

## CHAPTER 62

### ZOOLOGY

#### Doctoral Theses

590. ANAND (Shailly)  
**Genome of *Sphingobium indicum* B90A: A Hexachlorocyclohexane (HCH) Degrading Bacterium.**  
Supervisor : Dr. Rajagopal Raman  
Th 19070

#### *Abstract*

The study highlights a deeper insight of the genes involved in the degradation of diverse number of refractory environmental pollutants, the pool of available genomic data needs to be enhanced. There seems to be a high urgency for such ecologically important microbes to be sequenced and their genomes to be critically analyzed. *Sphingobium indicum* B90A is the most efficient degrader of Hexachlorocyclohexane (HCH) - an organochlorine pesticide. The genome sequencing of this bacterium would not only aid in cataloguing the genes that this organism harbors but will also add to the information available in the database. Thus in the current thesis, the genome project of this bacterium is undertaken.

#### *Contents*

1. Review of literature. 2. Materials and methods. 3. Results. 4. Discussion, summary, references and appendixes.

591. ARORA (Anshu)  
**Studies on Chromatin Organization: Epigenetic Modifications of Histones during Liver Regeneration in Mice.**  
Supervisor : Prof. Madan Mohan Chaturvedi  
Th 19072

#### *Abstract*

The study analyse that the histone modification status of HGF and TGF- $\beta$ 1 promoter regions did not show any promoter

region-specific changes in modifications did show selective localizations with respect to the time frame of regenerative events. It is realised that in order to study gene-specific changes in terms of histone modifications it becomes essential to segregate different cell populations of liver. Alternatively, immuno-histochemistry on liver sections could also provide conclusive cell-type specific information with respect to localization of various histone modifications.

#### *Contents*

1. Review of literature. 2. Materials and methods. 3. Results. 4. Discussion, summary and references.

592. ATUL RANJAN  
**To Elucidate the Molecular Mechanism of DNA Minor Groove Binding Molecule as a Radiation Modulator.**  
 Supervisor : Prof. M. M. Chaturvedi  
Th 19113

#### *Abstract*

DMA, a Bis-benzimidazoles, is a minor groove binder and thus affect the expression level of different gene/protein. The minor groove binding of the DNA leads to the compression of the major groove that antagonizes transcription factor binding to the DNA major groove in an allosteric fashion. The Study demonstrate that DMA a novel Bis-benzimidazoles analogue, effectively minimize ionizing radiation induced DNA damage in cultured cells. This radioprotection of DMA is in part attributed to promotion of DNA damage repair and activation of AKT signal pathway.

#### *Contents*

1. Review of literature. 2. Gene expression studies in response to DNA minor groove binding ligand, DMA and ionizing radiation in human embryonic kidney (HEK293) cells. 3. Regulation of Protein expression in response to DNA minor groove binding ligand, DMA and ionizing radiation in human embryonic kidney (HEK293) cells. 4. Regulation of AKT signaling pathway in response to DNA minor groove binding ligand, DMA and radiation in human embryonic kidney (HEK293) cells. Appendix and Publications and poster presented.

593. BHARTI (Neetu)  
**Study of Novel Adaptogen 'Aerva sanguinolenta': Potential use for cancer Chemoprevention.**  
Supervisor : Dr. Anju Shrivastava  
Th 19067

*Abstract*

The study deals with the role of Aerva sanguinolenta, in life threatening disease like cancer and its mechanism of action. An attempt is also made to find out the novel suitable synergistic partner for Aerva sanguinolenta for more effective cancer treatment. The characterization is done to explore the secondary metabolites responsible for its therapeutic effect.

*Contents*

1. Immunomodulatory role of Aerva sanguinolenta on murine macrophage functions and its mechanism of action. 2. Study of mechanism of Aerva sanguinolenta- mediated antitumor activity against Dalton's lymphoma cells. 3. A combination study of Aerva sanguinolenta with known anticancer compounds and herbs in vitro and in vivo. 4. Evaluation of anticancer activity of Aerva sanguinolenta, Artemisinin and Baicalin against human breast cancer cells: A comparative study. 5. Characterization of Aerva sanguinolenta extract. Synopsis.

594. GARG (Nidhi)  
**Exploring Different Bioremediation Approaches for the Development of Technology for Decontamination of Hexachlorocyclohexane (HCH) Contaminated Sites.**  
Supervisor : Dr. Rajagopal Raman  
Th 19069

*Abstract*

The study investigates a bacterial strain F2<sup>T</sup> is isolated from HCH contaminated soil sample which is found to degrade HCH isomers ( $\alpha$ -,  $\beta$ -,  $\gamma$ -  $\delta$ - HCH) faster in comparison to the other sphingomonads isolated from the same dumpsite. This strain F2<sup>T</sup> is then characterized taxonomically by using a polyphasic approach. The strain F2<sup>T</sup> is found to be a novel species of the genus Sphingobium for which the name Sphingobium lucknowense sp. nov. is proposed.

1. Development of a microbial consortium for HCH bioremediation. 2. Developing a bioremediation concept for HCH contaminated soils using a combination of biostimulation and bioaugmentation approach. 3. Enzymatic bioremediation of HCH isomers by a linB double mutant generated through site-directed mutagenesis of linB of *Sphingobium indicum* B90A. 4. Taxonomic characterization of *Sphingobium lucknowense* F2<sup>T</sup>, a hexachlorocyclohexane (HCH) degrading bacterium isolated from HCH contaminated soil. 5. Appendices.

595. GAUTAM (Mukesh)  
**Comparative Genomic and Functional Studies of Sertoli Cells Obtained from Spermatogenically Inactive and Active Testis.**  
 Supervisor : Prof. Umesh Rai  
Th 19114

*Abstract*

Analyzes the global gene expression of wall lizard testis from active, recrudescence and regressed phase of reproductive cycle and Sertoli cells from 5 days and 60 days old rats. Indicates that the genes involved in spermatogonial stem cell niche maintenance are expressed both in regressed phase testis of lizard and immature Sertoli cells from rat. This shows conservation of genes involved in basic cellular functions in testis from reptiles to mammals.

*Contents*

1. Transcriptome analysis of spermatogenically regressed, recrudescence and active testis of seasonally breeding indian wall lizard *Hemidactylus flaviviridis*. 2. Comparative evaluation of follicle stimulating hormone and / or testosterone responsiveness of sertoli cells cultured from 5-days, 18-days and 60 days old rat testes. 3. Whole genome transcriptome profiling of terminally differentiated rat sertoli cells upon follicle stimulating hormone and testosterone stimulation. Summary and Appendix.

596. GOSAIN (Anuradha)  
**Caspase Independent Cell Death in Dictyosteli Discoideum with Respect to Transglutaminases.**  
 Supervisors : Dr. Shweta Saran and Dr. Anju Shrivastava  
Th 19075

*Abstract*

The present study demonstrates the presence of calcium independent TG activity in *Dictyostelium discoideum*. Attempted to identify the genes responsible for the TG activity but conclusive results could not be drawn as knock out strains are still to be constructed. It identify and characterize a novel peptide: N-glycanase enzyme which is responsible for the deglycosylation reaction of denatured glycoproteins and belongs to the transglutaminase superfamily.

*Contents*

1. An introduction to *dictyostelium discoideum*: the model system. 2. Biochemical characterization of transglutaminase activity in *dictyostelium discoideum*. 3. Identification of the proteins responsible for transglutaminase activity in *dictyostelium discoideum*. 4. Identification and characterization of peptideL N-glycanase of *dictyostelium discoideum*. Summary, Conclusions and appendix.

597. KAPINDER  
**Behavioural Responses of *Cotesia plutellae* (L.) (Hymenoptera: Braconidae) towards Certain Food Sources and Environmental Stimuli.**  
Supervisor : Prof. A. K. Singh  
Th 19115

*Abstract*

The study has investigated effect of different food sources on certain behavioural aspect of *Cotesia plutellae*, a larval endoparasitoid of *Plutella xylostella*. Orientation response of *C. plutellae* is evaluated in the T-tunnel olfactometer in which honey showed the attraction, antennation and mouth parts extension by female wasps however, male showed only later two responses. Sucrose and water did not show any of the above response. Duration of stay and number of visits on the honey vial mouth cover is also significantly more than other sucrose and water. Feeding response of *C. plutellae* on carbohydrate is assessed in the feeding chamber. The female wasp reached to honey and sucrose with honey vapour, much earlier and showed antennation and mouth parts extension than on other carbohydrate food sources.

*Contents*

1. Historical Resume. 2. Materials and methods. 3. Orientation and feeding response of cotesia plutellae towards different food sources. 4. Effect of carbohydrates and vitamins on the survival, parasitisation, adult emergence and sex ratio of cotesia plutellae. 5. Effect of food on the flight activity of cotesia plutellae. 6. Learning of cotesia plutellae towards different odour. Discussion, summary and references.

598. KUMARI VANDANA RANI  
**Induction, Characterization and Expression of Proteins Synthesized by Primary Hepatocytes of Murrel, Channa punctatus (Bloch) on Exposure to Estrogens.**  
 Supervisor : Prof. Neeta Sehgal  
Th 19074

*Abstract*

The study highlights that in addition to provide embryonic nutrition, murrel vitellogenin in vitro identifies and inhibits growth of Aeromonas hydrophila bacteria and enhances macrophage phagocytosis. Existence of vitellogenin like polypeptide in mucous substantiates our assumption that vitellogenin molecule plays a significant role in defense mechanism. Vitellogenesis and choriogenesis are multifaceted processes between hepatic and extrahepatic tissue involving numerous metabolic pathways. The potential defensive role of vitellogenin in vivo i.e. identifying and killing invading bacteria needs to be examined.

*Contents*

1. Development and standardization of a technique for primary monolayer culture, characterization and localization of synthesized proteins, and ultrastructure of hepatocytes isolated from murrel, channa punctatus. 2. Experimental studies on the expression of genes (vg) and synthesis of proteins by primary culture of hepatocytes 3. Preliminary studies on the additional role of vitellogenin from the indian freshwater murrel, channa punctatus. 4. Summary, Literature cited and Publications.

599. MALHOTRA (Jaya)  
**Dynamics of Soil Microbial Diversity at Pesticide Polluted Agricultural Soils.**  
 Supervisor : Dr. Rajagopal Raman  
Th 19071

*Abstract*

The study suggests that extensive use of pesticides and fertilizers lead to drastic changes in the microbial community profile which could be illustrated from the decrease in the diversity by increasing the input does of agrochemicals applied in the agricultural fields. The microbial community near HCH manufacturing unit is also investigated that showed the presence of genera which have been reported for their role in xenobiotic degradation. HCH residue levels at the site revealed the predominance of  $\beta$ -HCH isomer among all other isomers. The presence and sequence diversity of HCH degrading *linA* and *linB*-homologous genes at HCH contaminated site, indicated that gene variants exist in nature and can be studied for HCH degradation. Further, a novel bacterial strain isolated from HCH dumpsite is taxonomically characterized.

*Contents*

1. The influence of chemical farming with extensive use of fertilizers and pesticides on soil microbial diversity and nitrogen fixing community. 2. Effect on bacterial community in hexachlorocyclohexane (HCH) contaminated pond soil due to excessive waste produced from a lindane manufacturing unit. 3. Diversity of *linA* (Dehydrochlorinase) from hexachlorocyclohexane (HCH) contaminated pond soil. 4. Taxonomic characterization of *Acinetobacter indicus* A648T isolated from hexachlorocyclohexane (HCH) dump site. Appendixes and List of publications.

600. MISRA (Nisha)  
**Anti-inflammatory and Anti-arthritis activity of the Plant *Crinum asiaticum*.**  
Supervisor : Dr. Anju Shrivastava  
Th 19066

*Abstract*

The study strongly support the anti-inflammatory and anti-arthritis potential of the plant *C. asiaticum* and its use in traditional medicine. As mentioned previously, several compounds found in methanol extract of *C. asiaticum* leaves are well known for their anti-inflammatory activities. The presence of these compounds in the *C. asiaticum* leaf extract may explain the anti-arthritis properties of this plant.

1. Review of literature. 2. Materials and methods. 3. Results. 4. Discussion. 5. Conclusion and references.

601. N. GAYATRI PRIYA  
**Diversity Analysis and Functional Role of Insect Gut Bacteria.**  
Supervisor : Dr. Rajagopal Raman  
Th 19112

*Abstract*

Studies the gut bacterial diversity of *Helicoverpa armigera* by culturable and non-culturable methods and examines the effect of host plant and location in the observed bacterial diversity. Finds out the role of gut bacteria in insecticide metabolism within the insect.

*Contents*

1. Review of literature. Material and methods. 3. Results. 4. Discussion. References, Summary, List of publications and Appendix.

602. RAJEEV RANJAN  
**Anti-tumor and Anti-inflammatory Effect of Pongamia Pinnata Leaf Extract.**  
Supervisor : Dr. Anju Shrivastava  
Th 19068

*Abstract*

The study has demonstrated the anti-inflammatory and anti-arthritic effect of *Pongamia pinnata*, and thus its efficacy in the treatment of chronic inflammatory disease like rheumatoid arthritis. It has also shown the hepatoprotective effect since it could lower the enhanced levels of liver marker enzymes in CFA-induced inflammation model, especially at a higher dose of 500 mg/kg b wt being most effective. The actual mechanism of action of *Pongamia* on proinflammatory cytokines like TNF- $\alpha$ , Interleukins and other relevant mediators are needed to be explored and also the detailed mechanism of action needs to be studied.

*Contents*

1. Review of literature. 2. Rationale and aim of the study. 3. The

toxicity study of pongamia pinnata leaf extract. 4. Anti-tumor activity of pongamis pinnata leaf extract. 5. Anti-inflammatory and anti-arthritic activity of pongamia pinnata leaf extract. 6. Chemical characterization of the pongamia pinnata leaf extract and identification of different components present. 7. General discussion, conclusion and recommendation.

603. SMRITI SUMAN  
**Influence of Certain Plant Extracts on Behavioural and Biological Attributes of Plutella Xylostella (L.) (Lepidoptera: Plutellidae).**  
 Supervisor : Prof. A. K. Singh  
Th 19073

*Abstract*

The study indicate the L. camara and neem extracts have toxic, growth regulatory, antifeedant and oviposition deterrent effects which can be incorporated into control programmes for P. xylostella.

*Contents*

1. Historical resume. 2. Materials and methods. 3. Effect of camara and neem extracts on the feeding behaviour of P. xylostella. 4. Effect of L. camara and neem foliage extracts on the growth and development of P. xylostella. 5. Effect of L. camara and neem foliage extracts on the oviposition behaviour and egg hatchability of P. xylostella. Discussion, summary and references.

## M.Phil Dissertations

604. DIVYA MOHAN  
**HDAC Expression and Inhibition in Cancer Cells.**  
 Supervisor : Dr. Anju Shrivastava
605. GUNJAN KUMAR SAURAV  
**Molecular Identification of Thrips Palmi and Study of its Endosymbiotic Bacterial Diversity.**  
 Supervisor : Dr. Rajagopal Raman

606. PALLEE SHREE  
**Studies on Genetic Diversity of Indian Rice using RAPD Marker and SDS PAGE.**  
Supervisor : Prof. D. K. Singh
607. RANGARAJAN (Rohini)  
**Role of Quality and Female Presence in Influencing Song Production Inadult Male Zebra Finch (Taenipygia Guttatta)**  
Supervisor : Prof. Vinod Kumar
608. RASHMI (Deepika)  
**Distinguishing Indian Wheat Varieties using RAPD and SDS PAGE**  
Supervisor : Prof. D. K. Singh
609. SHARMA (Niharika)  
**Histopathological Characterization of Mouse Breast Cancer.**  
Supervisor : Dr. Rita Singh
610. SHELLY (Asha)  
**Studying the Virulence Attributes of Aeromonas Hydrophila in Clarias Gariepinus.**  
Supervisor : Dr. Shibnath Mazumder
611. SINGH (Swati)  
**Genetic Association of Cardiovascular Disease.....Ovarian Syndrome.**  
Supervisor : Dr. Rita Singh
612. SUNIL KUMAR  
**Effect of Vitellogenin on Macrophage Activity in the Indian Freshwater Murrel, Channa Punctatus.**  
Supervisor : Prof. Neeta Sehgal
613. VASUDHA (Rupanagudi)  
**Gonadotropin Antibodies Characterization and Its Application.**  
Supervisor : Prof. K. Muralidhar
614. VATS (Tarun Kumar)  
**Bioefficacy of Plant Extracts.....Plutella xylostella.**  
Supervisor : Prof. A. K. Singh