

Curriculum Vitae



Name: ARPANA HEMRAJ JOBANPUTRA

Qualifications: M.Sc., Ph.D., Microbiology

Designation: Professor in Microbiology

Nationality: Indian

Address : Department of Microbiology,
P.S.G.V.P.M's, S.I.P. Arts, G.B.P. Science & S.T.K.V.S. Commerce
College, Shahada, 425409, District Nandurbar, Maharashtra, INDIA
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Details of Academic Qualifications:

Sr. No.	Qualification	Name of Board / University	Month and Year of Passing	Grade / Marks / Division
1	SSC	PUNE BOARD	March - 1982	FIRST WITH DISTINCTION
2	HSC	PUNE BOARD	March - 1984	FIRST CLASS
3	B.Sc.	UNIVERSITY OF PUNE	April - 1993	FIRST CLASS
4	M.Sc.[MICROBIOLOGY]	NORTH MAHARASHTRA UNIVERSITY, JALGAON	June - 1995	FIRST CLASS WITH DISTINCTION
5	Ph.D.[MICROBIOLOGY]	NORTH MAHARASHTRA UNIERISTY, JALGAON	September - 2004	BY THESIS

Present status

Working as Professor in Microbiology at PSGVPM Mandal's, ASC College, Shahada teaching UG since January 1999 and teaching PG since 2007.

Research ongoing &/completed for M.Phil. &Ph.D.:

Sr. No.	Name of candidate & University	Date of Registration	Topic	Status
M.Phil.				
1.	Mrs. ManjulaPatil	31-08-2009	“Studies on rhizo-remediation of pollutants using local isolates”	Completed 2010
Ph.D.				
1.	Mr. Swapnil Joshi KBC, NMU, Jalgaon	09.02.2015	“Studies on production and possible applications of microbial lipases”	Awarded May 2021
2.	Mrs. Manjula Patil	09-09-2011	“Biodegradation of methomylanoximecarbamates insecticide using local isolates”	Awarded March 2019
3.	Mrs. Varsha Chaudhari NMU, Jalgaon	01-04-2009	“Studies on Physiological & Biochemical characteristics of pigment producing soil & effluent isolates	Awarded April 2018
4.	Mr. Rajendra Vasait NMU, Jalgaon	01-04-2009	“Studies on Biotransformation of Cephalosporin C	Awarded April 2018
5.	Mrs. AshwiniPatil NMU, Jalgaon	01-04-2009	“ Studies on use of consortia of plant extracts on the pathogenic bacteria in dental lesions for preparation of a sustainable, cost-effective product”	Awarded March 2015
6.	Ms. Vidya Kothari NMU, Jalgaon	01-04-2009	“Studies on oil & petroleum biodegradation potential of natural isolates & their genetic characterization”	Awarded November 2014
7.	Mrs. Mariya Husain	09.02.2015	“Isolation and characterisation of keratinase enzyme from potent local isolate(s)”	Ongoing

Research Experience:

Sl. No	Title of Project	Funding Agency	Year	Duration	Amount Sanctioned (Rs.)
1.	“Scale up for biotransformation of rifamycin B to S using bacterial isolate”	UGC New Delhi	2009-2012	3 years	7,51347 lacs
2.	“Screening of Siderophoregenic isolates from local soil and their type determination”	UGC WRO	2004-2006	2 years	0.70 lacs
3.	“Studies on the Physiological and Biochemical characteristics of <i>Chryseobacterium indologenes</i> .”	UGC-WRO	2000-2002	2 years	0.35 lacs

Participation in Training Programmes

Sl.No.	Programme	Sponsorer	Duration	Grade
1.	Refresher Course in Environmental Education, Academic Staff College, Devi Ahilya University, Pune	UGC	18-01-2012 to 07-01-2012	A
2.	Refresher Course in Life Sceince, Academic Staff College, Devi Ahilya University, Pune	UGC	05-01-2011 to 25-01-2011	A
3.	Training on Sustainable Agriculture & Rural Development: Biovillage Model, M.S. Swaminathan Research Foundation, Chennai	DST	15-11-2010 To 19-11-2010	-
4.	TLC/HPTLC training programmed Anchrom Enterprises, Mumbai	CAMAG Switzerland	11-02-2004 to 13-02-2004	-
5.	NSS programme officer's orientation course, Ahmednagar College.	Govt. of India, Ministry of youth affairs	30-11-2004 to 09-12-2004	-
6.	Refresher Course in Life Science, North Maharashtra University, Jalgaon	UGC	11-11-2003 to 01-12-2003	A
7.	Training on Biotransformation of Rifamycins, NIPER, Chandigarh	--	01-08-2002 to 31-10-2002	-
8.	Orientation Course, Academic Staff College, Pune	UGC	01-01-2001 to 27-01-2001	O
9	Short term training, ASC, Aurangabad Nanoscience and Nanotechnology	-	29-08-2016 To 06-09-2016	-

Association with professional bodies

1. Life Member of Microbiologist Society of India (MBSI)
2. Life Member of Asian PGPR Society
3. Member for Women in Science for the Developing World (OWSDW)
4. Life member of Biotech Research Society of India (BRSI).
5. Life member of Association of Microbiologists of India (AMI).
6. Member of Biotech Consortium India Limited (BCIL).

Research Interests

1. **Biotransformation of Antibiotics**
2. **Bioremediation**
3. **Biopigments**
4. **PGPR**

Co-curricular & Extra-curricular activities

- Lady programme officer for **National Service Scheme (NSS)** during 2003-06.
- Member of '**Yuvati Sabha**' under women empowerment programme.
- Participation in corporate life by rendering **consultancy services** by performing anti-microbial tests of samples like plant extracts, papain etc.
- Conducted seminars, science poster and quiz competitions under the '**Science forum**' platform of the college and the department.
- Chairman for syllabus re-structuring, question paper setting, examining & moderating at UG &/or PG level.
- Referee for Ph.D. thesis evaluation at Bharatidasan University, Tamil Nadu.
- Recognized guide for Singhanian University, Rajasthan.
- Observer for SET examinations, Examiner for Avishkar etc
- Member of IQAC, Audit Committee, Discipline Committee, IPR, Consultancy Services and MoU Committee, College Development Committee.

Patent

A. H. Jobanputra and S. B. Chincholkar (2005) "A METHOD FOR BIOTRANSFORMATION OF RIFAMYCIN B TO S BY *CHRYSEOBACTERIUM INDOLOGENES*", Indian Patent No. 196508 (Sanctioned).

Publications (25)

1. Joshi Swapnil S and Jobanputra Arpana H (2020) Application of lipase extracted from *Pseudomonas aeruginosa* SJ2 as a detergent additive, Adv. Biores., 11 (1), 1-3 [Online ISSN 2277-1573]
2. Joshi Swapnil S and Jobanputra Arpana H. (2019) Isolation, Identification and Susceptibility Testing of Potential Lipase Producing Bacterial and Fungal Strains from soil, Res.J. Biotech. Vol. 14 (8), 89-96. [E-ISSN 2278-4535; PRINT-ISSN 0973-6263] IF 0.233
3. Joshi Swapnil S and Jobanputra Arpana H. (2019) Applications of Lipases, Res.J. Biotech, Vol 14 (11), 130-138 [E-ISSN 2278-4535; PRINT-ISSN 0973-6263] IF 0.233
4. Ashwini G. Patil, Arpana H. Jobanputra (2018) Fabrication of Quercetin Loaded Chitosan Nanoparticles and Their Superior In-Vitro Antibacterial Activity against Dental Pathogens 2 Vol. , Issue 4, 146-152 [E-ISSN 2250-0294, P-ISSN 2249-3581]
5. Manjula P. Patil, Arpana H. Jobanputra and Sumer Singh, (2016) Isolation, screening and polyphasic characterization of Methomyl degrading strain and assessment of its biodegradation potential by GC-MS, International Journal of Scientific & Engineering Research Volume 7 (5), 454-466 ISSN 2229-5518 [IF-3.8]
6. R. D. Vasait, A. H. Jobanputra (2016) Optimization of medium components for the production of Amylase enzyme *Bacillus* species, International Referred Multidisciplinary Journal of Contemporary Research, VIII, 83-86. ISSN-2319-5789 Online 2320-3145
7. Rajendrabhai D. V, Arpana H. J., (2015/5) Single step Bioconversion of Cephalosporin C by strain of *Achromobacter* species isolated from -rhizosphere soil. Adv. Biores., Vol 6 [3]: 124-127. DOI: [0.15515/abr.0976-4585.6.3.124127](https://doi.org/10.15515/abr.0976-4585.6.3.124127)
8. Patil Ashwini G and Jobanputra Arpana H (2015/10) Formulation, Characterization and Evaluation of a Thermoresponsive *In Situ* Gel Containing Gallic Acid-Loaded Chitosan Nanoparticles for the Treatment of Periodontal Disease, Journal of Bionanoscience, 9 (5), 401-408 DOI: <http://dx.doi.org/10.1166/jbns.2015.1324>
9. Jobanputra, A.H., Vasait, R.D., (2015), Cephalosporin C acylase from *Pseudomonas* species: Production and enhancement of its activity by.... Biocatal. Agric. Biotechnol., <http://dx.doi.org/10.1016/j.bcab.2015.06.009>

10. Rajendrabhai Daulatbhai Vasait and Arpana Hemraj Jobanputra, (2015) Relative Assessment of Cephalosporin C bioconversion of soil isolates, *Asian Journal of Biochemcial and Pharmaceutical Research*, 1(5), 246-250. ISSN : 2231-2560
11. Vidya Kothari, A. H. Jobanputra, (2014) Monitoring and Analysis of Petrol Biodegradation using Chromatographic Methods, *Asian Journal of Microbiol, Biotech Environ Sci*, 17, (1), 255-259.
12. Ashwini G. Patil¹, Arpana H. Jobanputra^{2*} (2014) Rutin-Decorated Chitosan Nanoparticles: Assessment of Anticariogenic Activity, *Polymer-Plastic Technology*, 54:2, 202-208, Impact factor: 1.4
13. Ashwini G. Patil¹, Arpana H. Jobanputra² (2013) *In vitro* antimicrobial potential of an active phytoconstituent isolated from the ethanolic extract of *Achyranthes asper* stem against oral pathogens, *International Journal of Advanced Life Sciences*, 6 (5), 549-553, ISSN: 2277-758X.
14. Bhushan Karode, Ulhas Patil, Arpana Jobanputra, (2013) Biotransformation of Low Cost Lignocellulosic substrates into Vanillin by White Rot Fungi *Phanerochaete chrysosporium* NCIM 1197, *Indian Journal of Biotechnology*, Vol. 12, 281-283. Impact factor : 0.6
15. Chaudhari Varsha, Jobanputra Arpana, (2013) Isolation, identification and characterization of novel pigment producing bacteria from distillery spent wash, 7(5): 194-200. ISSN 0974-7435
16. Rajendrabhai D. Vasait, Arpana H. Jobanputra, (2013) Screening, isolation and identification of bacterial isolates having potential for bioconversion of cephalosporin C, *Biotechnology: An Indian Journal*., 7 (4) 159-162. ISSN 0974-7435
17. Chaudhari Varsha, Jobanputra Arpana, (2013) Screening of significant nutrient parameters for pigment production from newly isolated organism *Planococcus maritimus* AHJ_2 using Plackett-Burman design, *J. Microbiol. Biotech. Res.*, 3 (1): 79-83. ISSN 2231 -3168 CODEN (USA): JMBRB4
18. V. R. Kothari, B. A. Karode, A. H. Jobanputra, (2012) Biodegradation of Oil and Diesel Compounds using Soil Isolates and Gravimetric Analysis for Utilization of the Individual Substrates, *International Journal of Chem Envi & Pharma research*., 3(1): 87-95.
19. Arpana Hemraj Jobanputra, Bhushan Ashok Karode, Sudhir Bhaskar Chincholkar, (2011) Calcium alginate as supporting material for the immobilization of rifamycin

oxidase from *Chryseobacterium* species, *Biotechnol. Bioinf. Bioeng.*, 1 (4): 529-535.
ISSN 2249-9075

20. Arpana Jobanputra, Ashwini Patil, Bhushan Karode(2011) Evaluation of antibacterial activity of *Azadiracta indica* leaves against dental caries microorganisms by well diffusion method, *International Journal of Biotechnology & Bioengineering research*, 2 (2), 331-336.
21. Arpana H. Jobanputra, Sudhir B. Chincholkar and Bhushan A Karode (2010) Studies on the Scale up of rifamycin biotransformation using *Chryseobacterium* species, *TWOWS proceedings of International World* (160).
22. A. G. Patil, A. H. Jobanputra and B. R. Kamble (2009) The Effect of neem (*Azadirachta indica*) extract on dental caries microbes, *Proceedings of National Conference on Biodiversity, Sustainable Development & Human welfare* (140-149).
23. A. H. Jobanputra and S. B. Chincholkar (2007) Influence of nitrogen sources and heavy metal ions on the production of rifamycin oxidase by *Chryseobacterium* sp. *Journal of Scientific and Industrial research (JSIR)*, 66: 615-617. (Impact factor: 2.5)
24. A. H. Jobanputra, A. V. Ahire, and S. B. Chincholkar, (1996) Cellulase and β -galactosidase activities of *Oidium* species in solid state fermentation of banana pseudo stem, *J. Adv. Sci. and Technol.*, I (2): 8-13.
25. Arpana H. Jobanputra, Deepak A. H. Jobanputra, G. D. Patil, R. Z. Sayyed, A. B. Chaudhari and S. B. Chincholkar(2002) Microbial Transformation of Rifamycin: A Novel Approach to Rifamycin Derivatives, *Ind. J. Biotechnol*, 2: 370-377. (Impact factor: 1.5)

Chapters in Books (7)

- Vidya Kothari and Arpana Jobanputra (2022) Molecular Approaches towards the Synthesis of Biosurfactants in Microbial Biosurfactants: Applications in Environmental Reclamation and Bioremediation, CRC Press, Taylor and Francis group, New York, (3), 35-58
- A. H. Jobanputra et al., (2019) Plant Growth Promoting Rhizobacteria: An Eco friendly Approach for Sustainable Agriculture and Increased Crop Production, in Microbiology for Sustainable Agriculture, Soil Health and Environmental Protection, Apple Academic Press, CRC Press, Taylor and Francis group, USA, <https://doi.org/10.1201/9781351247061>

- Arpana H. Jobanputra, Deepak Kumar Verma *et al.*, (2019) Microbial Control: A Potential Solution for Plant Disease Management in a Sustainable Environment and Agriculture, Microbiology for Sustainable Agriculture, Soil Health and Environmental Protection, Apple Academic Press, CRC Press, Taylor and Francis group, USA. <https://doi.org/10.1201/9781351247061>
- Manjula P. Patil, Arpana H. Jobanputra, Deepak Kumar Verma, Shikha Srivastava and Anil Kumar Dwivedi, (2019) Bioremediation of Pesticides: An Eco-friendly Approach for A Clean Environment, *Recent advances and innovations in Agricultural Microbiology*, APPLE ACADEMIC PRESS, USA. <http://dx.doi.org/10.1201/9781351247061-8>
- Ashwini G. Patil, Pravin O. Patil, Arpana H. Jobanputra* and Deepak Kumar Verma (2017), Herbal Formulations for the treatment of Dental diseases: Perspectives, Potential and Applications in Innovations in Agricultural and Biological Engineering: Engineering Interventions in Foods and Plants, Apple Academic Press, ISBN hard: 978-1-77188-596-6, <http://dx.doi.org/10.1201/9781315194677-2>
- A. H. Jobanputra and B. A. Karode (2012) Microbial transformation of rifamycin by a bacterial strain *Chryseobacterium* species, in *Prospects in Bioscience: Addressing the issues*, Sabu, Abdulhameed: Augustine, Ann. (Eds.) ISBN 978-81-322-0809-9.
- R. Z. Sayyed, A. H. Jobanputra and S. B. Chincholkar (2005) *Curvularia lunata*: A versatile organism for biotransformation of organic compounds In: *Current Trends in Mycological Research*: (Ed. M. K. Rai, S. K. Deshmukh), ISBN: 81-7233-403-6.

Chapters in Conference Proceedings (03)

- A. H. Jobanputra*, V. R. Kothari, M. P. Patil, Bacterial Consortia for Bioremediation of hydrocarbons and pesticides, International Conference on “*Biotechnology for Better Tomorrow*” Rajiv Gandhi Science Centre, Mauritius, ***Current Research in Biochemistry and Microbiology***, November, 11-12, 2013 [Oral Presentation]
- Arpana H. Jobanputra, Sudhir B. Chincholkar and Bhushan A Karode (2010) Studies on the Scale up of rifamycin biotransformation using *Chryseobacterium* species, *TWOWS proceedings of International Conference on Women Scientists in a Changing World* (160).

- A. G. Patil, A. H. Jobanputra and B. R. Kamble(2009) The Effect of neem (*Azadirachta indica*) extract on dental caries microbes, *Proceedings of National Conference on Biodiversity, Sustainable Development & Human welfare* (140-149).

Presentations in National & International Conferences Workshop (14)

1. Jobanputra Arpana H. and Joshi Swapnil S, Lipase from newly isolated *Pseudomonas aeruginosa* SJ2: Purification and characterization, Oral Presentation in **BRE3CH, International Conference on Biotechnology for Resource, Efficiency, Energy, Environment, Chemicals and Health, Dehradun, Dec., 1-4, 2021, [Oral Presentation]**.
2. A. H. Jobanputra, Biocontrol Potential of Plant Growth Promoting *Chryseobacterium* species **1st Asian PGPR Indonesia Chapter International Conference Sustainable Agriculture and Ecotourism, Udayana University, Bali, Indonesia, August 28-30, 2021, [Speaker]**
3. A. H. Jobanputra, **Recent Trends in Biodiversity, Conservation and Sustainable Development, National Conference, Satana, February 2016, [Lead Lecture, Chairman]**
4. Biodegradation monitoring of methomyl insecticide by HPLC using a local soil isolate *Enterobacter* sp., Avishkar, **2015, [Poster Presentation]**
5. A. H. Jobanputra, **Recent Advances & Innovation for Modernization of Drug Delivery in Pharmaceutical Sciences, MSBTE sponsored workshop, 2014, December 27-28, [Oral Presentation]**.
6. A. H. Jobanputra*, M. P. Patil, Microbial Degradation of Methomyl and its monitoring by GC-MS, **International Conference on “Third Global sustainable Biotech Congress 2014, NMU, Jalgaon, December, 1-5, 2014 [Oral Presentation]**
7. A. H. Jobanputra*, V. R. Kothari, M. P. Patil, Bacterial Consortia for Bioremediation of hydrocarbons and pesticides, **International Conference on “Biotechnology for Better Tomorrow” Rajiv Gandhi Science Centre, Mauritius, November, 11-12, 2013 [Oral Presentation]**
8. B. A. Karode and A. H. Jobanputra, Potential of *Bacillus* species AHJ9 for Dye Decolorization in presence of Diesel and Petrol, DST sponsored **National Conference on “Bioengineering Sciences: Present Status & Future Perspectives”, College of Engineering, Pune, March 15-16, 2013. [Oral presentation]**

9. Varsha Chaudhari and A. H. Jobanputra, Screening of nutrient parameters..., National Conference on “*New Insights of Micorbial Biotechnology*”: UGC & BRSI sponsored, SSVP Santha’s, ASC College, Dhule, Feb 8-9, **2013**. [Oral presentation]
10. Bhushan Karode and **A. H. Jobanputra**, Biotransformation of Rifamycin to B to S using a Bacterial Isolate: A novel approach for synthesis of semi-synthetic rifamcyins, 2nd **International conference on “Challenges in Biotechnology & Food Technology”, Annamalai University, Tamil Nadu, Jan.9-10, 2012**. [Oral Presentation]
11. **Arpana H. Jobanputra**, Sudhir B. Chincholkar and Bhushan A Karode, Studies on the Scale up of rifamycin biotransformation using *Chryseobacterium* species, **International Conference on Women Scientists in a Changing World, Beijing, China, June 27-30, 2010**. [Oral presentation]
12. **A. H. Jobanputra** and S. B. Chincholkar, Siderophores of a novel genus *Chryseobacterium* sp., **International conference on Exploring Horizons in Biotechnology: A Global Venture, Sardar Patel University and Charutar Vidya Mandal, Vallabh Vidyanagar, Gujarat, Nov. 2-4, 2006**. [Poster presentation]
13. **A. H. Jobanputra** and S. B. Chincholkar,, Influence of nitrogen sources and heavy metal ions on the production of rifamycin oxidase by *Chryseobacterium* sp., **National conference on Path to Health- Biotechnology Revolution in India, Anna University, Chennai, Nov. 24-26, 2005**. [Poster presentation]
14. **Jobanputra, A. H.** and Chincholkar, S. B., Effect of iron on growth and siderophore production of *C. indologenes*, **International Conference on Women : environment, energy and biotechnology, IICT, Hyderabad, Oct. 17-21, 2000**. [Oral presentation]

ACADEMIC AND RESEARCH PROFILE

- **Google Scholar:**
<https://scholar.google.co.in/citations?hl=en&user=j15HoXUAAAAJ>
- **Orcid:** <https://orcid.org/0000-0003-0419-217X?lang=en>
- **Research Gate :** <https://www.researchgate.net/profile/Arpana-Jobanputra>
- **Scopus Author ID: 6504381346**

Conferences, Seminars, Workshop, symposia, attended (20)

Sr. No.	Title of Conference / Symposium / Workshop	Level	Place	Period
1	Seminar - [Recent Development in the field of Life Sciences]	University	D.N. college, Faizpur	12th August, 2003
2	Workshop - [Paryavaran Vigyan Avam Taknikishastra]	National	Rajkot, Gujarat	6th-7th January, 2003
3	Workshop - [Intellectual Property rights with special reference to Patents]	University	NMU, Jalgaon	9th January, 2004
4	Symposium - [Developments in Biotechnology: Emerging Trends & Challenges]	National	NMU, Jalgaon	25th-27th November, 2004
5	Symposium - [Developments in Biotechnology: Emerging Trends & Challenges]	National	NMU, Jalgaon	25th-27th November, 2004
6	Seminar - [Emerging Trends at the Interface of Biotechnology]	National	PSGVP Mandal's, ASC College, Shahada	17th-18th February, 2007
7	Seminar - [Exploring Horizons in Microbial Biotechnology]	National	PSGVP Mandal's, ASC college, Shahada	16th February, 2008
8	Conference - [Biodiversity, Sustainable Development & Human Welfare]	National	SSVPS College, Dhule	10th-11th January, 2009
9	Seminar - [Recent Advances in Nanocrystalline Materials & Applications]	National	PSGVP Mandal's, ASC College, Shahada	6th-7th February, 2009
10	“Gandhi Thought : The Only Solution to Corruption & Terrorism,	National	PSGVP M's, ASC College Shahada	23 rd -24 th Dec., 2013
11	“Recent Emerging Trends in Plant Sciences”	National	PSGVP M's, ASC College Shahada	6 th -7 th , September, 2013
12.	Conference - [New Insights of Microbial Biotechnology]	National	SSVPS, Dhule	8-9 February, 2013
13	“Zoology”	National	PSGVP M's, ASC College	6 th -7 th , December,

			Shahada	2013
14.	Symposium - [Recent Advances and Innovation for Modernization of drug delivery in Pharma Sciences]	National	COP, Shahada	Dec 2014
15.	Seminar - [Interdisciplinary Approaches in Biotechnology]	National	MJ College	Feb 2014
16.	Conference - [Recent Trends in Biodiversity, Conservation and Sustainable Development]	National	Satana, MS	Feb 2016
17.	Workshop - [Syllabus framing workshop for M.Sc I]	University	PSGVP Mandals ASC College Shahada	16-07-2018
18.	Workshop - [Syllabus framing workshop S.Y.B.Sc Microbiology]	University	R.C.Patel College, Shirpur	24-04-2019
19.	Conference - [Recent Trends in Novel Methods in Synthetic Chemistry]	National	PSGVPMs ASC College Shahada	22-02-2019
20.	Workshop - [CBCS workshop]	University	PSGVPMs ASC College Shahada	July, 2019

Books published: Co-authored Text book as per NMU, Jalgaon syllabus.

1. **A. H. Jobanputra & co-writers, (2010)** Microbiology: Molecular Biology, Microbial Biotechnology, Enzymology, Prashant Publications, Jalgaon (148 pages)
2. **A. H. Jobanputra & co-writers, (2010)** Microbiology: Microbial Diseases, Clinical & diagnostic Immunology, Environmental Microbiology, Prashant Publications, Jalgaon (215 pages)
3. **A. H. Jobanputra & co-writers, (2009)** Microbiology: Microbial Genetics, Fermentation Technology, Microbial Metabolism, Prashant Publications, Jalgaon (145 pages)
4. **A. H. Jobanputra & co-writers, (2009)** Microbiology: Medical Microbiology, Immunology, Applied Microbiology, Prashant Publications, Jalgaon (181 pages)