



Dr. Priyabrat Swain

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Department	Fish Health Management Division
Institute/University	Central Institute of Freshwater Aquaculture (<i>Indian Council of Agricultural Research</i>)
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Date of Birth	18 th September, 1965
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Educational qualifications

Sl. No.	Degree	Class/ CGPA	Year	University	Rank/ prizes
1	B.V.Sc & A.H	First class, 8.11	1988	Orissa University of Agriculture and Technology, Bhubaneswar	Hons, Gold Medal
2	M.V.Sc.	First class, 8.83	1991	IVRI, Izatnagar, U.P.	1 st position
3	Ph.D	First class, 8.57	1997	IVRI, Izatnagar, U.P.	-

Professional Experience				
Sl. No.	Period	Place of Employment	Designation	Scale of pay
1	21.07.93 to 18.12.93	NAARM, Hyderabad	Scientist (Trainee)	2200-4000/- (pre-revised)
2	19.12.93 to 09.08.94	CIFA, Bhubaneswar	Scientist (Trainee)	2200-4000/- (pre-revised)
3	10.08.94 to 30.06.98	IVRI, Mukteswar	Scientist	8000-13500/- (pre-revised)
4	21.07.02 to 7.04.2011	CIFA, Bhubaneswar	Senior Scientist	37400-67000/- plus GP 9,000/-
5	01.01.09 to till date	CIFA, Bhubaneswar	Principal Scientist	37400-67000/- plus GP 10,000/-
6	8.04.2011 to till date	CIFA, Bhubaneswar	National Fellow	37400-67000/- plus GP 10,000/-

Major Research/ Technological Achievements	
Technology used by Industry	<ul style="list-style-type: none"> Immunoboost-C (an immunostimulant) for improvement of brood fish health and production of more and healthy carp seed: Star Aqua Lab, Banshichak, Thakurchak, Paschim Medinipore, West Bengal-721424, India Replacement of fetal calf serum by goat serum: Life technologies, USA
Technology Developed	<ul style="list-style-type: none"> Mab based diagnostics for Newcastle disease of poultry. Dot-ELISA kit for diagnosis of Edwardsiellosis, Aeromoniasis and Bacterial gill disease of Indian major carps. Indirect ELISA kit for differential diagnosis of <i>A. hydrophila</i>, <i>E. tarda</i> and <i>P. fluorescens</i> infections in Indian major carps. Spot agglutination kit for <i>Flavobacterium branchiophilum</i>, <i>Aeromonas hydrophila</i> and <i>Edwardsiella tarda</i> infection. Antigen captured ELISA kit for detection of Gram-negative bacterial toxins in fish and fish products.

	<ul style="list-style-type: none"> Competitive ELISA kit for diagnosis and seromonitoring of bacterial gill disease in all the freshwater fish species. Nested PCR for detection of Koi herpes virus
Other Important Accomplishments	<p>Website development and Updating</p> <ol style="list-style-type: none"> Development and timely updating of website of Central Institute of Freshwater Aquaculture (CIFA) (www.cifa.in) Preparation and updation of Rohu, <i>Labeo rohita</i> database for Indian Council of Agricultural Research (ICAR) website (www.icar.org/database/index.php).
ICAR's breakthrough fishery technology	<p><i>Based on adoption by farmers in last five years</i></p> <ul style="list-style-type: none"> Spot agglutination kit for <i>Flavobacterium branchiophilum</i>, <i>Aeromonas hydrophila</i> and <i>Edwardsiella tarda</i> infection of carp fishes.
Innovative Vaccine Technology Developed for fish	<ul style="list-style-type: none"> Developed a live attenuated strain from virulent <i>Aeromonas hydrophila</i>, after 8 years of continuous laboratory culture in the similar line of BCG of <i>Mycobacterium tuberculosis</i>, which may be used as candidate vaccine for fish and other animals including human being, against the diseases, caused due to this pathogen across the globe (<i>P. Swain, T. Behera, D. Mohapatra, P. K. Nanda, S. K. Nayak and P. K. Meher (2010). Derivation of rough attenuated variants from smooth virulent Aeromonas hydrophila and their immunogenicity in fish. Vaccine, 28:4626-4631.</i>
Repository of Freshwater fish pathogens, immunodiagnosics	<ul style="list-style-type: none"> Prepared a repository of fish pathogens based on serotypes and pathotypes and immune reagents against them for the first time in the country which are being supplied to different diagnostic laboratories and research institutes on payment to CIFA.
Patents filed	<ol style="list-style-type: none"> (Patent application No. 1403/DEL/2003 dated 12/11/2003) A process for differential sero-diagnosis of gram-negative bacterial infections and detection of their toxins in human food in reference to fish and fish products using polyclonal antibodies to their less cross reacting and highly specific extra cellular products antigen. (P. Swain, S.K. Nayak, P.K. Meher, B.K. Mishra and S. Ayyappan) (Patent application No. 1402/DEL/2003 dated 12/11/2003) A Competitive ELISA for diagnosis and seromonitoring of microbial infections in Indian major carps. (P. Swain, S.K. Nayak and P.K. Meher)

Patent granted	<p>1. (Patent No. 252072 dated 24.04.2012)</p> <p>Male-specific protein of Indian major carp (<i>Labeo rohita</i> Ham.) – A key for sex differentiation and brood stock management. (P. Swain, P. Routray, S.D. Gupta, N. Sarangi, R.K. Jana, P.K. Meher, S. Dash, J. Bal)</p>
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Current Research Interests	<ul style="list-style-type: none"> ➤ Application of nanotechnology in aquaculture: for fish health management and water remediation. ➤ Use of micro and nanoparticles for antigen/protein delivery. ➤ Development of diagnostic tests for diagnosis of bacterial and viral diseases of freshwater fishes. ➤ Immunity of mother fish and its transfer to hatchlings for high survival at early stages. ➤ Serosurveillance and diagnosis of bacterial and viral diseases of fishes such as Aeromoniasis, Edwardsiellosis, Bacterial gill disease, Columnaris disease, Koi herpes virus and spring viraemia of carps.
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Research projects handled

Externally funded projects	<ol style="list-style-type: none"> 1. ICAR-National Fellow Project: Nanotechnology in aquaculture: an alternative approach for fish health management and water remediation. Place of Work: CIFA, Bhubaneswar Time duration: Ongoing since 08.04.2011 Position: Principal Investigator 2. ICAR-IPR funded project: Intellectual property management and transfer/commercialization of agricultural technology scheme (Up-scaling of existing component i.e. intellectual property right (IPR) under ICAR headquarters scheme on management and information services). Place of Work: CIFA, Bhubaneswar. Time duration: Ongoing since 01.04.2007 Position: Principal Investigator 3. DBT (Govt. of India) Project: Studies on association of viral infections in diseases of koi carps by immunological and molecular techniques.
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	<p>Place of Work: CIFA, Bhubaneswar. Time duration: 29.03.2007 to 28.03.2010 Position: Principal Investigator and Coordinator.</p> <p>4. DST (Govt. of India) Project: Isolation, Identification and characterization of active components from amoebocytes of Horseshoe crab for developing suitable diagnostics. Place of Work: Division of Aquatic Animal Health, CIFA, Bhubaneswar. Time duration: 1.05.06 to 30.04.09 Position: Coordinator/Mentor Scientist.</p> <p>5. ICAR APCess Funded project: Passive transfer of immunity from mother to offspring of Indian major carps and evaluation of specific and nonspecific immunity parameters for protection against infectious diseases at early stage of life for healthy seed production. Place of Work: Division of Aquatic Animal Health, CIFA, Bhubaneswar. Time duration: 14.07.2003 to 13.07.06 Position: Principal Investigator.</p> <p>6. ICAR Lal Bahadur Shastri Young Scientist Award Project: Development of Newer immuno-diagnostics against important microbial diseases of fish and shellfish. Place of Work: Division of Aquatic Animal Health, CIFA, Bhubaneswar Time duration: 10.11.99 to 9.05.03 Position: Principal Investigator.</p> <p>7. DBT Funded project: Development of DNA vaccine to combat <i>Edwardsiella tarda</i> infection in commercially important food fishes. Place of Work: Division of Aquatic Animal Health, CIFA, Bhubaneswar Time duration: 31.03.2010 to 31.03.2012 Position: Co- Principal Investigator</p> <p>8. ICAR APCess Funded project: Cryopreservation of primordial germ cells and embryonic cells of Indian major carps and their utilization in aquaculture biotechnology. Place of Work: CIFA, Bhubaneswar. Time duration: 03.11.04 to 02.11.07 Position: Co- Investigator.</p>
Institute based projects	<p>1. Nanotechnology in aquaculture: an alternative approach for fish health management and water remediation. Place of Work: CIFA, Bhubaneswar</p>

Time duration: 01.04.2010 to 31.03.2011

Position: Principal Investigator

2. Three-dimensional fish cell culture using nano fiber based scaffolds

Place of Work: CIFA, Bhubaneswar.

Time duration: 01. 04. 2008 to 31. 03. 2010

Position: Principal Investigator

3. Development of primary cell cultures derived from carp kidney, liver, fin and prawn larvae

Place of Work: CIFA, Bhubaneswar.

Time duration: 01.04.05 to 31.03.08

Position: Co- Principal Investigator

4. Qualitative and quantitative assessment of gonad and gametes of Indian major carps through induced breeding with GnRH based inducing agents and carp pituitary extract

Place of Work: CIFA, Bhubaneswar.

Time duration: 01.04.04 to 31.03.08

Position: Co- Principal Investigator

5. Pathological and Immunological investigation on gill fluke infestation of Indian major carps and their management

Place of Work: CIFA, Bhubaneswar.

Time duration: 01.04.04 to 31.03.07

Position: Co- Investigator

6. Development of disease management measures for finfish and shellfish.

Place of Work: Division of Aquatic Animal Health, CIFA, Bhubaneswar.

Time duration: 1.04.2001 to 31.03.2004

Position: Co-Investigator.

7. Diagnosis of diseases of fish and shellfish and their health management.

Place of Work: Division of Aquatic Animal Health, CIFA, Bhubaneswar.

Time duration: 01.07.98 to 31.03.2001

Position: Co-Investigator.

8. Disease investigation and diagnosis of diseases of animals in temperate regions of India.

Place of Work: Division of Virology, IVRI, Mukteswar (Nainital), Uttaranchal.

Time duration: 01.04.97 to 30.06.98.

Position: Co-Investigator.

Research Publications

A. Research Articles

International Journals

- 1) T. Behera, **P. Swain** (2012) Antigen adsorbed surface modified poly- ϵ -caprolactone microspheres stimulates both adaptive and innate immune response in fish. **Vaccine**, 30: 5278– 5284.
- 2) **P. Swain**, T. Behera, D. Mohapatra, P.K. Nanda, S.K. Nayak and P.K. Meher (2010). Derivation of rough attenuated variants from smooth virulent *Aeromonas hydrophila* and their immunogenicity in fish. **Vaccine**, 28: 4626-4631.
- 3) T. Behera, **P. Swain** (2011) Antigen adsorbed calcium phosphate nanoparticles stimulate both innate and adaptive immune response in fish, *Labeo rohita* H. **Cellular Immunology** 271, pp. 350-359.
- 4) T. Behera, **P. Swain** and S.K Sahoo, (2011) Antigen in chitosan coated liposomes enhances immune responses through parenteral immunization. **International Immunopharmacology**, 11, pp 907-914.
- 5) T. Behera, P. K. Nanda, C. Mohanty, D. Mohapatra, **P. Swain**, B. K. Das, P. Routray, B. K. Mishra and S.K Sahoo, (2009). Poly D, L-lactide-co-glycolic acid (PLGA) microparticle encapsulated antigen stimulates both acquired and innate immune parameters through parenteral immunization in fish. **Fish and shellfish immunology**, 28:320-325.
- 6) S.K.Nayak, **P.Swain**, P.K.Nanda, D.Mohapatra, T. Behera, (2011) Immunomodulatory potency of lipopolysaccharides (LPS) derived from smooth type of bacterial pathogen in Indian major carp. **Veterinary Microbiology**, doi: 10.1016/j.vetmic.2011.03.021.
- 7) P. K. Nanda, **P. Swain**, S. K. Nayak, S. Dash, P. Routray, S. K. Swain and B. C. Patra (2008). Goat serum as an alternative to establish cell culture from Indian major carp, *Cirrhinus mrigala*. **In Vitro Cellular and Developmental Biology- Animal** 45: 148-151.
- 8) P. Routray, S.N. Dash, C. Dash, **P. Swain**, S.K. Sarkar and N. Sarangi (2008). Cryopreservation of silver barb, *Puntius gonionotus* (Bleeker) spermatozoa: Effect of extender composition, cryoprotective agents and freezing rate on their post thawing fertilization ability. **Aquaculture research**. 2008: 1-9.

- 9) S. N. Dash, P. Routray, C. Dash, B. C. Guru, **P. Swain** and N Sarangi (2008). Use of the Non-Toxic Cryoprotectant Trehalose Enhances Recovery and Function of Fish Embryonic Stem Cells Following Cryogenic Storage. **Current Stem Cell Research & Therapy**, 23: 277-287.
- 10) P. Routray, C. Dash, S.N.Dash, D. K. Verma, P. K. Meher, S. K. Swain, **P. Swain**, B. C. Guru (2009). Cryopreservation of isolated blastomeres and embryonic stem like cells of Leopard danio, *Brachydanio frankei*. **Aquaculture research**, 2009:1-11.
- 11) **P. Swain**, S. Dash, P.K. Sahoo, P. Routray, S.K. Sahoo, S. D. Gupta, P.K. Meher and N.Sarangi.(2007). Non-specific immune parameters of brood Indian major carp *Labeo rohita* and their seasonal variations. **Fish and Shell Fish Immunology**, 22:38-43.
- 12) **P. Swain**, A. Behura, S. Dash and S. K. Nayak (2007). Serum antibody response of Indian major carp, *Labeo rohita* to three species of pathogenic bacteria; *Aeromonas hydrophila*, *Edwardsiella tarda* and *Pseudomonas fluorescens*. **Vet. Immunol. Immunopathol**, 117: 137-141.
- 13) P. Routray, A.K. Choudhary, S. N. Dash, D. K. Verma, C. Dash, **P. Swain**, J. K. Jena, S. D. Gupta and N. Sarangi (2006). Cryopreservation of dead fish spermatozoa several hours after death of Indian major carp, *Labeo rohita* and its successful utilization in fish production. **Aquaculture**. 261: 1204-1211.
- 14) S. K. Nayak, **P. Swain**, S. C. Mukherjee (2007). Effect of dietary supplement of probiotic and vitamin C on the immune response of Indian major carp, *Labeo rohita* (Ham.). **Fish Shellfish Immunol**. 23: 892-896.
- 15) S.K. Nayak, **P. Swain**, P.K. Nanda, S. Dash and N.K. Maiti (2008) Effect of endotoxin on the immunity of Indian major carp, *Labeo rohita*. **Fish and Shellfish Immunology**. 24: 394-399.
- 16) S. Dash, **P. Swain**, M.M. Swain, S.K. Nayak, A. Behura, P.K. Nanda and B.K. Mishra (2008). Investigation on infectious dropsy of Indian major carps. **Asian Fisheries Science**. 21: 377-384.
- 17) **P.Swain**, S.K.Nayak, A.Sahoo P.K.Meher, and B. K.Mishra (2003). High antigenic cross-reaction among the bacterial species responsible diseases of cultured freshwater fishes and strategy to overcome it for specific serodiagnosis. **Comp. Immunol. Microbiol. Infect. Dis**. 26: 199-211.

- 18) **P. Swain**, S. Dash, J. Bal, P. K. Sahoo, P. Routray, S. K. Sahoo and S. D. Gupta. (2006) Passive transfer of maternal antibodies and their existence in eggs, spawn and fry of Indian major carp, (*Labeo rohita* HAM.). **Fish and Shellfish Immunology**, 20:519-527.
- 19) **P. Swain**, S.K. Nayak, A. Sahu, B.C. Mohapatra and P.K.Meher (2002). Bath immunization of spawns, fries and fingerlings of Indian major carps using a particular antigen and determination of age, dose and duration of antigen exposure. **Fish and Shellfish Immunology** .13:133-140.
- 20) **P. Swain**, S. C. Mukherjee, B. K. Das, P. K. Sahoo, P. Pattnaik, G. Murjani and S. K. Nayak (1999). Dot Enzyme linked immunosorbent assay (Dot-ELISA) for diagnosis of *Edwardsiella tarda* infection in fish. **Asian Fisheries Science**. 14:89-93.
- 21) **P.Swain** and S.K.Nayak (2003) Comparative sensitivity of different serological tests for seromonitoring and surveillance of *Edwardsiella tarda* infection of Indian major carps. **Fish and Shellfish Immunology**. 15: 333-340.
- 22) P. K. Sahoo, **P. Swain**, S. K. Sahoo, S. C. Mukherjee and A. K. Sahu (1999). Pathology of the bacterium *Edwardsiella tarda* in *Anabas testudineus*. **Asian Fisheries Science**, 13:357-362.
- 23) **P.Swain**, K.C. Verma, J.M. Kataria, S.K. Mohanty and K. Dhama (1998) Antigenic characterization of Indian isolates and vaccine strains of Newcastle disease virus. **Tropical Animal Health and prodn**. 30:295-298.
- 24) **P. Swain**, J.M. Kataria, K.C. Verma (1993). Biological characterization of an Indian isolate of egg drop syndrome-76 virus. **Res. Vet. Sci**. 55:396-397.
- 25) **P. Swain**, J.M. Kataria, K. Dhama, K.C. Verma (1997). Purification of egg drop syndrome-76 virus by velocity density gradient centrifugation - a comparative study. **Acta Virologica**. 41:303-304.

Indian Journals

- 1) T. Behera, **P. Swain**, D. Mohapatra and S. K. Sahoo (2011). Immunostimulatory effects of curcumin in fish, *Labeo rohita*. *Indian J. of natural products and resources*, 2(2): 184-88.

- 2) C. Dash, P. Routray., S. N Dash, **P. Swain**, D. K. Verma and P. K. Nanda (2009). Localization of primordial germ cells (PGCs) in different developmental stages of rohu, *Labeo rohita* (Ham.). **The Indian Journal of Animal Sciences**, 79(6): 111-114.
- 3) G. Rathore, G. Kumar, **P. Swain** and W.S. Lakra. (2009). Development of new PCR primers for detection of Koi herpes virus (KHV). *Indian journal of comparative microbiology, immunology and infectious diseases*, 30(1): 52-53.
- 4) Gurav Rathore, Gokhlesh Kumar, **P. Swain** and W. S. Lakra (2009). Development of new PCR primers for detection of Koi Herpes Virus (KHV).
- 5) S. Dash, **P. Swain**, S. K. Nayak, P. K. Nanda, P. V. Rangacharyulu, B. K. Mishra and S. K. Swain (2008). A survey of some major bacterial diseases in key freshwater aquaculture zones of India: Andhra Pradesh, West Bengal and Orissa. **E-planet** 6(2):12-17.
- 6) **P. Swain**, Sasmita Mishra, S. Dash, S. K. Nayak, B. K. Mishra, K. C. Pani and R. Ramakrishna (2007). Outbreak of bacterial gill disease in Indian major carps due to *Flavobacterium branchiophilum* infection. **Indian J. Anim. Sci.** 77: 646-649.
- 7) P. Routray, S.N. Dash, C. Dash, **P. Swain**, S.D. Gupta, D.K. Verma, A. Saha, P. Das, N. Sarangi and B.C. Guru (2005). Cryopreservation of embryonic stem like cells of *Labeo rohita* (Ham.) and their viability assessment. *The Proceedings of the seventh Indian Fisheries Forum, Bangalore, India*, pp 182-188.
- 8) S. K. Mohanty, J. M. Kataria, **P. Swain** and K. C. Verma (2000) Development of hybridoma secreting monoclonal antibodies against a velogenic Newcastle Disease virus isolated from Guinea fowl (*Numida meleagris*). **Indian J. Comp. Microbiol. Immunol. Infect. Dis.**, 21, 63-65.
- 9) B.K. Banja, N. Sahoo, P.K. Das, **P. Swain** and H.K. Panda (2002). Comparison of different laboratory tests for diagnosis of parvo and corona viral infections in dogs. **Indian vet. J.**, 79: 425-427.
- 10) **P. Swain**, S.K. Nayak, A. Sahu, P.K. Sahoo and B.K. Mishra (2001). Biochemical, biological and serological character of some bacterial pathogens associated with diseases of Indian major carps. In the **proceedings of International conference on advanced technologies in fisheries and marine science**, at Noorul Islam College of Engineering Tamilnadu, India, Feb-2-4.

- 11) P. C Harbola, K. Dhama, P. Swain, R. Laha and Hema Prasanth (1999) Prevalence of important infectious diseases amongst livestock in kumaon hills; **Indian Vet. Med. J.** 23: 325-328.
- 12) P. Swain, K. Dhama, A.B. Pandey and P.C. Harbola (1999) Evaluation of the viability of BHV-I with various stabilizers at different stage temperatures. **Indian J. Comp. Microbiol. Immunol. Infect. Dis.** 20: 65-66.
- 13) P. Swain, K. C. Verma, J. M. Kataria and S. K. Mohanty (1999). Monoclonal antibody based dot-Enzyme linked immunosorbent assay (Dot-ELISA) and agar gel precipitation test (AGPT) for identification of Newcastle disease virus (NDV). **Indian J. Exp. Biol.**, 37:1037-1038.
- 14) P. Swain, K.C Verma, J.M. Kataria and S.K. Mohanty. (1998). Development of hybridomas secreting specific monoclonal antibodies against Newcastle disease virus. **Indian J. Animal Sci.** 68: 1005-1008.
- 15) A.B. Pandey, M.L. Mehrotra, K. Dhama, P. Swain, B. S. Negi and P.C. Harbola (1998). Characterization and comparison of cell culture adapted Indian isolates of bovine herpes virus-I by plaque assay and animal pathogenicity test. **Indian Vet. Med. J.** 22: 51-54.
- 16) J.M. Kataria, R.S. Kataria, P. Swain and K.C. Verma (1998). Electrophoretic analysis of reovirus isolates of chicken origin. **Indian J. Comp. Microbiol. Immunol. Infect. Dis.** 19: 54 - 55.
- 17) K. Dhama, P. Swain, A.B. Pandey, B.S. Negi and P.C. Harbola. (1998). Experimental studies of Indian isolates of bovine herpes virus - I in rabbits and mice. **Indian Vet. J.** 75: 740 - 741.
- 18) K. Dhama, P. Swain, A. B. Pandey, P.C. Harbola, B. S. Negi and T. S. Nair (1998). Serological investigation of frequent abortions in dairy animals. **Indian Vet. Med. J.**, 22: 225 -226.
- 19) P. Swain, J.M. Kataria, K.C. Verma (1997). Kinetics of growth of egg drop syndrome-76 virus in chicken embryo liver cell cultures assayed by FAT microscopy. **Indian Vet. Med. J.** 21:14-17.
- 20) P. Swain, K.C. Verma and J.M. Kataria. (1997) Characterization of structural polypeptides of velogenic Newcastle disease virus. **Indian J. Comp. Microbiol. Immunol. Infect. Dis.** 18:125-129.
- 21) P. Swain, J.M. Kataria, K.C. Verma. and M.L. Mehrotra (1996). Purification and isolation of nucleic acid of egg drop syndrome -76

		<p>(EDS-76) virus isolated from japanese quail. Indian J. Comp. Microbiol. Immunol. Infect. Dis. 16: 141-143.</p> <p>22) P. Swain, J.M. Kataria, K.C. Verma (1995) Immunoresponse of egg drop syndrome-76 virus in chicken. Indian J. Anim. Sci. 65:1196-1198.</p> <p>23) P. Swain, J.M. Kataria, K.C. Verma and R.L. Sah. (1993). Experimental studies of Indian isolate of egg drop syndrome -76 virus in chicken. Indian J. Animal Sci. 63:591-595.</p> <p>24) P. Swain, J.M. Kataria, K.C. Verma and Satish kumar. (1992). Physicochemical and biological characterization of indigenous isolate of egg drop syndrome -76 virus. Indian J. Virol. 8: 8-14.</p> <p>25) B.K Swain, T.S Johri, P Swain, A.K Shrivastav (2000). Effect of supplementation of different combinations of some selected nutrients on the performance and immune response of broilers. Indian Journal of Poultry Science. 35:247-251.</p>
B.	Review Articles	<p>International</p> <p>1) P.Swain, S.K. Nayak, P.K. Nanda and S.Dash (2008). Biological Effects of Endotoxin in Fish- A Review. Fish and Shellfish Immunology, 25:191-2001</p> <p>2) P. Swain and S. K. Nayak (2009). Role of maternally derived immunity in fish. Fish and Shellfish Immunology, 27: 89-99.</p> <p>National</p> <p>1) P. Swain, K. C. Verma and J. M. Kataria (1997) Viral diseases of Japanese Quail (<i>Coturnix coturnix japonica</i>)- A Review. Indian J. Virol. 13: 77-84.</p> <p>2) P. Swain, K. Dhama, K. C. Verma and J. M. Kataria (1998). Monoclonal antibodies in Newcastle disease virus research. Indian J. Comp. Microbiol. Immunol. Infect. Dis. 19:1-7.</p>
C.	Books Written	<p>1) P. Swain, P. K. Sahoo and S. Ayyappan (2005). Fish and Shellfish Immunology: An Introduction, published by Narendra publishers, New Delhi, (ISBN 81-85375-90-9).</p> <p>2) B. K. Mishra, P. Swain, P. K. Sahoo, B. K. Dash and N. Sarangi (2006). Disease Management in Freshwater Pisciculture, published by Agrotech Publishing Academy, Udaipur, Rajasthan (ISBN 81-8321-059-7).</p>

		<ol style="list-style-type: none"> 3) B. P. Sethi, B. Sahu and P. Swain (2008). Matsya O Ama Bikash (in Oriya), published by Innovate Orissa Initiative, Bhubaneswar. 4) B. K. Mishra, P. Swain, B. K. Das and A. E. Eknath (2011). A small book on fish Diseases, under publication by Narendra publishers, Delhi. 5) S. K. Swain, P. Swain, B.R. Pillai, M. Raghunath and P. Jayasankar (2012). Lead papers on Strategies for aquaculture development on the occasion of National conference on Aquaculture: Fish for Billion in commemoration of silver Jubilee celebrations published by CIFA, Bhubaneswar, (ISBN: 978-93-5067-472-7). 6) B. K. Mishra, P. Swain and B. K. Das (2011). Concepts of HACCP and its application in Aquaculture. Published by CIFA, Bhubaneswar. (ISBN: 978-81-924918-1-3)
<p>D.</p>	<p>Book Chapters</p>	<ol style="list-style-type: none"> 1. P. Swain, S.Dash, B.K. Mishra and B.K. Dash (2006). An insight into fish and shellfish diseases in India. In “Bioinformatics and Statistics in Fisheries Research. Vol-II Pp. 168-182. (ISBN: 81-7525-691-5) 2. P.Swain (2006). Specific defence mechanisms of fish: The basis of antibody production and cell-mediated immune response. In “Fish and Shellfish Immunology- an Introduction”. Narendra publisher, Delhi. (ISBN 81-85375-90-9). 3. P.Swain and P.K. Sahoo (2006). Cytokines of fish In “Fish and Shellfish Immunology- an Introduction”. Narendra publisher, Delhi (ISBN: 81-85375-90-9). 4. P.Swain (2006). Principles of serological techniques in disease diagnosis. In “Fish and Shellfish Immunology an Introduction”. Narendra publisher, Delhi. (ISBN: 81-85375-90-9). 5. P.Swain (2006). Adjuvants in Fish Health. In: Fish and Shellfish Immunology- An Introduction. Narendra publisher, Delhi (ISBN: 81-85375-90-9). 6. P.Swain (2007). Viruses and viral diseases of fish and shellfish. In: Disease Management in Freshwater Pisciculture. Agrotech Publishing Academy, Udaipur. (ISBN: 81-8321-059-7). 7. P. Swain and S. Dash (2007). Serological techniques in diagnosis of microbial diseases of fish. In: Disease Management in Freshwater Pisciculture. Agrotech Publishing

		<p>Academy, Udaipur (ISBN: 81-8321-059-7).</p> <ol style="list-style-type: none"> 8. P. Swain and S. Dash (2007). Fish vaccines. In: Disease Management in Freshwater Pisciculture. Agrotech Publishing Academy, Udaipur (ISBN: 81-8321-059-7). 9. P. Swain (2000). Recent trends in diagnosis of microbial diseases of fish. In MIRCEN (UNESCO) Training manual on Aquatic Microbiology and Fish Microbial Diseases, pp: 67. 10. P. Swain (2005). Immunization of carp brood for disease resistance. In International training manual “Induced Breeding and Polyculture of Indian major carps” (14th August to 15th September, 2005). pp: 47. 11. P. Swain, S. Dash and B. K. Mishra (2006). Fish and shellfish diseases in India. In Proceedings of National workshop cum training on Bioinformatics and Statistics in Aquaculture Research. Pp: 180-191. 12. P. Routray, S.N. Dash and P. Swain (2005). Climate change and its impact on fisheries. In Environmental Issues and Options (C. S. K. Mishra, J. W. Kim and A. Saxena, eds.). Daya Publishing House, Delhi (ISBN 81-7035-431-5). 13. P. Swain, S. K. Nayak, A. Sahu, P. K. Sahoo and B. K. Mishra (2001). Biochemical, biological and serological character of some bacterial pathogens associated with diseases of Indian major carps. In the proceedings of International Conference on Advanced Technologies in Fisheries and Marine Science, at Noorul Islam College of Engineering, Tamil Nadu, India, Feb - 2-4.
<p>E.</p>	<p>Databases Developed</p>	<ul style="list-style-type: none"> ➤ Developed a database on Rohu (<i>Labeo rohita</i>) ➤ Developed IP and Technologies database of Central Institute of Freshwater Aquaculture (CIFA) ➤ Database on diseases of livestock in temperate regions of India; Kumaon and Gharwal hills of Central Himalayas.
<p>F.</p>	<p>Scientific Popular Articles</p>	<p><i>(a) English</i></p> <ol style="list-style-type: none"> 1) P. Swain, C. Tosh and S. Nandi (1998) Zoonotic influenza - A global problem. Science Reporter. March 22-24. 2) P. Swain, K. Dhama, A. B. Pandey and B.B. Dash (1998). Viral diseases of Japanese quail in India. Indian Farming. 47 (12): 30-32.

- 3) S. Nandi, **P. Swain** and G. Chakraborty. (1996). Foot and mouth disease in wild animals. **Asian Livestock**. 21 (1): 2-5.
- 4) S. Nandi and **P. Swain** (1996). Rabies in cats. **Indian Farming**. 41 (1): 29
- 5) **P. Swain**, K. Dhama (1999). Calf diarrhoea. **Indian Farming**. 48(11) 25-27.
- 6) **P. Swain** (2003). Bacterial gill disease of Indian major carps: A threat to freshwater aquaculture sector. **Indian Farming**. 53(4): 11.
- 7) S.K.Nayak and **P. Swain** (2003). Disease diagnosis: An Overview. **Science and culture**. 69(1-2): 20-23.
- 8) **P. Swain** and S. Saurabh (2005). Aeromoniasis of freshwater fishes. **Indian Farming**. 54(11): 27-32.
- 9) P. Routray, S.N. Dash, C.Dash, **P. Swain**, A.K. Choudhary, and S. D. Gupta (2006). Primordial germ cells (PGCs) in fishes and their potential applications in aquaculture biotechnology. **Fishing Chimes**. 26(7): 47-49.
- 10) **P. Swain**, S. Dash and B. K. Mishra (2007). Diagnostic kits for diagnosis of fish bacterial diseases. **Indian Farming**. 56(10): 54-56.
- 11) **P. Swain**, S.K. Nayak, P.K. Nanda (2008). Potential applications of nanotechnology in aquaculture. **Aqua International**. 16(8): 24-27.
- 12) **P. Swain**, P. K. Nanda and S. K. Nayak (2009). 3-D scaffold based fish cell culture: an emerging concept. **Fishing Chimes**, 29(9): 34-36.

(b) Hindi

- 1) **P. Swain** (1995) Anda Utpadan par chot karta egg drop syndrome. **Kheti**; Nov.: 25.
- 2) **P. Swain** and A.B. Pandey, (1995) Bhed ka ghatak rog Nirlassana. **Krishi chayanika** Oct.-Dec.: 70-72.
- 3) **P. Swain**, A.B. Pandey, K. Dhama and B.B. Dash. (1998). Bharat mein japani batero ke vishanu rog. **Kheti**. 51 (8): 4-6.
- 4) A.B. Pandey and **P. Swain**. (1997). Manusyoko prabhawit karne vale pashu vishanu rog-zoonosis **Baigyanik**. 29 (3): 35-36.
- 5) B. K. Mishra, B. K. Das, **P. Swain**, P. K. Sahoo (2005). Dhyan

		<p>rakhe machhaliyan ki sehat ka. Kheti. 58(2): 11-17.</p> <p>6) B.K.Mishra, P. K. Sahoo, P. Swain and B. K. Das (2004). Machhaliyan ki samasya bimariya tatha unka bachab ebam niyantran. Nilitima.4&5(6): 43-44.</p> <p>7) S.K. Swain, S.Chandra, P.Swain and N.Sarang (2007). Rozagar ki Disa mein alankarik matsyaki. Kheti. 60(8): 3-7.</p>
		<p>(c) Oriya</p> <p>1) S.Dash and P.Swain (2005). Maa machhara rogo o tara nirakarana. Mastya O Ama Bikasha. 1(1): 19-21.</p> <p>2) P.Swain and S.Dash (2005). Sitadinare machhara rogo o tara nirakarana. Mastya O Ama Bikasha.1 (2): 29-31.</p> <p>3) P.Swain and S.Dash (2006). Sitadinae machha rogo o tara nirakarana. The Samaja, p –13, 23/11/06.</p> <p>4) P. Swain, S.Dash (April, 2006). Macha rogara niyantrana bidhi, (in Oriya), pp- 199-201. Matsya O Ama Bikash, published by Innovate Orissa Initiative, Bhubaneswar.</p> <p>5) P. Swain, S.Dash (April, 2006). Rangini machhara roga o tara nirakarana (in Oriya) pp- 199-201. Matsya O Ama Bikash, published by Innovate Orissa Initiative, Bhubaneswar.</p> <p>6) P. Swain, S.Dash (April, 2006). Susta macha o adhika janal pain roga pratirodhaka sakti, udhigiraka ausadha, ImmunobooSt-C (in Oriya) pp- 199-201. Matsya O Ama Bikash, published by Innovate Orissa Initiative, Bhubaneswar.</p>

Other Important Publications

<p>A.</p>	<p>Books Written/Edited for Students and teachers</p>	<p>1) P. Swain, P. K. Sahoo and S. Ayyappan (2006). Fish and Shellfish Immunology: An Introduction, published by Narendra publishers, Delhi, (ISBN 81-85375-90-9).</p> <p>2) P. Swain, K. D. Mahapatra, J. K. Jena, P. Das, P. Routray, B. K. Das, A. S. Mahapatra, H. K. De, B. B. Sahu and P. Jayasankar (2012). Rohu (<i>Labeo rohita</i>) Database, Published by CIFA, Bhubaneswar (ISBN 978-81-924918-0-6).</p> <p>3) B. K. Mishra, P. Swain, P. K. Sahoo, B. K. Dash and N. Sarangi (2007). Disease Management in Freshwater Pisciculture, published by Agrotech Publishing Academy, Udaipur, Rajasthan (ISBN 81-8321-059-7).</p>
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		<p>4) S. K. Swain, P. Swain, B.R. Pillai, M. Raghunath and P. Jayasankar (2012). Lead papers on Strategies for aquaculture development on the occasion of National conference on Aquaculture: Fish for Billion, in commemoration of silver Jubilee celebrations. Published by CIFA, Bhubaneswar (ISBN 978-93-5067-472-7).</p> <p>5) B. K. Mishra, P. Swain and B. K. Das (2011). Concepts of HACCP and its application in Aquaculture. Published by CIFA, Bhubaneswar (ISBN 978-81-924918-1-3).</p>
B.	Books written for Farmers	<p>1) B. P. Sethi, B. Sahu and P. Swain (2008). Matsya O Ama Bikash, Fish and our development (in Oriya), Published by Innovate Orissa Initiative, Bhubaneswar.</p> <p>2) B. K. Mishra, P. Swain, B. K. Das and P. Jayasankar (2011). Management of Freshwater fish Diseases. Published by CIFA, Bhubaneswar.</p> <p>3) S. K. Swain, P. Swain, B. K. Das and S.C. Rath (2012) Ame O Ama Krushak, We and Our Farmers. Published by Orissa Krushak Samaj, Bhubaneswar on the occasion of World Food Day, 16th October, 2012.</p>

Honours/ Awards/ Recognitions	<ul style="list-style-type: none"> ▪ ICAR National fellowship for the year 2010-2011 by ICAR, Ministry of Agriculture, Govt. of India, New Delhi ▪ ICAR Hari Om Ashram Trust Award for the biennium 2008-2009 by ICAR, Ministry of Agriculture, Govt. of India, New Delhi ▪ ICAR award for outstanding team research for the biennium 2001-2002 by ICAR, Ministry of Agriculture, Govt. of India, New Delhi as Team Leader ▪ ICAR award for outstanding team research for the biennium 2003-2004 by ICAR, Ministry of Agriculture, Govt. of India, New Delhi. as Team Member ▪ ICAR Lal Bahadur Shastri Young Scientist Award for Agricultural Research for the biennium 1997-98 ▪ BOYSCAST fellowship award, 2000 sponsored by Department of Science and Technology, Govt. of India, New Delhi. ▪ Special award by Directorate of Extension, Ministry of Agriculture, New Delhi, 1987
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	<ul style="list-style-type: none"> ▪ Best Young Scientist Award- 2003 by Dr Hiralal Chaudhuri Fisheries Foundation, Mumbai. ▪ Best young scientist award of CIFA for the year 2001. ▪ World food day special award- 2007 by Orissa Krusak Samaj, Bhubaneswar, ▪ Odisha University of Agriculture and Technology Gold medal
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Foreign Deputations

Sl. No.	Duration		Institute and the country	Purpose of visit
	From	To		
1	20-03-2001	05-08-2001	IOWA state University and University of Maryland, USA	Training on molecular diagnostics
2	10-07-2010	24-07-2010	Michigan State University, East Lansing, MI, USA	Delegation of ICAR on Intellectual Property Management and Technology Transfer
3	5-09-2011	31-11-2011	University of Copenhagen	Training on nanotechnology

National/ International Assignments

Expert member	<ul style="list-style-type: none"> • IPR expert for Central Rice Research Institute, Cuttack. • Delegation of ICAR on Intellectual Property Management and Technology Transfer to Michigan State University, East Lansing, MI, USA under ICAR-MSU partnership development program to gain knowledge on enhancement of IPR activities in ICAR. • Member, Zonal Technology Management Committee of Indian Council of Agricultural Research for east zone. • Member –Secretary of Institute technology management Unit (ITMU) of CIFA, Bhubaneswar. • Editor of a monthly Oriya Magazine “Matshya O Ama Bikasha” for farmers published by Innovate Orissa Initiative, Bhubaneswar.
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	<ul style="list-style-type: none"> ● Associate Editor of E-Planet, journal published by Organization for protection of ecosystem, environment and endangered species, Bhubaneswar. ● FAO/CIFA/NACA Expert Consultation on the Intensification of Food Production in Low Income Food Deficit Countries through Aquaculture, Bhubaneswar, India, 16–19 October 2001. ● Expert-member of project evaluation committee of ICAR funded APCess Scheme.
<p>Guest faculty and external examiner</p>	<ul style="list-style-type: none"> ➤ External Examiner and Guest Faculty Central Institute of Fisheries Education (CIFE), Mumbai, Vidyasagar University, West Bengal, Utkal University, Bhubaneswar, Orissa University of Agriculture and Technology(OUAT), Bhubaneswar, Central Agricultural University, Imphal
<p>Reviewer for International Scientific Journals</p>	<ul style="list-style-type: none"> ➤ Journal of Applied Microbiology (Wiley-Blackwell Publishing) ➤ Journal of Clinical Microbiology (American Society for Microbiologists) ➤ Innate Immunity (<u>International Endotoxin & Innate Immunity Society</u>) ➤ Fish and Shellfish Immunology (Elsevier sciences) ➤ Vaccines (Elsevier sciences) ➤ Aquaculture nutrition (Wiley-Blackwell Publishing) ➤ Journal of Fish Biology (Wiley-Blackwell Publishing) ➤ Aquaculture research (Wiley-Blackwell Publishing)
<p>Membership of academies/ scientific societies/ professional bodies</p>	<ul style="list-style-type: none"> ➤ Life member of the Indian Association of Veterinary Microbiologists, Immunologists and Specialists in Infectious Diseases ➤ Life member of Agricultural Research Service Scientists' Forum ➤ Life member of Organization for protection of ecosystem, environment and endangered species

<p>Trainings/ Workshops, seminars organized</p>	<ul style="list-style-type: none"> ➤ Organizing secretary, Scientists-Industry interface meet on commercialization of diagnostic kits and therapeutics held at CIFA, 9th September, 2003 ➤ Co-Convener, Workshop on Concepts of HACCP and its application in aquaculture held at CIFA from 22-24 Sept. 2009. ➤ Co-Convener, Second Workshop on Concepts of HACCP and its application in aquaculture held at CIFA from 9-11, Nov. 2010. ➤ Co-Convener, Second Workshop on Concepts of HACCP and its application in aquaculture held at CIFA from 28-30, Aug. 2011 ➤ Course Coordinator and faculty member, contributed to around thirty training programmes on “Fish Health Management” to state fisheries department officials, entrepreneurs and fish farmers of the country. ➤ Co-Course Director, Winter school on Application of molecular and serological tools in fish disease diagnosis held at CIFA from. 9-29, Nov. 2009. ➤ Course Coordinator, Summer School on Disease diagnosis and health management of Freshwater fish and shellfish held at CIFA, 06-26, July, 2004. ➤ Member, Organising Committee, National conference on Aquaculture: Fish for Billion in commemoration of silver Jubilee celebrations of CIFA, 16-17, March, 2012 ➤ Member, Organising Committee, The brain storming meet on aquaculture 2025: Challenges and opportunities during 7-8 June, 2008.
<p>Service to farming community</p>	<ul style="list-style-type: none"> ➤ Diagnosed and suggested remedial measures for more than 2000 fish disease cases received at CIFA by farmers as well as ornamental and carp breeding unit of CIFA till 2012. ➤ Participated in several Doordarshan programmes such as Krushi Darshan, Palishree on “Diseases in freshwater aquaculture and their management” and different topics on aquaculture practices at Doordarshan Kendra, Bhubaneswar and also in All India Radio, Cuttack. ➤ Attended 29 Disease outbreaks in different districts of Orissa, Andhra Pradesh, Tamilnadu and West Bengal. ➤ Expert of fish diseases for KISAN HELPLINE at CIFA for attending the phone calls and queries from farmers regarding disease aspects of fish and suggesting remedial measures.

- Written twenty-five scientific popular articles in Oriya, Hindi and English for better understanding by farmers and common man.
- Organised and contributed to around thirty training programmes on “Fish Health Management” to state fisheries department officials, entrepreneurs and fish farmers of the country.

Ph.D. students guided: Four	
Utkal University	Three
Medinipore University	One

