dhanze, R. Dhanze, S. T. Indulkar. 14-28,ISBN-9781003107583. DOI <https://doi.org/10.1201/9781003107583>

GenBank SUBMISSIONS

1. Saha, A., Pattanaik S., Pradhan, A and **Nayak, M.**2017. *Labeo rohita* Kiss1 receptor (Kiss1r) mRNA, partial CDS. (GenBank Acc No# MF663196).
2. Khalkho, N., Pradhan, A., **Nayak, M.** and Saha, A.2017. *Labeo rohita* tachykinin 3 (tac3) mRNA, partial cds. (GenBank Acc No# KY751704).
3. **Nayak, M.**, Saha, A., Pradhan, A. and Giri, S.S.2017. *Barbonymus gonionotus* fatty acid elongase (ELO) mRNA, partial cds. (GenBank Acc No# KY751703).
4. Saha, A., Pradhan, A., Parija, S.R., **Nayak, M.** and Giri, S.S.2016. Rohu gonadotropin alpha subunit mRNA, complete cds (GenBank Acc No# KU743471).
5. Saha, A., Sengupta, S., Pradhan, A., **Nayak, M.**, Sahoo, L. and Giri, S.S. 2013. *Labeo rohita* kisspeptin1 (*kiss1*) mRNA, partial cds (GenBank Acc No#KF737179).
6. Saha, A., Sengupta, S., Pradhan, A., **Nayak, M.** and Giri, S.S. 2013. Molecular characterization of Kisspeptin 2 of rohu, *Labeo rohita* (GenBank Acc No #KF695115).
7. **Nayak, M.**, Saha, A., Pradhan, A. and Giri, S.S. 2012. Molecular characterization and expression analysis of delta-6 fatty acyl desaturase gene in *Puntius gonionotus*.(GenBank Acc No#JX678221).

Seminar/Symposium/ Training attended

1. National training programme on “Fish feed production and feeding management in aquaculture” held during 7th to 9th December, 2016 at ICAR-CIFA, Bhubaneswar.
2. National training programme on “Advances of fish nutrition and feed technology” held during 21st to 23rd September, 2016 at ICAR- CIFA, Bhubaneswar.
3. National Symposium on Use of Veterinary Biochemists and Biotechnologists of India (SVBBI) and National symposium on use of advanced technologies of biochemistry and biotechnology in livestock health, production and reproduction, during March 11-12 at OUAT, Bhubaneswar.
4. Attended and presented paper in the “Emerging Trends in Biotechnology: Present Scenario and Future Dimensions” during 29-30th March 2014 at Utkal University. Bhubaneswar.
5. International Brainstorming Meet on “Recent Advances In fish Reproductive Physiology” on 16 August 2011 at CIFA, Bhubaneswar.
6. National workshop on “Application of Solid State fermentation Technology in Aquaculture” held on 29th May 2012 at CIFA, Bhubaneswar.
7. National Seminar on “The present and future of biodiversity conservation” during 26-27th December 2009 at Banki College, Odisha.

8. National Workshop on “Recombinant DNA Technology” during 21-31st May 2007 at Central Facility for Biotechnology Teaching and Research (CFBTR) , Madurai Kamaraj University, Tamilnadu.

TRAINING MANUAL EDITED

S.C. Rath, K.N. Mohanta, K.C. Das, **M. Nayak**, P.Jayasankar. 2016. Training Manual of National Training Programme on “Advances in Fish Nutrition and Feed Technology” during 21-23 Sep. 2016 at CIFA, Bhubaneswar, published by ICAR-Central Institute of Freshwater Aquaculture, Bhubaneswar, pp.120.

ABSTRACTS and PAPER PRESENTATION

Madhusmita Nayak, Ashis Saha, Avinash Pradhan, Tapan Kumar Mohanty, and Shiba Shankar Giri. 2016. “Dietary fish oil supplementation on growth, nutrient utilization, tissue fatty acid profile and $\Delta 6$ fatty acyl desaturase gene expression in Silver barb, *Puntius gonionotus*”. In Proceedings of National Symposium on Use of Veterinary Biochemists and Biotechnologists of India (SVBBI) and National symposium on use of advanced technologies of biochemistry and biotechnology in livestock health, production and reproduction, during March 11-12 at OUAT, Bhubaneswar.

Avinash Pradhan, Sushmita Sengupta, **Madhusmita Nayak**, Mrinal Samanta, Suresh Chandra Rath, Laxman Sahoo and Ashis Saha. 2016. Expression of *kiss2* gene in the adult male and female rohu (*Labeo rohita*) during the different phase of reproductive cycle. In Proceedings of 2nd International Symposium on Genomics in Aquaculture, during 28-30 Jan. 2016 at CIFA, Bhubaneswar, India. pp-83.

Avinash Pradhan, **Madhusmita Nayak**, Sushmita Sengupta and Ashis Saha. 2015. Molecular cloning and expression analysis of luteinizing hormone receptor during different stages of gonadal development in Indian major carp, rohu (*Labeo rohita*). In Proceedings of International Symposium on Reproductive physiology and comparative endocrinology, during 25-28 Feb. 2015 at BHU, Varanasi, India. pp-94.

Madhusmita Nayak, Avinash Pradhan, Ashis Saha, and Shiba Shankar Giri. 2014. Molecular characterization and expression analysis of Δ -6 fatty acyl desaturase in the freshwater carp, *Puntius gonionotus*. In Proceedings of National Symposium on “Emerging trends in Biotechnology: present scenario and future dimensions”, during 29-31 March 2014 at Utkal University, Bhubaneswar, pp-35.

Avinash Pradhan, **Madhusmita Nayak**, Sushmita Sengupta and Ashis Saha.2014.Reproductive stage specific expression of Gonadotropin receptor in Indian major carp *Labeo rohita*.In Proceedings of “83rd Annual meeting of Society of Biological chemist”, during 17-21 Dec. 2014 at KIIT University, Bhubaneswar.

Avinash Pradhan, Ashis Saha, RudraPrasanna Panda, **Madhusmita Nayak**, Sushmita Sengupta and Shiba Shankar Giri.2014. Expression analysis of luteinizing hormone receptor gene during different stages of ovarian development in rohu (*Labeo rohita*). In Proceedings of National Symposium on “Emerging trends in Biotechnology: present scenario and future dimensions”, during 29-31March 2014 at Utkal University, Bhubaneswar,pp-36.

Madhusmita Nayak, Ashis Saha ,Tapan K. Mohanty, Chiranjiv Pradhan and S.S.Giri.2012. Proximate and fatty acid composition of the muscles and liver of an important diversified carp species olive barb, *Puntius sarana*.In Proceedings of 8th Biennial Animal Nutrition Association Conference, Bikaner, India.during 28-30 November 2012.

Samiran Nandi, Shiba Shankar Giri, Deepak Ranjan Sahoo, **Madhusmita Nayak**, Chiranjibi Chhotaray, Tapan Kumar Mohanty, Satyendra Nath Mohanty, Pratap Kumar Mukhopadhyay. 2011. Characterization of putative del-6 Desaturase cDNA, its tissue expression and correlation with enzyme activity level during different stages of growth in *Labeo rohita*. Asian Pacific Aquaculture, January 17-20, Kochi, India.pp- 364.

AWARDS

- JAWAHARLAL NEHRU AWARD, ICAR (Indian Council of Agricultural Research), 2019
- Award of SERB NPDF(National Post-Doctoral fellowship) DST, GOVERNMENT OF INDIA, 2019
- DST Women scientist-A from Department of Science and Technology, Govt. ofIndia, 2011.
- Received Best seminar presentation award from Berhampur University,Odisha, India, 2006.

Project handled as PI

- Neonatal hypothyroidism-induced epigenetic plasticity in the brain of adult rat: Implications of DNA methylation machinery and impact of curcumin.DST,SERB, GOVT OF INDIA
- Screening and characterization of an efficient Δ -6 desaturase among warm freshwater fishes in India. DST,GOVT OF INDIA

