

Name: **Prof. Pravindra Kumar**  
Designation: **Professor and Head of Department**

Department/Institute/University:

**Department of Biosciences and Bioengineering,  
Indian Institute of Technology Roorkee**

Date of Birth: **01/03/1973**

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Area of Specialization: **Structural biology**



### **Education:**

Sl No.	Institution / Place	Degree Awarded	Year	Field of Study
1.	A.I.I.M.S. Delhi	Ph.D.	1996-2001	Biophysics
2.	Purdue University, U.S.A.	Post-Doc. Research Work	2001-2005	Structural Biology

### **Position and Employment:**

Sl No.	Institution Place	Position	From (Date)	To (date)
1	IIT Roorkee	Head of Department	February, 2020	Till date
2	IIT Roorkee	Professor	January, 2019	Till date
3	IIT Roorkee	Associate Professor	October, 2012	January 2019
4	IIT Roorkee	Assistant Professor	November, 2005	October 2012

### **Honors/Awards**

#### **International**

1. ASM-IUSSTF INDO-US Visiting Professorship in 2017.
2. IUSSTF Award for organizing Indo-US conference and Symposium in 2014.

#### **National**

1. Fellow, Biotech Research Society, India (BRSI) in 2021.
2. National Bioscience Award by Department of Biotechnology (DBT), Ministry of Science & Technology, Govt. of India in 2016.
3. BOYSCAST award from Department of Science and Technology, India and Visiting Scientist

to USA in 2008.

4. Visiting Scientist at Purdue University, USA from May - July 2006.
5. S.V. TALEKAR MEDAL for Best Post Graduate Degree in AIIMS, DELHI in 2001.

### **Professional Endeavour:**

Dr. Pravindra Kumar is currently Professor and Head at the Department of Biosciences and Bioengineering, IIT Roorkee. He completed his Ph.D. in Biophysics from A.I.I.M.S. Delhi in 2001 and carried out his postdoctoral research at Purdue University, USA (2001-2005). His research focuses on understanding structure-function and mechanisms of enzymes by using X-ray crystallography technique. He uses the mechanistic studies of proteins to exploit their functional capabilities either for the biodegradation or Structure based drug development. His most significant contributions are in the development of novel biocatalysts in a sustainable way for bioremediation and the development of novel therapeutics. He has 8 patents, about 118 peer-reviewed research papers, authored 5 book chapters and edited two books.

As of now, Prof. Kumar has guided 21 fellows for their doctoral research, and also served on the research advisory committee of more than 50 research scholar. He has represented India in the scientific community of The United States of America, Canada, and France. He was elected as fellow of the Biotech Research Society, India in 2021. He is the recipient of the ASM-IUSSTF INDO-US Visiting Professorship award by Purdue University, USA in 2017; National Bioscience Award in 2016 by DBT, Ministry of Science & Technology, Govt. of India; BOYSCAST award by Department of Science and Technology, India and Visiting Scientist to USA in 2008; and S.V. Talekar Gold medal for the best postgraduate degree from A.I.I.M.S. Delhi in 2001.

Prof. Kumar has extensive expertise in X-ray crystallography and research in oxidoreductases over the past 20 years. After joining IIT Roorkee, he started working on biphenyl dioxygenases (BPDO) targeted towards degradation of polychlorinated biphenyls (PCBs) and continued his scientific pursuits on Rieske-oxygenases and worked on PCB, plastic and plasticizer degrading enzymes from different bacteria such as *Pandoraea pnomenusa* B-356, *Burkholderia xenovorans* LB400, *Comamonas testosteroni* KF1 and *Rhodococcus jostii* RHA1. His research insights into structural aspects of these enzymes led to significant enhancement in substrate specificity and range of pollutant degradative capabilities. Apart from structural characterization and activity enhancement of biphenyl dioxygenases and dehydrogenases, he has also worked extensively on pathways involved in plasticizer degradation which include di-(2-ethylhexyl) phthalate hydrolase and mono-(2-ethylhexyl) phthalate hydrolase, phthalate and terephthalate dioxygenases (*JBC*, *JB*), dehydrogenases (*ABB*), decarboxylases, and transporter proteins.

He is also working on drug targets and antimicrobials. He has targeted various enzymes of shikimate pathway and discovered role of chlorogenic acid as effective antimicrobial compound (*JB*, *ABB*). He has worked on plant-based proteins and discovered the role of Tamarind kunitz inhibitor in antithrombotic therapy (*FEBS*) and established the role of *Murraya koenigii* miraculin like protein as trypsin inhibitor (*ABB*).

Prof. Kumar has published extensively in reputed journals, emphasizing the relevance of structural studies in the targeted improvement of enzyme efficiency, substrate specificity, and environmental

tolerance. He has collaborative ventures with renowned scientists in USA and Canada working in the field of bioremediation and is constantly eager to embark upon challenging research in the area.

### **Publications:**

Books: **2**      Research Papers, Reports: **127**      General articles: **6**      Patents: **8**

1. Mahto, J. K., Neetu, N., Sharma, M., Dubey, M., Vellanki, B. P., & **Kumar, P.** (2022). Structural Insights into Dihydroxylation of Terephthalate, a Product of Polyethylene Terephthalate Degradation. *Journal of bacteriology*, 204(3), e0054321.
2. Mahto, J.K., Sharma, M., Neetu, N., Kayastha, A., Aggarwal, S., & **Kumar, P.** (2022). Conformational flexibility enables catalysis of phthalate cis-4,5-dihydrodiol dehydrogenase. *Archives of biochemistry and biophysics*, 727, 109314. Advance online publication.
3. Rani, R., Long, S., Pareek, A., Dhaka, P., Singh, A., **Kumar, P.**, McInerney, G., & Tomar, S. (2022). Multi-target direct-acting SARS-CoV-2 antivirals against the nucleotide-binding pockets of virus-specific proteins. *Virology*, 577, 1–15.
4. Dalal, V., Golemi-Kotra, D., & **Kumar, P.** (2022). Quantum Mechanics/Molecular Mechanics Studies on the Catalytic Mechanism of a Novel Esterase (FmtA) of *Staphylococcus aureus*. *Journal of chemical information and modeling*, 62(10), 2409–2420.
5. Katiki, M., Sharma, M., Neetu, N., Rentala, M., & **Kumar, P.** (2022). Biophysical and modeling-based approach for the identification of inhibitors against DOHH from *Leishmania donovani*. *Briefings in functional genomics*, elac014. Advance online publication.
6. Singh, V., Dhankhar, P., Dalal, V., Tomar, S., Golemi-Kotra, D., & **Kumar, P.** (2022). Drug-repurposing approach to combat *Staphylococcus aureus*: Biomolecular and binding interaction study. *ACS omega*, 7(43), 38448–38458.
7. Dhankhar, P., Dalal, V., Sharma, A. K., & **Kumar, P.** (2022). Structural insights at acidic pH of Dye-decolorizing peroxidase from *Bacillus subtilis*. *Proteins*, 10.1002/prot.26444. Advance online publication.
8. Dhankhar, P., Dalal, V., Singh, V., Tomar, S., & **Kumar, P.** (2022). Computational guided identification of novel potent inhibitors of N-terminal domain of nucleocapsid protein of severe acute respiratory syndrome coronavirus 2. *Journal of biomolecular structure & dynamics*, 40(9), 4084–4099.
9. Singh, V., Dhankhar, P., Dalal, V., Tomar, S., & **Kumar, P.** (2022). In-silico functional and structural annotation of hypothetical protein from *Klebsiella pneumoniae*: A potential drug target. *Journal of molecular graphics & modelling*, 116, 108262.
10. Kumar, R., Das, J., Mahto, J. K., Sharma, M., Vivek, S., **Kumar, P.**, & Sharma, A. K. (2022). Crystal structure and molecular characterization of NADP<sup>+</sup>-farnesol dehydrogenase from cotton bollworm, *Helicoverpa armigera*. *Insect biochemistry and molecular biology*, 147, 103812.
11. Pareek, A., Kumar, R., Mudgal, R., Neetu, N., Sharma, M., **Kumar, P.**, & Tomar, S. (2022). Alphavirus antivirals targeting RNA-dependent RNA polymerase domain of nsP4 divulged using surface plasmon resonance. *The FEBS journal*, 289(16), 4901- 4924.
12. Katiki, M., Neetu, N., Pratap, S., & **Kumar, P.** (2022). Biochemical and structural basis for *Moraxella catarrhalis* enoyl-acyl carrier protein reductase (FabI) inhibition by triclosan and estradiol. *Biochimie*, 198, 8–22.
13. Chakravarty, N., Sharma, M., **Kumar, P.**, & Singh, R. P. (2022). Biochemical and molecular insights on the bioactivity and binding interactions of *Bacillus australimaris* NJB19 L-asparaginase. *International journal of biological macromolecules*, 215, 1–11.

14. Kumari, N., Dalal, V., **Kumar, P.**, & Rath, S. N. (2022). Antagonistic interaction between TTA-A2 and paclitaxel for anti-cancer effects by complex formation with T-type calcium channel. *Journal of biomolecular structure & dynamics*, 40(6), 2395–2406.
15. Gupta, D. N., Dalal, V., Savita, B. K., Alam, M. S., Singh, A., Gubyad, M., Ghosh, D. K., **Kumar, P.**, & Sharma, A. K. (2022). Biochemical characterization and structure-based in silico screening of potent inhibitor molecules against the 1 cys peroxiredoxin of bacterioferritin comigratory protein family from *Candidatus Liberibacter asiaticus*. *Journal of biomolecular structure & dynamics*, 1–13. Advance online publication.
16. Alam, M. S., Sharma, M., Kumar, R., Das, J., Rode, S., **Kumar, P.**, Prasad, R., & Sharma, A. K. (2022). In silico identification of potential phytochemical inhibitors targeting farnesyl diphosphate synthase of cotton bollworm (*Helicoverpa armigera*). *Journal of biomolecular structure & dynamics*, 1–10. Advance online publication.
17. Dhankhar, P., Dalal, V., Singh, V., Sharma, A. K., & **Kumar, P.** (2021). Structure of dye-decolorizing peroxidase from *Bacillus subtilis* in complex with veratryl alcohol. *International journal of biological macromolecules*, 193(Pt A), 601–608.
18. Mahajan, S., Choudhary, S., **Kumar, P.**, & Tomar, S. (2021). Antiviral strategies targeting host factors and mechanisms obliging +ssRNA viral pathogens. *Bioorganic & medicinal chemistry*, 46, 116356.
19. Savita, B. K., Dalal, V., Choudhary, S., Gupta, D. N., Das, N., Tomar, S., **Kumar, P.**, Roy, P., & Sharma, A. K. (2021). Characterization of recombinant pumpkin 2S albumin and mutation studies to unravel potential DNA/RNA binding site. *Biochemical and biophysical research communications*, 580, 28–34.
20. Mahto, J.K., Neetu, N., Waghmode, B., Kuatsjah, E., Sharma, M., Sircar, D., Sharma, A.K., Tomar, S., Eltis, L.D. and **Kumar, P.**, (2021). Molecular insights into substrate recognition and catalysis by phthalate dioxygenase from *Comamonas testosteroni*. *Journal of biological chemistry*, p.101416.
21. Neetu, N., Katiki, M., Mahto, J. K., Sharma, M., Narayanan, A., Maity, S., Tomar, S., Ambatipudi, K., Sharma, A. K., Yernool, D., & Kumar, P. (2021). Deciphering the enigma of missing DNA binding domain of LacI family transcription factors. *Archives of biochemistry and biophysics*, 713, 109060.
22. Sharma, M., Mahto, J. K., Dhaka, P., Neetu, N., Tomar, S., & **Kumar, P.** (2021). MD simulation and MM/PBSA identifies phytochemicals as bifunctional inhibitors of SARS- CoV-2. *Journal of biomolecular structure & dynamics*, 1–14. Advance online publication.
23. Dubey A, Choudhary S, **Kumar P**, Tomar S. (2021). Emerging SARS-CoV-2 Variants: Genetic Variability and Clinical Implications. *Current Microbiology*. 14;79(1):20.
24. Choudhary, S., Neetu, N., Singh, V.A., **Kumar, P.**, Chaudhary, M. and Tomar, S., (2021). Chikungunya virus titration, detection and diagnosis using N-Acetylglucosamine (GlcNAc) specific lectin-based virus capture assay. *Virus Research*, p.198493.
25. Kumar, K.A., Sharma, M., Dalal, V., Singh, V., Tomar, S. and **Kumar, P.**, (2021). Multifunctional Inhibitors of SARS CoV2 by MM/PBSA, Essential dynamics, and Molecular dynamic investigations. *Journal of molecular graphics and modelling*, p.107969.
26. Sharma, M., Mahto, J.K., Dhaka, P., Neetu, N., Tomar, S. and **Kumar, P.**, (2021). MD simulation and MM/PBSA identifies phytochemicals as bifunctional inhibitors of SARS- CoV-2. *Journal of biomolecular structure and dynamics*, pp.1-14.
27. Dalal, V., Dhankhar, P., Singh, V., Rakhaminov, G., Golemi-Kotra, D. and **Kumar, P.**, (2021). Structure-based identification of potential drugs against FmtA of *Staphylococcus aureus*: Virtual screening, molecular dynamics, MM-GBSA, and QM/MM. *The protein journal*, 40(2), pp.148-165.
28. Gupta, D.N., Dalal, V., Savita, B.K., Dhankhar, P., Ghosh, D.K., **Kumar, P.** and Sharma, A.K., (2021). In-silico screening and identification of potential inhibitors against 2Cys peroxiredoxin of *Candidatus*

*Liberibacter asiaticus*. *Journal of biomolecular structure and dynamics*, pp.1-15.

29. Saini, G., Dalal, V., Gupta, D.N., Sharma, N., **Kumar, P.** and Sharma, A.K., (2021). A molecular docking and dynamic approach to screen inhibitors against ZnuA1 of *Candidatus liberibacter asiaticus*. *Molecular simulation*, pp.1-16.
30. Dhankhar, P., Dalal, V., Singh, V., Tomar, S. and **Kumar, P.**, (2020). Computational guided identification of novel potent inhibitors of N-terminal domain of nucleocapsid protein of severe acute respiratory syndrome coronavirus 2. *Journal of biomolecular structure and dynamics*, pp.1-16.
31. Dhankhar, P., Dalal, V., Mahto, J.K., Gurjar, B.R., Tomar, S., Sharma, A.K. and Kumar, P., (2020). Characterization of dye-decolorizing peroxidase from *Bacillus subtilis*. *Archives of biochemistry and biophysics*, 693, p.108590.
32. Neetu, N., Sharma, M., Mahto, J.K. and **Kumar, P.**, (2020). Biophysical and In-Silico Studies of Phytochemicals Targeting Chorismate Synthase from Drug-Resistant *Moraxella Catarrhalis*. *The Protein Journal*, 39(5), pp.449-460.
33. Dhankhar, P., Dalal, V., Kotra, D.G. and **Kumar, P.**, (2020). In-silico approach to identify novel potent inhibitors against GraR of *S. aureus*. *Frontiers in bioscience (Landmark edition)*, 25, pp.1337-1360.
34. Kumar, P., Dalal, V., Sharma, N., Kokane, S., Ghosh, D.K., **Kumar, P.** and Sharma, A.K., (2020). Characterization of the heavy metal binding properties of periplasmic metal uptake protein CLas-ZnuA2. *Metallomics*, 12(2), pp.280-289.
35. Kesari, P., Pratap, S., Dhankhar, P., Dalal, V., Mishra, M., Singh, P.K., Chauhan, H. and **Kumar, P.**, (2020). Structural characterization and in-silico analysis of *Momordica charantia* 7S globulin for stability and ACE inhibition. *Scientific reports*, 10(1), pp.1-13.
36. Kumar, P., Dalal, V., Kokane, A., Singh, S., Lonare, S., Kaur, H., Ghosh, D.K., Kumar, P. and Sharma, A.K., (2020). Mutation studies and structure-based identification of potential inhibitor molecules against periplasmic amino acid binding protein of *Candidatus Liberibacter asiaticus* (CLasTcyA). *International journal of biological macromolecules*, 147, pp.1228-1238.
37. Neetu, N., Katiki, M., Dev, A., Gaur, S., Tomar, S. and **Kumar, P.**, (2020). Structural and biochemical analyses reveal that chlorogenic acid inhibits the shikimate pathway. *Journal of Bacteriology*, 202(18), pp. e00248-20.
38. Singh, N., Dalal, V. and **Kumar, P.**, (2020). Molecular docking and simulation analysis forelucidation of toxic effects of dicyclohexyl phthalate (DCHP) in glucocorticoid receptor- mediated adipogenesis. *Molecular simulation*, 46(1), pp.9-21.
39. Kumari, N., Dalal, V., **Kumar, P.** and Rath, S.N., (2020). Antagonistic interaction between TTA-A2 and paclitaxel for anti-cancer effects by complex formation with T-type calcium channel. *Journal of Biomolecular Structure and Dynamics*, pp.1-12.
40. Kumar, P., Dalal, V., Kokane, A., Singh, S., Lonare, S., Kaur, H., Ghosh, D.K., **Kumar, P.** and Sharma, A.K., (2020). Mutation studies and structure-based identification of potential inhibitor molecules against periplasmic amino acid binding protein of *Candidatus Liberibacter asiaticus* (CLasTcyA). *International journal of biological macromolecules*, 147, pp.1228-1238.
41. Dalal, V., Kumar, P., Rakhaminov, G., Qamar, A., Fan, X., Hunter, H., Tomar, S., Golemi-Kotra, D. and **Kumar, P.**, (2019). Repurposing an ancient protein core structure: Structural studies on FmtA, a novel esterase of *Staphylococcus aureus*. *Journal of molecular biology*, 431(17), pp.3107-3123.
42. Kaur, R., Mudgal, R., Jose, J., **Kumar, P.** and Tomar, S., (2019). Glycan-dependent chikungunya viral infection divulged by antiviral activity of NAG specific chi-like lectin. *Virology*, 526, pp.91-98.
43. Saini, G., Dalal, V., Savita, B.K., Sharma, N., **Kumar, P.** and Sharma, A.K., (2019). Molecular docking

and dynamic approach to virtual screen inhibitors against Esbp of *Candidatus Liberibacter asiaticus*. *Journal of Molecular Graphics and Modelling*, 92, pp.329-340.

44. Singh, N., Dalal, V., Kumar, V., Sharma, M. and **Kumar, P.**, (2019). Characterization of phthalate reductase from *Ralstonia eutropha* CH34 and in silico study of phthalate dioxygenase and phthalate reductase interaction. *Journal of Molecular Graphics and Modelling*, 90, pp.161-170.
45. Kumar, P., Kesari, P., Kokane, S., Ghosh, D.K., Kumar, P. and Sharma, A.K., (2019). Crystal structures of a putative periplasmic cystine-binding protein from *Candidatus Liberibacter asiaticus*: insights into an adapted mechanism of ligand binding. *The FEBS journal*, 286(17), pp.3450-3472.
46. Kaur, R., Mudgal, R., Jose, J., **Kumar, P.** and Tomar, S., (2018). Glycan-dependent chikungunya viral infection divulged by antiviral activity of NAG specific chi-like lectin. *Virology*, 526, pp.91-98.
47. Kumar, V., Sharma, A., Pratap, S. and **Kumar, P.**, (2018). Biochemical and biophysical characterization of 1, 4-naphthoquinone as a dual inhibitor of two key enzymes of type II fatty acid biosynthesis from *Moraxella catarrhalis*. *Biochimica et Biophysica Acta (BBA)- Proteins and Proteomics*, 1866(11), pp.1131-1142.
48. Narwal, M., Singh, H., Pratap, S., Malik, A., Kuhn, R.J., **Kumar, P.** and Tomar, S., (2018). Crystal structure of chikungunya virus nsP2 cysteine protease reveals a putative flexible loop blocking its active site. *International journal of biological macromolecules*, 116, pp.451-462.
49. Sharma, A., Kumar, V., Pratap, S. and **Kumar, P.**, (2018). The inhibitory and binding studies of methyl-sulfone hydroxamate based inhibitors against LpxC from drug resistant *Moraxella catarrhalis* using biophysical, biochemical and in silico approaches. *International journal of biological macromolecules*, 118, pp.1747-1762.
50. Kumar, V., Sharma, A., Pratap, S. and **Kumar, P.**, (2018). Biophysical and in silico interaction studies of aporphine alkaloids with Malonyl-CoA: ACP transacylase (FabD) from drug resistant *Moraxella catarrhalis*. *Biochimie*, 149, pp.18-33.
51. Saini, G., Sharma, N., Dalal, V., Warghane, A., Ghosh, D.K., **Kumar, P.** and Sharma, A.K., (2018). The analysis of subtle internal communications through mutation studies in periplasmic metal uptake protein CLas-ZnuA2. *Journal of structural biology*, 204(2), pp.228-239.
52. Kumar, V., Sharma, A., Pratap, S. and **Kumar, P.**, (2018). Characterization of isoflavonoids as inhibitors of  $\beta$ -hydroxyacyl-acyl carrier protein dehydratase (FabZ) from *Moraxella catarrhalis*: Kinetics, spectroscopic, thermodynamics and in silico studies. *Biochimica et Biophysica Acta (BBA)-General Subjects*, 1862(3), pp.726-744.
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*macromolecules*, 106, pp.1089-1106.

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### **Patents granted/filed (As Inventor)**

1. Tomar S., **Kumar, P.**, Sircar, D., Kumar, R., Singh, V.A. A prophylactic and therapeutic antiviral composition and method thereof. Provisional Indian Patent, Application no. 202011023131 (2nd June 2020)
2. Tomar S., **Kumar P.** Neetu, Singh VA. and Choudhary S. Chikungunya virus titration and detection kit. Indian patent application no. 201911035044 (30th August 2019)
3. Tomar S., **Kumar P.**, Singh H., Mudgal R. Chikungunya virus protease inhibitors and uses thereof. Indian patent, Application no. 201811022065 (13th June 2018)
4. Tomar S., **Kumar P.**, Kaur R., Chaudhary N., Singh VA., an antiviral composition of tamarind chi-like lectin and uses thereof. Indian patent, Application no. 201811019298 (23<sup>rd</sup> May 2018)
5. Tomar S., **Kumar P.** and Kaur R.; “A highly sensitive nsp1 enzyme assay and kit for determining inhibitors of alphavirus/chikungunya virus.” PCT application no. PCT/IB2018/051760 (16th March 2018)
6. Tomar S., **Kumar P.** and Kaur R.; “A highly sensitive nsp1 enzyme assay and kit for determining inhibitors of alphavirus/chikungunya virus.” Indian patent application no.: 201711039736 (8th November 2017)
7. **Kumar P.**, Mahto J.K., Kumar K.A., Kayastha A.; “A phthalate binding protein-based system and method to extract phthalate from the contaminated water” Indian patent application no.: 202211044498 dated (3rd August 2022)
8. **Kumar P.**, Mahto J.K., Kumar K.A., Kayastha A.; “A phthalate binding protein (PhtE) from *Comamonas testosteroni* KF1” Indian patent application no.: 202211044919 dated (5th August 2022).

### **Research Support**

#### **Ongoing Research Projects**

S. No.	Title	Funding Agency	Amount	Date of sanction and Duration
1	Structural analysis of Deoxyhypusine Hydroxylase (DOHH) and anti-parasitic drug design	ICMR	21 Lacs	2022, 3 years
2	Translational and Structural Bioinformatics	DBT	1.9 Crores	2021, 5 years
3	Enzyme engineering for bio-degradation of plasticizers in PPCPs	DST	44 Lacs	2020, 3 years

4	Discovery of structure- based antivirals against SARS-CoV2 targeting key viral genome replication enzymes	SERB	39 Lacs	2020, 5 years
5	Structural characterization of enzymes from shikimate pathway for designing rational inhibitors as antimicrobial molecules	SERB	21 Lacs	2019, 3 years
6	Structural Characterization of Transcription factor-Cra, influencing the virulence host cell	ICMR	33 Lacs	2019, 3 years
7	Structural studies of methicillin resistance factor	CSIR	18 lacs	2019, 3 years

<b>Completed Research Projects</b>				
<b>S.No</b>	<b>Title</b>	<b>Funding Agency</b>	<b>Duration</b>	<b>Amount (in lakh)</b>
1.	Structural Studies of Aromatic- ring-Hydroxylating Dioxygenases and their complexes with toxic Polyaromatic compounds	DST	2006-2008	11.16
2.	Structural characterization of the enzymes involved in the biodegradation of polychlorinated biphenyls and other Waste materials	MHRD-IITR	2006	1.0
3.	Structural studies of biphenyl dehydrogenase from <i>Comamonas testosteroni</i> strain B-356	CSIR	2008-2011	10.7
4.	Structural Characterization of DAHP Synthase for Designing Rational Inhibitors As Antibacterial Drug	MHRD-SCHEME- B	2008-2011	9.6
5.	Structural analysis of DAHP synthase from <i>Arabidopsis thaliana</i>	DST	2010-2013	29.95
6.	Microbial degradation of toxic aromatic compounds using structural biology approach	DRDO	2012-2015	41.27
7.	Structure-based development of anti-bacterial enzyme inhibitors against enzyme involved in lipo-ligosaccharide (LOS) biosynthesis Structure determination and in-silico drug design against <i>Moraxella catarrhalis</i> UDP-N- acetylglucosamine acyltransferase (LpxA)	ICMR	2012-2015	40.0
8.	Structural studies of chorismate synthase	CSIR	2013-2016	23.0
9.	Structural studies of 11s Globulin from <i>Wrightia Tinctoria</i> , a medical plant	DBT	2014-2017	26.0
10.	Structure based inhibitors anenzyme: UDP-n-acetylglucosamine-carboxyvinyl transferase (murA) from <i>Providencia Alcalifaciens</i>	DRDO	2016-2019	9.5
11.	Structural characterization of <i>Moraxella Catarrhalis</i> enoylacyl carrier protein reductase (FabI) and in-silico inhibitor	ICMR	2015-2018	40.0
12.	Biodegradation of phthalates	DBT	2017-2020	15.0
13.	Removal of pathogenic bacteria from contaminated water using bacteriophage	Vin PolyRecyclers Pvt Ltd	2018-21	8.5
14.	Structural characterization of dye- decolorizing peroxidase enzyme from <i>Bacillus subtilis</i> and <i>Pseudomonas putida</i> with an aim for bioremediation of industrial wastewater	DBT	2017-2020	40