

The Official Publication of the Association of Microbiologists of India



# Indian Journal of Microbiology

## CONTENTS

### Editorial

1. Indian Journal of Microbiology: The Journey from 2007 to 2012  
R. Lal 1

### Review Article

2. Integrative Biological Hydrogen Production: An Overview  
S. K. S. Patel · V. C. Kalia 3

### Original Articles

3. Microbial Community Structure at Different Fermentation Stages of Kutajarista, a Herbal Formulation 11  
H. Kumar · P. K. Pandey · V. V. Doiphode · S. Vir · K. K. Bhutani · M. S. Patole · Y. S. Shouche
4. Microbial Dynamics and Diversity of *Bacillus thuringiensis* in Textile Effluent Polluted and Non-polluted Rice Field Soils of Orissa, India 18  
J. Das · T. K. Dangar · T. K. Adhya
5. Identification of a *Pseudomonas* sp. that Inhibits RHL System of Quorum Sensing 28  
Y. Zhang · Y. Zhang · Y. Yang · L. Wang · L. Weng
6. Expression of *CagL* from *Helicobacter pylori* and Preliminary Study of its Biological Function 36  
H. Wang · S. Huang · J. Zhao · J. Han · X. Guan · S. Shao
7. Reverse Line Blot Macroarray for Simultaneous Detection and Characterization of Four Biological Warfare Agents 41  
Vanlalhmua · K. Thavachelvam · U. Tuteja · K. Sarika · S. Nagendra · S. Kumar
8. Surface Plasmon Resonance Biosensor for Detection of *Bacillus anthracis*, the Causative Agent of Anthrax from Soil Samples Targeting Protective Antigen 48  
N. Ghosh · G. Gupta · M. Boopathi · V. Pal · A. K. Singh · N. Gopalan · A. K. Goel
9. Proteomic Analysis of Differential Protein Expression in *Acidithiobacillus ferrooxidans* Grown on Ferrous Iron or Elemental Sulfur 56  
J. Ouyang · Q. Liu · B. Li · J. Ao · X. Chen
10. Purification and Characterization of an Extracellular Low Temperature-Active and Alkaline Stable Peptidase from Psychrotrophic *Acinetobacter* sp. MN 12 MTCC (10786) 63  
R. Salwan · R. C. Kasana
11. Chemical Composition and Sensory Evaluation of Fermented Tea with Medicinal Mushrooms 70  
W.-F. Bai · X.-Y. Guo · L.-Q. Ma · L.-Q. Guo · J.-F. Lin
12. Production of Polyhydroxyalkanoate Co-polymer by *Bacillus thuringiensis* 77  
M. Singh · P. Kumar · S. K. S. Patel · V. C. Kalia
13. The Influence of Rhamnolipids on Aliphatic Fractions of Diesel Oil Biodegradation by Microorganism Combinations 84  
E. Kaczorek · K. Cieślak · K. Bielicka-Daszkiwicz · A. Olszanowski
14. Role of Microorganisms in Emission of Nitrous Oxide and Methane in Pulse Cultivated Soil Under Laboratory Incubation Condition 92  
J. Jena · S. Ray · H. Srichandan · A. Das · T. Das
15. In Vitro Antibacterial Activity of Cysteine Protease Inhibitor from Kiwifruit (*Actinidia deliciosa*) 100  
M. Popovic · U. Andjelkovic · M. Grozdanovic · I. Aleksic · M. Gavrovic-Jankulovic

16.	Association of Three Plasmid-Encoded <i>spv</i> Genes Among Different <i>Salmonella</i> Serotypes Isolated from Different Origins <b>A. Derakhshandeh · R. Firouzi · R. Khoshbakht</b>	106
<b>Short Communication</b>		
17.	Anti-pathogenic Potential of Coral Associated Bacteria Isolated from Gulf of Mannar Against <i>Pseudomonas aeruginosa</i> <b>D. Bakkiyaraj · C. Sivasankar · S. K. Pandian</b>	111
<b>News and Views</b>		
18.	<i>Cupriavidus metallidurans</i> : A Modern Alchemist <b>D. Lal · N. Nayyar · P. Kohli · R. Lal</b>	114
19.	Message from Editor in Chief ( <i>Indian Journal of Microbiology</i> ) <b>R. Lal</b>	116
20.	Message from the Incoming Editor in Chief <b>V. C. Kalia</b>	117
21.	ASM President's Outreach to India <b>T. Peterson</b>	118
22.	Know Your Chairman of Indian Academy of Microbiological Sciences <b>R. C. Kuhad</b>	119
23.	Microbes to Generate Electricity <b>D. Lal</b>	120
<b>Editorial</b>		
24.	Know Your INJM Editor in-Chief (April-2013) <b>V. C. Kalia</b>	123
<b>Presidential Profile</b>		
25.	Know Your AMI President (2013) <b>R. Lal</b>	124
<b>Presidential Address</b>		
26.	PRESIDENTIAL ADDRESS · (23rd November, 2012 at KIIT University, Bhubaneswar) <b>L. Venkateswar Rao</b>	126

The copies of the journal to members of the association are sent by ordinary post. If any of the member wishes to receive the copies by registered post or courier, kindly contact the journal's/publisher's office. Membership or subscription copies returned due to incomplete, incorrect or changed address for two consecutive occasions, would force us to delete the names from the mailing list of the journal. Providing complete, correct and up-to-date address is the responsibility of the members. The editorial board, association or publisher will not be responsible for non-receipt of copies due to incorrect or incomplete address. The copy received for personal use by a member of the association/society, should not be sold or given away for commercial or library use. It is also illegal to acquire copies from any other source without subscribing to the journal.

## CONTENTS

### Editorial

1. The Race for Visibility and Value  
**V.C. Kalia** 129

### Original Articles

2. Cross-Species Induction and Enhancement of Antimicrobial Properties in Response to Gamma Irradiation in *Exiguobacterium* sp. HKG 126  
**R. Pathak · R. Kumar · H.K. Gautam** 130
3. Molecular Characterization of *Vibrio cholerae* O1 Reveals Continuous Evolution of Its New Variants in India  
**M. Jain · K.S. Kushwah · P. Kumar · A.K. Goel** 137
4. Identification of *Legionella* spp. in Environmental Water Samples by ScanVIT-Legionella™ Method in Spain  
**C. Gruas · I. Álvarez · C. Lara · C.B. García · D. Savva · M.V. Arruga** 142
5. Teth137, a Conserved Factor of Unknown Function from *Thermoanaerobacter ethanolicus* JW200, Represses the Transcription of the *adhE* Gene In Vitro  
**Q. Jing · J. Wang · G. Wu** 149
6. Participation of the Cytoskeletal and Lysosomal Compartments in *Campylobacter jejuni* Invasion of Caco-2 cells, the Cellular Response by Morphometric Analysis and the Presence of Cytokine and Chemokine Transcripts  
**B.B. Fonseca · I.L. Santos · D.A. Rossi · R.T. Melo · T.G. Araújo · C.U. Vieira · E.P. Mendonça · M.E. Beletti** 155
7. Antibiotic Resistance Profiles and Quorum Sensing-Dependent Virulence Factors in Clinical Isolates of *Pseudomonas aeruginosa*  
**H. Wang · F. Tu · Z. Gui · X. Lu · W. Chu** 163
8. Screening and Evaluation of Biosurfactant-Producing Strains Isolated from Oilfield Wastewater  
**J. Liu · Y. Chen · R. Xu · Y. Jia** 168
9. Antifungal Metabolites Produced by *Chaetomium globosum* No.04, an Endophytic Fungus Isolated from *Ginkgo biloba*  
**G. Zhang · Y. Zhang · J. Qin · X. Qu · J. Liu · X. Li · H. Pan** 175
10. Evaluation of Burma Reed as Substrate for Production of *Pleurotus eryngii*  
**X. Zeng · J. Lin · L. Guo · R. Cao · W. Zeng** 181
11. Influence of the Environment on the Morphological and Biochemical Characteristics of Different *Aspergillus niger* Wild Type Strains  
**A. Šimonovičová · E. Hlinková · K. Chovanová · D. Pangallo** 187
12. Optimization of Biotransformation of L-Tyrosine to L-DOPA by *Yarrowia lipolytica*-NCIM 3472 Using Response Surface Methodology  
**S.T. Gurme · S.N. Surwase · S.A. Patil · S.B. Jadhav · J.P. Jadhav** 194
13. Culture Media Statistical Optimization for Biomass Production of a Ligninolytic Fungus for Future Rice Straw Degradation  
**V. Sarria-Alfonso · J. Sánchez-Sierra · M. Aguirre-Morales · I. Gutiérrez-Rojas · N. Moreno-Sarmiento · R.A. Poutou-Piñales** 199

14.	Chemical Constituents and Antimicrobial Activity of Indian Green Leafy Vegetable <i>Cardiospermum halicacabum</i> <b>R. Jeyadevi · T. Sivasudha · A. Ilavarasi · N. Thajuddin</b>	208
15.	Chitinase Expression Due to Reduction in Fusaric Acid Level in an Antagonistic <i>Trichoderma harzianum</i> S17TH <b>V. Sharma · P. Bhandari · B. Singh · A. Bhattacharya · V. Shanmugam</b>	214
16.	$\epsilon$ -Caprolactam Utilization by <i>Proteus</i> sp. and <i>Bordetella</i> sp. Isolated From Solid Waste Dumpsites in Lagos State, Nigeria, First Report <b>H.A. Sanuth · A. Yadav · O.E. Fagade · Y. Shouche</b>	221
17.	Microscopic Structural Changes in Paddy Straw Pretreated with <i>Trichoderma reesei</i> MTCC 164 and <i>Coriolus versicolor</i> MTCC 138 <b>U.G. Phutela · N. Sahni</b>	227
18.	Essential Oils and Herbal Extracts as Antimicrobial Agents in Cosmetic Emulsion <b>A. Herman · A.P. Herman · B.W. Domagalska · A. Młynarczyk</b>	232
<b>Short Communications</b>		
19.	Quick Diagnosis of Human Brain Meningitis Using <i>Omp85</i> Gene Amplicon as a Genetic Marker <b>S.K. Dash · M. Sharma · S. Khare · A. Kumar</b>	238
20.	Cervical Lymphadenitis by <i>Mycobacterium triplex</i> in an Immunocompetent Child: Case Report and Review <b>G. Caruso · R. Angotti · F. Molinaro · E. Benicchi · E. Cerchia · M. Messina</b>	241

## CONTENTS

### Editorial

1. The Visionary: Prof. Carl R. Woese 245  
**V.C. Kalia**

### Review Article

2. Carl Woese: from Biophysics to Evolutionary Microbiology 247  
**O. Prakash · K. Jangid · Y.S. Shouche**

### Original Articles

3. Development of Genomic Tools for the Identification of Certain *Pseudomonas* up to Species Level 253  
**A. Bhushan · J. Joshi · P. Shankar · J. Kushwah · S.C. Raju · H.J. Purohit · V.C. Kalia**
4. Production of *N*-acyl Homoserine Lactones and Virulence Factors of Waterborne *Aeromonas hydrophila* 264  
**W. Chu · Y. Liu · Y. Jiang · W. Zhu · X. Zhuang**
5. Impact of *Lactococcus lactis* spp. *lactis* Bio Adhesion on Pathogenic *Bacillus cereus* Biofilm on Silicone Flowing System 269  
**H. Ksontini · F. Kachouri · M. Hamdi**
6. Molecular Characterization and Toxicity Confirmation of LukM/F'-PV Producing *Staphylococcus aureus* Isolated from Bovine Mastitis Samples in Mysore, India 276  
**R.J. Padmaja · P.M. Halami**
7. Expression, Identification and Characterize of CD25-Binding Epitope Modified Human IL-2 in *Pichia pastoris* 283  
**S. Wang · H.T. Li · Y.H. Liu · Y.Z. Zhu · W.H. Wang · Y.X. An · L.G. Miao**
8. High Prevalence of Exfoliative Toxins Among Carrier Isolates of *Staphylococcus aureus* from Healthy Individuals from Various Communities in Chennai, South India 288  
**N. Abimanyu · S. Murugesan · P. Krishnan**
9. PCR-Based Detection of Extended-Spectrum  $\beta$ -Lactamases (*bla*<sub>CTX-M-1</sub> and *bla*<sub>TEM</sub>) in *Escherichia coli*, *Salmonella* spp. and *Klebsiella pneumoniae* Isolated from Pigs in North Eastern India (Mizoram) 291  
**H. Lalzampaia · T.K. Dutta · I. Warjri · R. Chandra**
10. Expression, Purification and Characterization of the Proline Dehydrogenase Domain of PutA from *Pseudomonas putida* POS-F84 297  
**E. Omidinia · R. Mahdizadehdehosta · H.S. Mohammadi**
11. Isolation and Identification of Pathogenicity Mutant of *Curvularia lunata* via Restriction Enzyme-Mediated Integration 303  
**Y.J. Wang · T. Liu · J.M. Hou · Y.H. Zuo**
12. First Report of OXA-4, an ESBL Isolated from *Pseudomonas aeruginosa* a South Indian Strain 308  
**S.A.J. Kingsley · S. Verghese**
13. Incidence of Subclinical Mastitis and Prevalence of Major Mastitis Pathogens in Organized Farms and Unorganized Sectors 315  
**R. Hegde · S. Isloor · K.N. Prabhu · B.R. Shome · D. Rathnamma · V.V.S. Suryanarayana · S. Yatiraj · C.R. Prasad · N. Krishnaveni · S. Sundareshan · D.S. Akhila · A.R. Gomes · N.R. Hegde**

14. Epidemiological Study on *Staphylococcus aureus* Isolates Reveals Inverse Relationship between Antibiotic Resistance and Virulence Repertoire 321  
**H.F. Sapri · N.A.M. Sani · H. Neoh · S. Hussin**
15. Probiotic *Bacillus amyloliquefaciens* SC06 Prevents Bacterial Translocation in Weaned Mice 323  
**J. Ji · S. Hu · W. Li**
16. Bio-ethanol Production from Green Onion by Yeast in Repeated Batch 329  
**R. Robati**
17. Efficient Production of Lactic Acid from Sweet Sorghum Juice by a Newly Isolated *Lactobacillus salivarius* CGMCC 7.75 332  
**Q. Liu · S. Wang · J.-F. Zhi · H. Ming · D. Teng**
18. Intensification of Fructosyltransferases and Fructo-Oligosaccharides Production in Solid State Fermentation by *Aspergillus awamori* GHRTS 337  
**T. Sathish · R.S. Prakasham**
19. Screening of lipid high producing mutant from *Rhodotorula glutinis* by low ion implantation and study on optimization of fermentation medium 343  
**L. Shichang · Z. Pengpeng · G. Shaobin · L. Hongxia · L. Ya · L. Shengnan**
20. Membrane Damage Induced by Supercritical Carbon Dioxide in *Rhodotorula mucilaginosa* 352  
**J. Li · A. Wang · F. Zhu · R. Xu · X.S. Hu**
21. Application of Hazard Analysis and Critical Control Points (HACCP) to the Cultivation Line of Mushroom and Other Cultivated Edible Fungi 359  
**J.E. Pardo · V.R. de Figueirêdo · M. Álvarez-Ortí · D.C. Zied · J.A. Peñaranda · E.S. Dias · A. Pardo-Giménez**

**Short Communication**

22. Expression and Antibody Preparation of GP5a Gene of Porcine Reproductive and Respiratory Syndrome Virus 370  
**C. Wei · Z. Huang · L. Sun · J. Xie · Y. Chen · M. Zhang · C. Zhang · H. Qi · W. Qi · Z. Ning · L. Yuan · H. Wang · L. Zhang · G. Zhang**

## CONTENTS

### Review Article

1. Acetic Acid Bacteria: Physiology and Carbon Sources Oxidation 377  
**D. Mamlouk · M. Gullo**

### Original Articles

2. Molecular Cloning, Expression of *minD* Gene from *Lactobacillus acidophilus* VTCC-B-871 and Analyses to Identify *Lactobacillus rhamnosus* PN04 from Vietnam *Hottuyenia cordata* Thunb. 385  
**T.H.K. Nguyen · V.T.T. Doan · L.D. Ha · H.N. Nguyen**
3. Cloning, Expression, Purification and Toxicity Evaluation of *Helicobacter pylori* Outer Inflammatory Protein A 391  
**O. Teymournejad · A.M. Mobarez · Z.M. Hassan · S. Noori · S.M. Moazzeni · N. Khoramabadi**
4. Preliminary Extraction and Identification of the 44.5 kDa Outer Membrane Proteins Isolated from Bovine *Fusobacterium necrophorum* (AB) 395  
**J. Xu · L.-Z. Chen · X.-Y. Liu · E.-K. Feng · S.-J. Wang · Y. Cao**
5. Shotgun Analysis of the Secretome of *Fusarium graminearum* 400  
**X.-L. Ji · M. Yan · Z.-D. Yang · A.-F. Li · L.-R. Kong**
6. Comparative Virulotyping of *Salmonella typhi* and *Salmonella enteritidis* 410  
**O.I. Elemfareji · K.L. Thong**
7. Gene Arrangements in Expression Vector Affect 3-Hydroxypropionic Acid Production in *Klebsiella pneumoniae* 418  
**Y. Li · X. Ge · P. Tian**
8. Microbial Diversity and Succession in the Chinese Luzhou-Flavor Liquor Fermenting Cover Lees as Evaluated by SSU rRNA Profiles 425  
**K. Li · Q. Zhang · X.-T. Zhong · B.-H. Jia · C.-H. Yuan · S. Liu · Z.-M. Che · W.-L. Xiang**
9. Stratified Communities of Methanogens in the Jiulong River Estuarine Sediments, Southern China 432  
**J. Chen · X. Yin**
10. Phytoextracts-Synthesized Silver Nanoparticles Inhibit Bacterial Fish Pathogen *Aeromonas hydrophila* 438  
**A. Mahanty · S. Mishra · R. Bosu · U. Maurya · S.P. Netam · B. Sarkar**
11. Biocontrol and Plant Growth Promotion Characterization of *Bacillus* Species Isolated from *Calendula officinalis* Rhizosphere 447  
**A. Ait Kaki · N. Kacem Chaouche · L. Dehimat · A. Milet · M. Youcef-Ali · M. Ongena · P. Thonart**
12. In Vitro Protective Efficacy of *Clostridium butyricum* Against Fish Pathogen Infections 453  
**Q. Gao · Y. Xiao · P. Sun · S. Peng · F. Yin · X. Ma · Z. Shi**
13. ATP-Binding Cassette Transporter B4 Anchors the Cell Adhesion Molecule DdCAD-1 to Cell Membrane in *Dictyostelium discoideum* 460  
**C. Yang · L. Hou · Q. Yang · C.-H. Siu**
14. Optimization of Nutrient Requirements and Culture Conditions for the Production of Rhamnolipid from *Pseudomonas aeruginosa* (MTCC 7815) using *Mesua ferrea* Seed Oil 467  
**S.P. Singh · P. Bharali · B.K. Konwar**
15. A Method for Molecular Analysis of Catalase Gene Diversity in Seawater 477  
**W. Wang · X. Ji · C. Yuan · F. Dai · J. Zhu · M. Sun**



**Short Communications**

16. Microbial Treatment for Prevention and Removal of Paraffin Deposition on the Walls of Crude Pipelines  
**J.H. Liu · Y.P. Jia · Y.T. Chen · R.D. Xu** 482
17. In Vitro Characterization of a Recombinant AHL-Lactonase from *Bacillus cereus* Isolated from a Striped Catfish (*Pangasianodon hypophthalmus*) Pond  
**N.T.N. Tinh · N.V. Dung · C.T. Trung · V.T. Thuy** 485
18. Cloning and Expression of Genes Encoding F107-C and K88-1NT Fimbrial Proteins of Enterotoxigenic *Escherichia coli* from Piglets  
**N.H. Loc · L.M.T. Ngoc · T.T. Lan · L.Q. Viet · L.D. Thao · H.T. Quang · D.T.B. Lan · P.T. Long** 488
19. Statistical Optimization of Culture Conditions for Milk-Clotting Enzyme Production by *Bacillus Amyloliquefaciens* Using Wheat Bran-An Agro-Industry Waste  
**W. Zhang · X. He · H. Liu · H. Guo · F. Ren · P. Wen** 492
20. Microbiological Identification and Analysis of Swine Lungs Collected from Carcasses in Swine Farms, China  
**Y. Zha · J. Xie · Y. Chen · C. Wei · W. Zhu · J. Chen · H. Qi · L. Zhang · L. Sun · X. Zhang · P. Zhou · Z. Cao · W. Qi · M. Zhang · Z. Huang · G. Zhang** 496