

# CURRICULUM VITAE



## Objective:

Be affiliated with a prestigious institution. Improve the standard of profession and empowering them with necessary skills, qualities, knowledge, attitude and value of time.

### Name and full correspondence address

: **Dr. T. RAJKUMAR, M.Sc., M.Phil., Ph. D.,**  
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## Academic Qualification

Education	Year	Subject	Grade	Institution / University
Ph. D.	Oct, 2018	Zoology	Commended	Thiruvalluvar University, Vellore
M. Phil.	Sep, 2012	Zoology	First Class	C. Abdul Hakeem College, Melvisharam
M. Sc.	April, 2011	Zoology	First Class	C. Abdul Hakeem College, Melvisharam
B. Sc.	April, 2009	Zoology	First Class	C. Abdul Hakeem College, Melvisharam
HSC.	Mar 2006	Science	First Class	Govt. B.HSS Polur
SSLC.	April, 2004	-	First Class	Govt. B.HSS Polur

**Position and Honours:**

<b>S. No</b>	<b>Position</b>	<b>Project Title</b>	<b>Funding Agency</b>	<b>Year</b>	<b>Institution</b>
1.	Research Scientist	Developing prebiotics and probiotics, Immunostimulants from microbial and medicinal plants for Aquaculture	-	Nov, 2018 to At present	Poseidon Biotech, Chennai, Tamil Nadu - 600095
2.	SRF	National Repository of Fish Cell lines (PHASE-II) and assess center C. Abdul Hakeem College, Melvisharam and research application of Virology, toxicology and gene expression studies	DBT-NBFGFR	Oct, 2017 to Oct, 2018	C. Abdul Hakeem College, Melvisharam, Vellore, Tamil Nadu-6063509
3.	JRF	“Prevention and future control of the two major socioeconomically-important pathogen in Asian aquaculture.”	DBT-BBSRC	Sep, 2016 to May, 2017	C. Abdul Hakeem College, Melvisharam, Vellore, Tamil Nadu-6063509
4.	SRF	“Control of white spot syndrome virus (WSSV) of shrimp using Nano-formulated dsRNAi”.	DBT – BIRAC GPS Biotech	Apr, 2015 to Aug, 2016	C. Abdul Hakeem College, Melvisharam, Vellore, Tamil Nadu-6063509
5.	JRF	“Potential use of Nanoparticles for DNA vaccine delivery in fish model to control bacterial and viral disease”.	DBT	May, 2013 to Mar - 2015	C. Abdul Hakeem College, Melvisharam, Vellore, Tamil Nadu-6063509
6.	PA	“Indo Norwegian platform of fish and shellfish vaccine development. Sub title- Development of viral vaccines against nodavirus and IPNV”.	DBT	Oct, 2012 to Apr, 2013	C. Abdul Hakeem College, Melvisharam, Vellore, Tamil Nadu-6063509

**Principal Investigator: Dr. A. Sait Sahul Hameed, Ph.D.,**

OIE Expert & FNAAS,  
Tata Innovation Fellow (DBT),  
OIE Reference Laboratory for WTD,  
Aquatic Animal Health Laboratory (AAHL),  
PG and Research Department of Zoology,  
C. Abdul Hakeem College, Melvisharam,  
Tamil Nadu – 632 509. India.

## **Title and summary of the M. Phil Work**

Thesis Title: “**Tissue distribution of Hepatopancreatic Parvo Virus (HPV) of shrimp in freshwater crab *Paratelphusa hydrodomous*”**

Supervisor: **Dr. A. Sait Sahul Hameed, Ph.D.,**  
OIE Expert & FNAAS,  
Tata Innovation Fellow (DBT),  
OIE Reference Laboratory for WTD,  
Aquatic Animal Health Laboratory (AAHL),  
PG and Research Department of Zoology,  
C. Abdul Hakeem College, Melvisharam,  
Tamil Nadu – 632 509. India.

### **Summary**

An attempt was made to determine the replication efficiency of Hepatopancreatic parvovirus (HPV) of shrimp in different organs of freshwater rice-field crab, *Paratelphusa hydrodomous* (Herbst).

The freshwater crabs was infected with HPV and samples were collected at 5 and 10 days p.i. for different analyses to confirm the replication of HPV. The viral replication was confirmed by PCR, RT-PCR, ELISA, Dot blot, Western blot and real-time PCR analyses, and also to use this crab instead of penaeid shrimp for the large-scale production of HPV. This crab was found to be highly susceptible to (HPV) by intramuscular injection. PCR and Western blot analyses confirmed the systemic HPV infection in freshwater crab.

The RT-PCR analysis revealed the expression of viral capsid gene in different organs of infected crab. Indirect ELISA was used to confirm the viral protein in different organs of crab using the antiserum against whole virus in mice. It was found that there was a high concentration of viral protein in hepatopancreas gill and heart tissue. The amount of viral protein was found to be higher in the crab infected with HPV for 10 days when compared to 5 days.

The  $C_T$  value of HPV in different organs of infected crab was quantified by real-time PCR, and the results revealed a steady decrease in  $C_T$  value in different organs of infected crab during the course of infection. The results revealed that this crab can be used as an alternate host for HPV replication and production.

## **Title and summary of the Ph.D. Work**

Thesis Title: “**Antiviral, Antibacterial and Immunomodulatory Activities of Bioactive Compounds derived from Actinomycetes for Aquatic Animal Health Management**”

Supervisor: **Dr. A. Sait Sahul Hameed, Ph.D.**,  
OIE Expert & FNAAS,  
Tata Innovation Fellow (DBT),  
OIE Reference Laboratory for WTD,  
Aquatic Animal Health Laboratory (AAHL),  
PG and Research Department of Zoology,  
C. Abdul Hakeem College, Melvisharam,  
Tamil Nadu – 632 509. India.

### **Summary**

Isolation and characterization of actinomycetes from endophytic actinomycetes and different environments (freshwater sample, fish pond water sample, marine water sample and effluent water sample) and extraction of bioactive compounds.

Purification and identification of active compound in the screened crude bioactive compounds of endophytic and freshwater actinomycetes. Optimization of large-scale production of active compounds (crude or pure form) from endophytic and freshwater actinomycetes.

Preliminary screening of crude extract from endophytic and freshwater actinomycetes for antimicrobial activity against microbial pathogens of aquatic animals and immunostimulatory activity in fish and shrimp. Screening of bioactive compounds (crude form and purified form) for antiviral and antibacterial activity against viral and bacterial pathogens of aquatic animals.

To study the effect of immunostimulatory and immune gene expression (different immunological parameters and immune genes) in shrimp. Toxicity of screened bioactive compounds of actinomycetes by in vitro assay using cell lines and in vivo assay using aquatic animals.

To study the efficacy of crude and pure form of bioactive compounds from actinomycetes to protect the fish or shrimp from infection. To evaluate the antiviral potentiality of identified bioactive compound was studied against shrimp viral pathogens. The viral clearance study was made by strength (dosage) of the identified bioactive compound.

**Professional Experience:**

- ✓ Experience in handling of all the bacterial and viral pathogens of fish and shrimp in the Indian aquaculture systems.
- ✓ Isolation of Virus, bacteria, Actinomycetes sp. and their identifications.
- ✓ Trainee for advanced molecular biology and immunological techniques to post graduate students, M. Phil and Ph. D scholar from various institutions.

**Achievements:**

- ✓ 47 Actinomycetes isolates was successfully isolated from various ecosystem.
- ✓ Two Actinomycetes sp. (*Streptomyces sp.*) was successfully identified and submitted to Genebank.
- ✓ Two antiviral and antibacterial bioactive compounds were identified from endophytic actinomycete isolates.
- ✓ Waiting for the patent ship for identified compound with the help of DBT.
- ✓ Antiviral compounds extracted from Indian medicinal plants for shrimp viral pathogens (WSSV, IMNV, MBV, HPV and IHHNV).
- ✓ In progress of technology transfer to industrials of antiviral plant extracted compounds.
- ✓ Bio synthesis (Microorganisms) of nanoparticles for aquatic pathogens (viral and bacterial) in shrimp and fish.
- ✓ Green synthesis (Indian medicinal plants) of nanoparticles for aquatic pathogens (viral and bacterial) in shrimp and fish.

**Contributions:**

- ✓ Developed Multiplex PCR kit for the detection of shrimp DNA virus (WSSV, MBV, HPV and IHHNV) in a single reaction.
- ✓ Developed Multiplex RT-PCR kit for the detection of shrimp RNA virus (IMNV, YHV, TSV and GAV) in a single reaction.
- ✓ Developed Multiplex RT-PCR kit for the detection of prawn RNA virus (*MrNV* and XSV) in a single reaction.
- ✓ Developed molecular vaccines (Recombinant and DNA vaccines) for fish nodavirus.
- ✓ Developed biodegradable carrier molecule (CS/TPP nanoparticles) for vaccine delivery in fish and shrimp.
- ✓ Developed Positive control plasmid for major bacterial and viral pathogen of fish and shrimp.

**Publications list (Title of paper, authors, Journal details, pages, year etc.)**

**Total Publications: 11**  
**International: 11**  
**Impact Factor: 25.605**  
**h index: 04**  
**i 10 index: 02**  
**Total Citation: 77**

- 1. Rajkumar T, Taju G, Abdul Majeed S, Thamizhvanan S, Santhosh kumar S, Sivakumar S, Vimal S, and Sahul Hameed A.S. (2017). Ontogenetic changes in the expression of immune related genes in response to immunostimulants and resistance against white spot syndrome virus in *Litopenaeus vannamei*. **Developmental and Comparative Immunology**. DOI: 10.1016/j.dci.2017.06.001. (Impact Factor: 3.119).**
- 2. S. Thamizhvanan, S. Sivakumar, S. Santhosh kumar, D. Vinoth Kumar, S. Suryakodi, K. Balaji, T. Rajkumar, S. Vimal, S. Abdul Majeed, G. Taju, A. S. Sahul Hameed. 2018. Multiple infections caused by white spot syndrome virus (WSSV) and *Enterocytozoon hepatopenaei* (EHP) in pond reared *Penaeus vannamei* in India and multiplex PCR for their simultaneous detection. **Journal of Fish Diseases**. Doi: 10.1111/jfd.12956. (Impact Factor: 1.988).**
- 3. Sivakumar, S., Vimal, S., Abdul Majeed, S., Santhosh Kumar, S., Taju, G., Madan, N., Rajkumar, T., Thamizhvanan, S., Shamsudheen, K.V., Vinod Scaria, Sridhar Sivasubbu, Sahul Hameed, A.S. 2018. A new strain of White spot syndrome virus (WSSV) affecting *Litopenaeus vannamei* in Indian shrimp farms. **Journal of Fish Diseases**.41(7):1129-1146. doi: 10.1111/jfd.12811. (Impact Factor: 1.988)**
- 4. Manickavelu Manimaran, T. Rajkumar, S. Vimal, G. Taju, S. Abdul Majeed, A. S. Sahul Hameed and Krishnan Kannabiran.2018. Antiviral activity of 9 (10H)-Acridanone extracted from marine *Streptomyces fradiae* strain VITMK2 in *Litopenaeus vannamei* infected with white spot syndrome virus. doi.org/10.1016/**Journal of Aquaculture**.2018.01.032. (Impact Factor: 3.022).**
- 5. A. S. Sahul Hameed, S. Abdul Majeed, S. Vimal, T. Rajkumar, S. Santhosh kumar and S. Sivakumar. (2017). Studies on the occurrence of infectious myonecrosis virus (IMNV) in pond reared *Litopenaeus vannamei* (Boone, 1931) in India. **Journal of Fish Diseases**. (Impact Factor: 1.988).**

6. G. Taju, N. Madan, S. Abdul Majeed, **T. Raj Kumar**, S. Thamizhvanan, S. K. Otta and A. S. Sahul Hameed (2014). Immune responses of whiteleg shrimp, *Litopenaeus vannamei* (Boone, 1931), to bacterially expressed dsRNA specific to VP28 gene of white spot syndrome virus. **Journal of Fish Diseases**. doi:10.1111/jfd.12256. (**Impact Factor: 1.988**).
7. G. Taju N. Madan S. Abdul Majeed **T. Rajkumar** M. A. Farook S. Vimal A. Nazeer Basha and A. S. Sahul Hameed (2017). Distribution of recombinant VP28 protein in tissues and its immunomodulatory effect against white spot syndrome virus in whiteleg shrimp, *Litopenaeus vannamei* (Boone, 1931). **Aquaculture International**. DOI 10.1007/s10499-017-0155-9. (**Impact Factor:1.455**).
8. S. Vimal, N. Madan, M.A. Farook, K.S.N. Nambi, S. Abdul Majeed, **T. Rajkumar**, S. Venu, A.R. Thirunavukkarasu and A.S. Sahul Hameed (2014). Production of recombinant vaccine using capsid gene of nodavirus to protect Asian sea bass, *Lates calcarifier* (Bloch, 1790). **Journal of Aquaculture**. 418 – 419, 148 – 154. (**Impact Factor: 3.022**).
9. M.A. Farook, N. Sundar Raj, N. Madan, S. Vimal, S. Abdul Majeed, G. Taju, **T. Rajkumar**, S. Santhosh kumar, S. Sivakumar and A.S. Sahul Hameed (2014). Immunomodulatory effect of recombinant *Macrobrachium rosenbergii* nodavirus capsid protein (r-MCP) against white tail disease of giant freshwater prawn, *Macrobrachium rosenbergii* (de Man, 1879). **Journal of Aquaculture** 433 (2014) 395–403. (**Impact Factor: 3.022**).
10. Venkatesan, C., Sahul AS Hameed, N. Sundarraaj, **T. Rajkumar**, and G. Balasubramanian. "Analysis of Immune Genes and Heat Shock Protein Genes under Exposure to White Spot Syndrome Virus (WSSV) and Herbal Immune Stimulant in *Litopenaeus vannamei*." **Journal of Bacteriology & Parasitology** 5, no. 5 (2014): 1. (**Impact Factor: 2.025**).
11. N. Madan, **T. Rajkumar**, N. Sundar Raj, M. A. Farook, K. S. N. Nambi, S. Abdul Majeed and A. S. Sahul Hameed (2013). Tissue distribution of hepatopancreaticparvo-like virus of shrimp in freshwater rice-field crab, *Paratelphusa hydrodomous* (Herbst). **Journal of Fish Diseases**. doi:10.1111/jfd.12183. (**Impact Factor: 1.988**).

## Sequence(S) Deposited at Genbank, NCBI

GenBank Accession No.	Protein Database Accession No.	Authors	Name of the Gene	Year of Submission
KR095192.1		<b>Rajkumar, T</b> and Sahul Hameed, A.S.	<i>Streptomyces sp.</i> CAHASS1 16S ribosomal RNA gene, partial sequence	2015
KT006906.1		<b>Rajkumar, T</b> and Sahul Hameed, A.S.	<i>Streptomyces sp.</i> CAHSH2 16S ribosomal RNA gene, partial sequence	2016
KF146304	AGV28568.1	Vimal, S., Madan, N., Farook, M.A., Nambi, K.S.N., Abdul Majeed, S., <b>Rajkumar, T.</b> , Venu, S., Thirunavukkarasu, A.R. and Sahul Hameed, A.S.	Asian seabass Nervous Necrosis Virus clone rBCP coat protein mRNA, complete cds.	2014
KU198278.1		Sahul A.S., Vimal S., Abdul M., <b>Rajkumar. T.</b> , Sivakumar, and Santhosh kumar, S	Uncultured Enterocytozoonidae isolate EHPAAHL01 small subunit ribosomal RNA gene, partial sequence.	2016

## Research Experience

Seven years Research experience in Molecular Biology, Immunology, Microbiology, Cell culture, Computational Biology, Environmental Science, Toxicology and Nano biotechnology techniques.

## Technical Experience

- ✓ Virus Propagation and Purification of virus using our established cell lines and infected animals.
- ✓ Isolation and identification of bacteria from living and non-living environments.
- ✓ Plasmid DNA, Genomic DNA and mRNA extraction; Restriction analysis of plasmid and genomic DNA.
- ✓ ELISA and Blot analysis (Western and dot blot).
- ✓ Primer Designing, PCR, Reverse Transcription PCR, Real time PCR.



- ✓ Construction of libraries in plasmid vectors, DNA based screening; Use of non-radioactive probes for screening; PCR Cloning, sub cloning and expression in different *E. coli* hosts; Site-directed mutagenesis N-terminal sequencing.
- ✓ Biochemical analysis of enzymes, nucleic acids, proteins and lipids.
- ✓ Agarose and polyacrylamide gel electrophoresis.
- ✓ SDS-PAGE, Raising polyclonal antibodies; Western, Dot blotting; ELISA, Biological assays and analytical techniques, Latex agglutination.
- ✓ Immunohistochemistry.
- ✓ Handling of experimental animals.
- ✓ Histology and microscopy.
- ✓ Computer applications in research.
- ✓ Synthesis of bio mediated nanoparticles.
- ✓ Fourier transforms infrared spectra (FTIR), Scanning electron microscope (SEM) and Transmission electron microscope (TEM).
- ✓ Preparation of PCR kit (Dr. Sahul PCR kit) for commercial through Poseidon Biotech private limited Chennai, Tamil Nadu.

### **Best Award**

- ✓ Third Prize for Paper presentation “**Biologically synthesized silver nanoparticle from *Streptomyces Sp. (CAHSH2)* for aquatic bacterial pathogens**” at One day State level Seminar on “**Challenges in aquaculture and marine biotechnology**”. C. Abdul Hakeem College, Melvisharam, Vellore, Tamil Nadu.
- ✓ Silver Medal for proficiency in University Exam April 2009.
- ✓ Overall performance award (Silver Medal) for proficiency Student general secretary in C. Abdul Hakeem College, Melvisharam, Vellore, Tamil Nadu. 2010-2011.
- ✓ Member of the ROTARACT Club during the year 2007-2008.
- ✓ Second prize winner in evacuation competition conducted by Lions Club of Vellore on 29 & 30<sup>th</sup> Oct. 2007.
- ✓ Award for the “Sirantha Sol Vithakar” from Jeyam society for younger cultural fest on 16<sup>th</sup> feb 2008 for Tamil speech.
- ✓ Award for the “Valar Inam Mani” from Salem younger cultural fest on 2009 for Tamil Speech.

- ✓ Honoured as “Student General Secretary in Umarupulavar mutthazil mandram” in C. Abdul Hakeem college, Melvisharam on 2007 – 2008.
- ✓ Elected as a “Student General Secretary” in C. Abdul Hakeem college Hostel, Melvisharam on 2009 – 2011.
- ✓ First prize in the State level Essay writing in Tamil for “Umarupulavar mutthazil mandram” in C. Abdul Hakeem college, Melvisharam on 5<sup>th</sup> march 2008.

### **Conference / Symposium Proceedings**

- ✓ Presented a paper oral “**Biologically synthesized silver nanoparticle from *Streptomyces Sp. (CAHSH2)* and their viral efficacy**” at National level Seminar “Current scenario and future perspectives of molecular biology in environment and medicine”. Islamiah College, Vaniyambadi, Tamil nadu.
- ✓ Poster presented S. Sivakumar, S. Abdul Majeed, S. Vimal, N. Madan, **T. Rajkumar**, S. Santhosh Kumar And A.S. Sahul Hameed. “**First Report on the Occurrence of Infectious Myonecrosis Virus (IMNV) in Pond Reared *Litopenaeus vannamei* in India**” at “International Symposium on Aquatic Animal Health and Epidemiology for Sustainable Asian aquaculture”. NBFGR, Lucknow, India, 20-21 April, 2017.
- ✓ Poster presented Kumar, S.S. Majeed, S.A., Madan, N., Taju, G., D. Kumar, V., **Rajkumar, T.**, Thamizhvanan, S. and Sahul Hammed, A. S. “**Occurrence of Multiple Infection Caused by White Spot Syndrom Virus (WSSV) and Enterocytozoon Hepatopennei (EHP) in Pond Reared *Litopenaeus vannamei*, and Standardization of A Multiplex PCR Protocol for their Simultaneous Detection**” at “International Symposium on Aquatic Animal Health and Epidemiology for Sustainable Asian aquaculture”. NBFGR, Lucknow, India, 20-21 April, 2017.

### **Workshop / Hands-on Training Involvement**

- ✓ DBT - Sponsored **National Workshop on Hands-on Training on Fish Cell Culture Techniques: Development and Applications** conducted as **Involvement** held at Aquatic Animal Health Laboratory, OIE Reference Laboratory, PG & Research Department of Zoology, C. Abdul Hakeem College [Autonomous] during 12<sup>th</sup> November to 17<sup>th</sup> November, 2018.

- ✓ DBT - Sponsored **National Workshop on Hands-on Training on Fish Cell Culture Techniques: Development and Applications** conducted as **Involvement** held at Aquatic Animal Health Laboratory, OIE Reference Laboratory, PG & Research Department of Zoology, C. Abdul Hakeem College [Autonomous] during 11<sup>th</sup> September to 16<sup>th</sup> September, 2017.
- ✓ DBT - Sponsored **National Workshop on Hands-on Training on Molecular Diagnostic Techniques** conducted as **Coordinator** held at Aquatic Animal Health Laboratory, OIE Reference Laboratory, PG & Research Department of Zoology, C. Abdul Hakeem College [Autonomous] during 12<sup>th</sup> February to 17<sup>th</sup> February, 2018.
- ✓ Two-Month Industrial Fermentation Technology Training Programme for “Bioprocess technology on Production and Manufacturing of Bioactive Nutraceuticals, Enzyme, Antibiotics antiviral and antibacterial compounds from microbes at Pilot Level” from 08<sup>th</sup> May, 2013 to 07<sup>th</sup> July, 2013 at Poseidon Biotech, Chennai, Tamil Nadu.
- ✓ One-Month Summer Training Programme for “Principles of designing, inoculum development, culture preservation in Fermentation Technology” from 10<sup>th</sup> May, 2011 to 09<sup>th</sup> June, 2011 at Poseidon Biotech, Chennai, Tamil Nadu.

#### **Conference / Symposium Attended**

- ✓ Participated in Dr. H. S. Rao Memorial Intercollegiate Oratorical contest entitled “**Bio fuel- A Source of renewable energy**”. Zoology Association, Voorhees College, Vellore, Tamil Nadu.
- ✓ Participated in International Seminar on “**Science of learning and teaching**”, C. Abdul Hakeem College, Melvisharam, Vellore, Tamil Nadu.
- ✓ Participated in “**5<sup>th</sup> National level seminar**” on “**Emerging Multiple Drug Resistant (MDR) and Extensively Drug Resistant (DR) Microbes**”, D.K.M. College for Women, Vellore, Tamil Nadu.
- ✓ Participated in State level Symposium “**Biotechnological Perspectives of Ornamental Fish Culture**”, Islamiah College, Vaniyambadi, Tamil Nadu.
- ✓ Participated in State level seminar on “**Recent trends in Chemistry**” in commemoration of International Year of Chemistry - IYC 2011”, in C. Abdul Hakeem College, Vellore, Tamil Nadu.

- ✓ Participated in UGC sponsored National seminar on “**Recent trends in Chemistry (RRTC-14)**” in C. Abdul Hakeem College, Vellore, Tamil Nadu.
- ✓ Participated in UGC sponsored One day seminar on “**Recent trends in Research**” in C. Abdul Hakeem College, Vellore, Tamil Nadu.
- ✓ Participated National conference on “**Bio-Sciences for 21<sup>st</sup> Century**” (NCBSC), Auxilium College, Vellore, Tamil Nadu.
- ✓ Participated in one day state level seminar on “**Challenges in green and environmental Chemistry (CGEC- 2017)**”, Thiruvalluvar University, Vellore.

### **Computer Skills**

- ✓ Gel image quantification analysis, DNA sequence analysis using Gen Bank Sequence analysis - BLAST and other Internet tools.
- ✓ PDB and protein structure prediction (Rasmol).
- ✓ Docking analysis (Auto dock) using ClustalW
- ✓ Operating Systems: Windows (all versions).
- ✓ MS-Office and all desktop applications.
- ✓ Statistics software (SPSS).

### **Languages Known**

- ✓ English, Tamil (To Read, Speak & Write)
- ✓ Diploma in Urdu from NCPUL, New Delhi centre at C. Abdul Hakeem College, Melvisharam.

### **Personal Details**

Date of Birth: 11.03.1988  
Sex (M/F): Male  
Nationality: Indian  
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## References

- 1. Dr. A. S. Sahul Hameed, Ph.D.,** OIE Expert & FNAAS,  
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- 2. Dr. S. Thiyagarajan, M.Sc., Ph.D.,**  
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- 3. Dr. S. Madan, M.Sc., Ph.D.,**  
Scientist - C,  
Department of Microbiology  
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## Declaration

I hereby declare that all the information furnished above is true to the best of my knowledge and belief.

Signature



(T. RAJKUMAR)