

International Journal of Science and Research (IJSR)

ISSN (Online): 2319-7064

www.ijsr.net



Volume 6 Issue 4, April 2017



INTERNATIONAL JOURNAL OF SCIENCE & RESEARCH

www.ijsr.net

ISSN: 2319 - 7064

CrossRef DOI: 10.21275/23197064

Email Your Article to editor.ijsrnet@gmail.com or Submit Online at <https://www.ijsr.net/initsubmit.php>

Search by Title or ISSN:



TOGETHER WE REACH THE GOAL



SJIF Evaluation on Request

The Editorial Staff who decide to use of this option will receive the SJIF Value within 7 days.

SJIF Publishers Panel Register journal - (Free Service)

in a scored and prestigious database of scientific journals.

Manage journal - (Free Service)

This section allows you to place information about the journal, editors, and publisher, etc.

SJIF Journal Rank

Full list of journals from database of SJIFactor.com. It contains currently over **23000 journals** from all over the world.

Certificate

A proof of being indexed in SJIF Journal Rank List.

International Journal of Science and Research (IJSR)

SJIF 2022: 7.942	Previous evaluationSJIF 2021: Not indexed 2020: 7.803 2019: 7.583 2018: 7.426
Area: Multidisciplinary Evaluated version: online	
The journal is indexed in: SJIFactor.com	
Basic information	
Main title	International Journal of Science and Research (IJSR)
Other title [English]	International Journal of Science and Research (IJSR)
Abbreviated title	IJSR.NET
ISSN	2319-7064 (E)
URL	http://www.ijsr.net
Country	India
Journal's character	Scientific
Frequency	Monthly
License	Free for educational use
Contact Details	
Editor-in-chief	Dr. R. M. Deshmukh Editor in Chief, International Journal of Science and Research (IJSR)
	India
Publisher	International Journal Of Science And Research (IJSR)
Journal's description	
The International Journal of Science and Research (IJSR) is a monthly, open access, peer reviewed and fully refereed international journal with very low research paper	

publication fee. Being an international journal focused on Engineering, Management, Science and Mathematics, we broadly cover research work on next generation cutting edge technologies and effective marketing strategies. Writing a research paper is a skill and International Journal of Science and Research have the team of scientists and academicians who are dedicated to help learn and improve that skill by providing a guide for writing high quality research papers through peer reviewing. Critical evaluation of research paper is a prime focus of each member of International Journal of Science and Research (IJSR) Reviewer Panel for identifying Plagiarism. We try our best to ensure the novelty in each research manuscript being published in International Journal of Science and Research (IJSR).

Copyright © 2022 - SJIFactor.com except certain content provided by third parties.



The screenshot shows the website interface for the International Journal of Science and Research (IJSR). The browser address bar displays the URL: <https://www.ijsr.net/issue1.php?page=80&i=8&edition=Volume%206%20Issue%204,%20A...>

International Journal of Science and Research (IJSR)
ISSN: 2319-7064
Since Year 2012 | Open Access | Fully Refereed | Peer Reviewed

Navigation menu: Home, Members, Current Issue, Archive, Submission, Instructions for Authors, Author Tools, Editorial Board, Conferences, Policies

Search Articles

Type Your Search Term Here and Press Search

Member's Area

- Get Registered Now
- Member Sign In

Quick Links

- Search Articles
- Article Processing Charge
- Submit Your Article

Volume 6 Issue 4, April 2017: Page 9

First Page Previous Page Next Page Last Page

Research Paper, Computer Science & Engineering, United States of America Pages: 394 - 403, Hits: 139

Cloud Computing - An Overview of Architectures, Security Threats and Their Solutions
Ashwini Phadke, Devashree Jadhav

Share this article (3 icons)

Research Paper, Management, India Pages: 404 - 408, Hits: 133

A Systematic Approach and Framework for Business Transformation through Enabling Technology
Akash Agrawal, Dr. L. Sudershan Reddy, Alok Agrawal

Share this article (3 icons)

Windows taskbar: 26°C Hujan, 12:02 AM, 4/21/2022

- Join IJSR YouTube Channel
- Join IJSR at Facebook
- Join IJSR at Twitter
- Join IJSR at LinkedIn

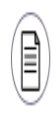
Indexing

- CrossRef Index
- CiteFactor Index
- e-Library.ru Index
- ScienceGate Index
- Scite_Index
- Mendeley Index
- Digital Repository Index
- Noel Meorial Library Index
- Semantic Scholar Index
- Research Bible Index
- Academia.Edu Index

Research Paper, Biological Sciences, Iraq Pages: 424 - 427, Hits: 127

Impact of Gold Nanoparticles in Blood Parameters in Treated Mice with Mammary Adenocarcinoma

Sumaiah I. Hussein, Ali S. Sultan, Nahi Y. Yaseen



Share this article

M.Tech / M.E / PhD Thesis, Biomedical Sciences, Indonesia Pages: 428 - 432, Hits: 92

Low Serum Uric Acid Level Increased the Risk of Parkinsons Disease

Kadek Trisnadewi, Wimpie I Pangkahila, Thomas Eko Purwata, I Putu Eka Widyadharna

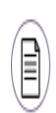


Share this article

Research Paper, Agriculture, Indonesia Pages: 433 - 437, Hits: 137

Agroecosystem Stability and Breakdown Leaves on Mustard Cropping after Application by the Bacillus thuringiensis

Akhmad Gazali, Ilhamiyah, Achmad Jaelani

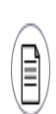


Share this article

M.Tech / M.E / PhD Thesis, Environmental Engineering, India Pages: 438 - 446, Hits: 122

To Increase Carrying Capacity of Tapi River Using HEC-RAS Software

Sania Modak, Prashant Nagarnaik



Share this article

Editorial Board Members

Editor in Chief

Dr. R. M. Deshmukh

Qualification: PhD (CSE), M.Tech Affiliation: Retired Professor, Nagpur University, Nagpur, Maharashtra, India Email ID: drrammdeshmukh[at]gmail.com

Deputy Editor in Chief

Dr. Angela Gusiyska

Qualification: PhD (Dentistry), DMD Affiliation: Associate Professor in the Department of Conservative Dentistry, Faculty of Dental Medicine, Medical University - Sofia, Bulgaria Email ID: gusiyska[at]icloud.com

Executive Editor

Dr. Victor Olu Matthews

Qualification: PhD (Telecommunication Engineering) Affiliation: Senior Lecturer, Covenant University, Electrical & Information Engineering Department, Ota, Ogun State, Nigeria Email ID: victor.matthews[at]covenantuniversity.edu.ng

Editorial Secretary

Dr. Fuat Kara

Qualification: PhD (Manufacturing Engineering) Affiliation: Assistant Professor, Department of Manufacturing Engineering, Duzce University, Duzce, Turkey Email ID: fuatkara[at]duzce.edu.tr

Editors

Dr. Shashi Kant Tiwari

Qualification: PhD (Biochemistry Science) Affiliation: Postdoctoral Fellow, University of California, San Diego, United States Email ID: sktiwari[at]ucsd.edu

Dr. Rajesh Keshavrao Deshmukh

Qualification: PhD (Computer Science and Engineering) Affiliation: Associate Professor (CSE), Kalinga University, Naya Raipur, Chhattisgarh, India Email ID: my.mail.raj[at]gmail.com

Dr. Emre Yucel

Qualification: PhD (Mechanical Engineering) Affiliation: Instructor, Department of Mech. and Manufac. Eng., Duzce University, Duzce, Turkey Email ID: emreyucel[at]duzce.edu.tr.tr

Dr. Tamar Shiukasvili

Qualification: Doctor of Academic Philology Affiliation: Assistant of professor, Department of Foreign Languages and Literature, Iakob Gogebashvili Telavi State University, Telavi, Georgia Email ID: tamar.shiukashvili[at]tesau.edu.ge

Dr. Syarbaini Ahmad

Qualification: PhD (Software Engineering) Affiliation: Officer of Student Affairs Development & Alumni, Deputy Rector of Stud. Affairs Development & Alumni Office, Faculty of Science & Info. Technology, International Islamic University College Selangor, Malaysia Email ID: syarbaini[at]kuis.edu.my

Dr. Elżbieta Macioszek

Qualification: Doctor of Science (DSc) (Traffic Engineering) Affiliation: Assistant Professor, Faculty of Transport of the Silesian University of Technology, Gliwice, Poland Email ID: elzbieta.macioszek[at]polsl.pl

Dr. Monal Deshmukh

Qualification: PhD (Management) Affiliation: Associate Professor, Department of Management, Rungta College of Engineering and Technology, Bilai, Chhattisgarh, India Email ID: monal0808[at]gmail.com

Dr. Ivan Dimitrov Gerzhikov

Qualification: PhD (Dentistry) Affiliation: Chief Assistant Professor, Department of Prosthetic Dental Medicine, Faculty of Dental Medicine, Medical University of Sofia, Sofia, Bulgaria Email ID: ivan_ger1971[at]abv.bg

Dr. Lucia Tsantilis

Qualification: PhD (Structure and Infrastructure Engineering) Affiliation: Assistant Professor, Department of Environment, Land and Infrastructure Engineering, Politecnico di Torino, Torino, Italy Email ID: lucia.tsantilis[at]polito.it

Dr. Vitalina Babenko

Qualification: D.Sc. (Economics), PhD (Technical Sciences) Affiliation: Professor, Department of International Business and Economic Theory of the School of International Economic Relations and Travel Business of V.N. Karazin Kharkiv National University, Kharkiv, Ukraine Email ID: vitalinababenko[at]karazin.ua

Dr. Grygorieva Nataliia

Qualification: PhD (Medical Sciences) Affiliation: Scientific Worker, Department of Clinical Physiology and Pathology of Musculoskeletal System, D. F. Chebotarev Institute of Gerontology" NAMS Ukraine Email ID: crystaLng[at]ukr.net

Dr. Chung-Kuang Hou

Qualification: Ph.D. (Business Administration) Affiliation: Assistant Professor, Department of Business Administration, Kun Shan University, Taiwan Email ID: ckhou[at]mail.ksu.edu.tw

Dr. Ishtiak Al Mamoon

Qualification: PhD.(Electronics and Communication Engineering) Affiliation: Asst. Professor, Department of Electrical and Computer Engineering (ECE), Presidency University, Dhaka, Bangladesh Email ID: ishtiakm[at]pu.edu.bd

Dr. Mahadeo B. Shinde

Qualification: PhD (Nursing), M.Sc. (Nursing) Affiliation: Professor, Krishna Institute of Medical Sciences Deemed University, Krishna Institute Of Nursing Sciences, Karad, Satara, Maharashtra, India Email ID: mahadeoshinde28[at]gmail.com

Dr. Junaidi Junaidi

Qualification: PhD. (Economy and Business), M.Si, SE Affiliation: Lecturer (teaching staff) in Faculty of Economy and Business, University of Jambi, Jambi City, Indonesia Email ID: junaidi[at]unja.ac.id

Dr. Amir Azizi

Qualification: PhD. (Manufacturing and Industrial Engineering) Affiliation: Assistant professor, Department of Industrial Engineering, Science and Research Branch, Islamic Azad University, Tehran, Iran Email ID: azizi[at]srbiau.ac.ir

Dr. Asha S. Ambhaikar

Qualification: PhD (Computer Science and Engineering) Affiliation: Professor (CSE) and Dean (Student Welfare), Kalinga University, Naya Raipur, Chhattisgarh, India Email ID: drambhaikar[at]gmail.com

Dr. Tarek Ali Mohamed Hassan

Qualification: Ph. D. (Laser Physics) Affiliation: Professor, Laser Institute for Research and Applications (LIRA), Beni - Suef University, Beni - Suef, Egypt Email ID: tarek.hassan[at]fysik.su.se

Dr. Ho Soon Min

Qualification: PhD (Materials Chemistry) Affiliation: Associate Professor, INTI International University, Jln BBN 12/1, Bandar Baru Nilai, 71800 Negeri Sembilan, Malaysia Email ID: soonmin.ho[at]newinti.edu.my

Dr. Berestetska Natalia

Qualification: PhD (Pedagogics) Affiliation: Associate Professor of Translation Department, National Academy of State Border Guard Service named after Bohdan Khmelnytskyi, Ukraine Email ID: berestetskanat[at]rambler.ru



Reviewer Panel Members

Mr. Anand Nayyar, M.Tech (I.T.), M.Phil (CS), M.C.A, KCL IMT, Jalandhar, India

Mr. Gurpreet Singh, M.Tech. (C.S.E.), B.Tech. (C.S.E.), IET Bhaddal, Punjab, India

Mr. Sreenivasa Rao Basavala, PhD (CS)*, M.Tech (I.T), Yodlee Infotech Pvt Ltd, Bangalore, India

Dr. Ashish Jolly, PhD (CSA), MCA, B.Sc (Electronics), Government P.G. College, Ambala Cantt, India

Dr. Aws Zuheer Yonis, PhD (Tele Engg), M.E. (Tele Engg), University of Mosul, Iraq

Dr. N.S.Murthy Sarma, PhD (E.C.E.), M.E. (M.R.E.), Osmania University, Hyderabad, India

Mr. Pradeep Kumar Jaisal, PhD (Elex)*, M.Tech (Elex), S.S.I.P.M.T., Raipur, India

Mr. Vikas Kumar Goel, M.Tech (Instrumentation), M.Sc., C-DAC, Mohali, India

Dr. Rohit Kapoor, PhD (PQM), M.E. (CAD/CAM), Indian Institute of Management, Indore, India

Dr. Shrinivas R. Patil, Ph.D, M Phil, MBA (Finance), IEMS B-School, Hubli, India

Mr. Subba Rayudu Rayasam, MBA (Marketing & HR), M.Phil, VISIT College, Tadepalligudem, India

Ms. Sudepta Pradhan, MBL (Business Law), LLB, IBS, Hyderabad, India

Dr. Shivakumar Deene, (D.Litt.), Ph.D, M.Phil, M.Com, Central University of Karnataka, Gulbarga, India

Dr. Shobha Sharma, Ph.D (Physics), MBA, M.Sc (Physics), St. John's College, Agra, India

Mrs. Rachana Shalini, M.Tech (Agricultural Engg), B.Tech, National Productivity Council, New Delhi, India

Dr. Bamidele Adewale SALAU, PhD (Biochem), M.Sc (Human Nutrition), Redeemer's University, Nigeria

Dr. Mayada Faris Ghanim, PhD (EEE), M.Sc (CE), University of Mosul, Mosul, Iraq

Mr. Harsh Vazirani, M.Tech (CSE), Maulana Azad National Institute of Technology, Bhopal, India

Mr. Rekh Ram Janghel, M.Tech (CSE), IIITM, Gwalior, India

Dr. Parnika Das, PhD (Physics), M. Tech (Applied Optics), Variable Energy Cyclotron Centre, Kolkata, India

Dr. Deepshikha Bhargava, PhD, M.Tech, Amity Institute of Information Technology, Jaipur, India

Mr. Neeraj Kumar Agrawal, M.Tech (I.T.), Gwalior Engineering College, Gwalior, India

Dr. Rakesh Rai, Ph.D (Education), Ph.D (Phylosophy), SRM University, Ghaziabad, India

Mr. N. K. Mandavgade, PhD (Mech Engg)*, ME (Mech), Priyadarshni College of Engineering, Nagpur, India

Mrs. Anita Rai, M.Ed.*, UGC-NET, M.Phil (English), SRM University, Ghaziabad, India

Dr. Ajayi Johnson Olusegun, Ph.D Sociology (Criminology)*, M.Sc, B.Sc, Ekiti State University, Ado-Ekiti, Nigeria

Mr. Sushant Rath, M.Tech (Mechanical Engg), RDCIS, SAIL, Ranchi, India

Dr. Ramel D. Tomaquin, PhD (Public Administration), PhD (Society and Culture), Surigao Del Sur State University, Philippines

Dr. D S Kushwaha, PhD(LCD), PhD (IT& Syst. Engg.), M Tech (IT), Institute of Engineering and Technology, Lucknow, India

Dr. Sanjeev Kumar, Ph.D.(Education), M.Phil.(Education), M.Ed, Government Middle School, Rugra, Solan, India

Mr. Simon Okwir, PhD (Industrial Economics & Management)*, MSc(Aero Mechanics), Stockholm , Sweden

Dr. Sonali Yadav, PhD, MBA (Finance), M.A (Eco), Institute of Management Studies, Dehradun, India

Mrs. Monal Deshmukh, PhD (Marketing)*, MBA (Marketing), RCET, Bhilai, India

Dr. Zuojun Guo, PhD (Computational Biochemistry), Center for Theoretical Biological Physics in UCSD and Genomics Institute of Novartis Research Foundation, San Diego, United States

Shamim Ahmed, M.Sc. (CSE), Bangladesh University of Business & Technology, Dhaka, Bangladesh

K. Kulathuraan, PhD (Physics), M.Sc. (Material Science), A.P.A College of Arts and Culture, Palani, Tamil nadu, India

Dr. Prabhpreet Kaur, PhD (Physics), M.Sc. (Physics), Bhai Gurdas Institute of Engineering and Technology, Patiala, Punjab, India

Dr. Amit Sharma, PhD (Physics), M.Phil.(Physics), BVCOE, New Delhi, India

Vishwajit K. Barbudhe, M.Tech (EC) , B.E (E&TC), Agnihotri College of Engineering, Amaravati, India

Dr. M.N.M.Ansari, PhD (Polymer Engineering), Universiti Tenaga Nasional, Kajang, Selangor, Malaysia

Dr. Abu Ubaida Siddiqui, MD (Anatomy) , MBBS, All India Institute of Medical Sciences (AIIMS), Raipur, India

Dr. Gee Marie S. Binag, Ph. D (Development Research Administration), Agusan del Sur State College of Agriculture and Technology, Philippines

Dr. Mohammad Akram, PhD (Literature English), Jazan University, Ministry of Higher Education, Kingdom of Saudi Arabia

Govinda Bhandari, M.Sc, B.Sc , Govinda Bhandari, EPTRI, Kathmandu, Nepal

Mohammad Alamgir Hossain, MSc (CSE), BSc (CSE), Islamic University, Kushtia-7003, Bangladesh

J. Rethna Virgil Jeny, PhD, M.E (CSE), B.E (CSE), Amrutvahini College of Engineering, Sangamner, India

Rajkumar Bapurao Deshmukh, M.Sc. (Botany), SET, Shardabai Pawar Mahila Mahavidyalaya, Pune, India

Sreehari Ravindranath, M.A (Life Skills Education) , B.A. (Psychology), Rajiv Gandhi National Institute of Youth Development, Chennai, India

Dr. Ravindra Kumar, PhD (Genetics), MSc (Chemistry), Sri Aurobindo Institute of Medical Sciences, Indore, India

Dr. Ajay Singh Yadav, Ph.D (Maths) M.Sc. (Maths), SRM University NCR Campus, Ghaziabad, India

Dr. Gerard G. Dumancas, PhD (Analytical Chemistry), B.Sc (Chemistry), Oklahoma Medical Research Foundation, Oklahoma, United States

Dr. Jaiprakash Jain, PhD, M.A (Economics), Government College, Jodhpur, India

Charles Guandaru Kamau, PhD (Business Administration), Ministry of Finance, Kibwezi, Kenya

Dr. Mohamed Shehadeh, PhD (Mechanical Engg), MSc, Arab Academy for Science, Technology and Maritime Transport, Alexandria, Egypt

Dr. S. P. Anand Raj, PhD (CS), M.Tech (CS), SR Engineering College, Warangal, India

Mr. Bryan Joseph E. Matillano, M.Ed (General Science), Leyte Normal University, Tacloban, Philippines

Mr. Daniyan Ilesanmi Afolabi, M. Eng (Mechanical Eng.), B.Tech (Chemical Eng), Afe Babalola University, Ado Ekiti, Nigeria

Dr. MELLAL Mohamed Arezki, PhD, MSc, BSc, M'Hamed Bougara University, Algeria

Dr. Rui Liu, PhD (Chemical & Material Science), California Institute of Technology, Los Angeles, United States

Dr. Muhammad Nasrum, PhD, School of Management YAPIM, Maros, Indonesia

Dr. Manoranjan Pradhan, Ph.D(CS), M.Tech(CS), Gandhi Institute For Technological Advancement, Bhubaneswar, India

Mr. Mohd Dilshad Ansari, Ph.D(CSE)*, M.Tech (CSE), Jaypee University of Information Technology, Solan, India

Dr. Magdy Shayboub Ali Mahmoud, PhD (CS), Suez Canal University, Ismaillia, Egypt

Mr. Abhishek Shukla, PhD (CS)*, MCA, R D Engineering College, Ghaziabad, India

Dr. D Mallikarjuna Reddy, PhD (Mechanical), Reva Institute of Technology & Management, Bangalore, India

Mr. D Lei Guo, MS (Biochemistry and Molecular Biology), Washington University, St. Louis, United States

Dr. Rabinjyoti Khataniar, M.A., Ph.D (Economics), B.H.College, Barpeta, Assam, India

Dr. Rezaoui Mohamed Mounir, Phd, Ecole National Polytechnique, Ain Oussera, Algeria

Dr. Pratibha Kumari, PhD (Chem), M.Phil, MSc, BSC, University of Delhi, Delhi, India

Dr. B. P. Bhaskar, Ph.D (Soil Science and Agricultural Chemistry), National Bureau of Soil Survey and Land Use Planning (ICAR), Nagpur, India

Mr. Sivakumar V, M.Tech, M.Sc, Centre for Development of Advanced Computing (C-DAC), Pune, India

Dr. Miao Cui, MD, Icahn School of Medicine at Mount Sinai (ISMMS), New York, United States

Mr. Zairi Ismael Rizman, Master (Science) in Microelectronics, Universiti Teknologi MARA (UiTM) Terengganu, Dungun, Malaysia

Dr. Sri Ranjani Sivapalan, PhD, M.Phil, PGDHM, University of Jaffna, Jaffna, Sri Lanka

Ms. Yah Awg Nik, M. Ed. TTELT, Universiti Malaysia Kelantan, Kota Bharu, Malaysia

Dr. Yonghua Yan, PhD (Mathematics), University of Texas at Arlington, Texas, United States

Dr. Sunanda Sharma, PhD (Animal Reproduction, Veterinary Obstetrics & Gynecology), College of Veterinary & Animal Science, Rajasthan University of Veterinary & Animal Sciences, Bikaner, Rajasthan, India

Dr. George Kolanchery, Ph.D., M.A., LL.B., TESOL (UK), CELTA (Cambridge), Dhofar University, Dhofar, Oman

Dr. Halima Mustafa Elagib, PhD (Pharmacy), B. Pharm., M. Pharm., University of Hail, Saudi Arabia

Mr. Mohamed Moussaoui, M.S., PhD, School of Applied Sciences of Tangier (ENSAT), Tangier, Morocco

Mr. K. M. Anwarul Islam, Assistant Professor, MBA (Banking), The Millennium University, Dhaka, Bangladesh

Dr. Garima Tiwari, PhD (Forestry) MSc (Forestry), Guru Ghasidas Vishwavidhyalya, Bilaspur, India

Mr. Jithin Krishnan, M Tech, B Tech, Sree Chitra Tirunal Institute for Medical Sciences and Technology, Trivandrum, India

Mr. Kalipindi Murali, M.Tech (ECE), M.Sc (Electronics), Vijaya Institute of Technology for Women, Vijayawada, India

Mrs. Archana Tiwari, Masters (Microwave Engineering), Chhatrapati Shivaji Institute Of Technology, Durg, India

Dr. Richard Remedios, Ph.D, M.Phil, MBA, S.V.E.T Commerce & Management College, Jamnagar, India

Jawad Ahmad Dar, M.Tech (CSE), Kurukshetra University, Kurukshetra, Haryana, India

Mr. Roshan D Bhagat, M.E. Thermal Engineering, College of Engineering and Technology Akola, Maharashtra, India

Dr. Balaji Maroti Rajurkar, Ph.D.(Botany), M.Sc., M. Phil., B. Ed., R. S. Bidkar Arts, Commerce and Science College, Hinganghat, Maharashtra State, India

Mr. Bambang Eka Purnama, M.Kom, University of Surakarta, Boyolali, Jawa Tengah, Indonesia

Mr. Gautam Rampalli, M.Tech (SE), B.Tech (CSE), Kakatiya Institute of Technology & Science, Warangal, Telangana, India

Mr. Jeetendra Sainkhediya, Ph.D*, M.Phil, M.Sc., B.Sc., PMB Gujarati Science College, Indore, M.P., India

Mr. Satish Rewatkar, MBA, BIT Ballarpur, Nagpur, Maharashtra, India

Mr. Vinod Nayak, M Phil (CS), MCA, BSc, Nuclear Power Corporation of India Limited, Kaiga Generating Station, Karwar, Karnataka, India

Mr. Jasman Bin Esmon, Masters Degree of Technical & Vocational Education, Degree of Electrical Engineering, Malaysia Community College, Bahau, Negeri Sembilan, Malaysia

Mr. Koteswara Rao M, M.Tech (Chemical Engineering), BKIT Bhalki, Karnataka, India

Downloads: **137**

Research Paper | Agriculture | Indonesia | Volume 6 Issue 4, April 2017

Agroecosystem Stability and Breakdown Leaves on Mustard Cropping after Application by the *Bacillus thuringiensis*

Akhmad Gazali ^[3] | Ilhamiyah ^[3] | Achmad Jaelani

Abstract: . The purpose of this research are 1) To test the effect of the application of *Bacillus thuringiensis* reproduced using the artificial medium against mustard leaf damage caused by leaf-eating pests, 2) Comparing the stability of the mustard plant agroecosystem after applied by various concentrations of *B. thuringiensis*. Tests using a randomized block design with 5 treatments and 4 replications. The treatments were a) Control (application by water), b) Application *B. thuringiensis* using a concentration of 2 cc/l of water, c) Application *B. thuringiensis* using a concentration of 4 cc/l of water, d) Application *B. thuringiensis* using a concentration of 6 cc/l of water, e) Application *B. thuringiensis* using a concentration of 8 cc/l of water. Observed variables consist of any number of arthropod species found and the intensity of leaf damage. Data were analyzed by analysis of variance using a randomized block design, while the difference between the effect of treatment is determined by LSD. agro-ecosystem stability is determined by determining the diversity index by Shannon and Weaver, Domination Index, Richness Index of species, and the similarity index. Research results can be summarized as follows 1) Application *B. thuringiensis* can reduce the intensity of the damage caused by leaf-eating pests in crop mustard mustard, 2) The concentration of *B. thuringiensis* the most severe damage is low intensity is a concentration of 6 cc/l and 8 cc/l, 3) Planting mustard has the highest stability of mustard plant ecosystem treated *B. thuringiensis* applications with a concentration of 4 cc/l with a diversity index of 1.867.

Keywords: Agroecosystem stability, *Bacillus thuringiensis*, Breakdown leaves, Mustard, Diversity, Arthropods

Edition: Volume 6 Issue 4, April 2017,

Pages: 433 - 437

[Agroecosystem Stability and Breakdown Leaves on Mustard Cropping after Application by the *Bacillus thuringiensis*](#)

How to Cite this Article?

Akhmad Gazali, Ilhamiyah, Achmad Jaelani, "Agroecosystem Stability and Breakdown Leaves on Mustard Cropping after Application by the *Bacillus thuringiensis*", International Journal of Science and Research (IJSR), https://www.ijsr.net/get_abstract.php?paper_id=ART20172344, Volume 6 Issue 4, April 2017, 433 - 437, [#ijsrnet](#)

How to Share this Article?

Enter Your Email Address

Download PDF

Agroecosystem Stability and Breakdown Leaves on Mustard Cropping after Application by the *Bacillus thuringiensis*

Akhmad Gazali¹, Ilhamiyah², Achmad Jaelani³

¹Faculty of Agriculture, University of Lambung Mangkurat, Jl. A. Yani Simpang Empat Banjarbaru, South Kalimantan, Indonesia

^{2,3}Faculty of Agriculture, Islam University of Muhammad Arsyad Al Banjary, Banjarmasin, South Kalimantan, Indonesia

Abstract: The purpose of this research are: 1) To test the effect of the application of *Bacillus thuringiensis* reproduced using the artificial medium against mustard leaf damage caused by leaf-eating pests; 2) Comparing the stability of the mustard plant agroecosystem after applied by various concentrations of *B. thuringiensis*. Tests using a randomized block design with 5 treatments and 4 replications. The treatments were a) Control (application by water); b) Application *B. thuringiensis* using a concentration of 2 cc/l of water; c) Application *B. thuringiensis* using a concentration of 4 cc/l of water; d) Application *B. thuringiensis* using a concentration of 6 cc/l of water; e) Application *B. thuringiensis* using a concentration of 8 cc/l of water. Observed variables consist of any number of arthropod species found and the intensity of leaf damage. Data were analyzed by analysis of variance using a randomized block design, while the difference between the effect of treatment is determined by LSD. agro-ecosystem stability is determined by determining the diversity index by Shannon and Weaver, Domination Index, Richness Index of species, and the similarity index. Research results can be summarized as follows: 1) Application *B. thuringiensis* can reduce the intensity of the damage caused by leaf-eating pests in crop mustard mustard; 2) The concentration of *B. thuringiensis* the most severe damage is low intensity is a concentration of 6 cc/l and 8 cc/l; 3) Planting mustard has the highest stability of mustard plant ecosystem treated *B. thuringiensis* applications with a concentration of 4 cc/l with a diversity index of 1.867.

Keywords: Agroecosystem stability, *Bacillus thuringiensis*, Breakdown leaves, Mustard, Diversity, Arthropods

1. Introduction

Mustard is a vegetable crop that is much consumed by the people of Indonesia. Mustard plant widely grown in the province of South Kalimantan and Central Kalimantan. In South Kalimantan mustard plants are planted in low-lying areas such as Banjarbaru, Banjar District, Banjarmasin. Many factors cause low production of mustard plants in South Kalimantan, one of which is the disruption of insect pests. They are the mustard leaf-eating caterpillars, *Plutella xylostella* Linn, *Crocidolomia binotalis*, and Some types of grasshoppers. Without controlled use of pesticides, in the dry season these pests can cause damage to 100%. One of the factors controlling caterpillars and grasshoppers naturally available in nature is the bacterium *Bacillus thuringiensis* that endogenous and already beradaftasi in nature. Therefore we need a research to find *B. thuringiensis* is effective in controlling *P. xylostella* caterpillars and other pest on crop land.

The first step in the development and utilization of *B. thuringiensis* is undertaking these bacteria in nature, pathogenicity test, looking for mass propagation media and then test the influence of mass propagation medium the pathogenicity of *B. thuringiensis* against insect pests. Given the magnitude of destructive ability of leaf-eating pests against mustard plant, it is necessary to find a suitable medium for propagation of *B. thuringiensis* and can increase the pathogenicity against these pests, and is able to adapt to the environment tidal land.

The purpose of this study were 1) To test the effect of the application of *B. thuringiensis* reproduced using the artificial

medium against mustard leaf damage caused by leaf-eating pests; 2) Comparing the stability of the mustard plant agroecosystem after applied by various concentrations of *B. thuringiensis*.

2. Methodology

The research was conducted in the laboratory of Plant Pests and Diseases, Faculty of Agriculture, Lambung Mangkurat University, as well as the farmer's land. The study lasted four months. Materials used consist of distilled water, Luria-Bertani Broth, 0.25 M sodium acetate pH 6.8, T3 medium (per liter: 3 g tryptone, 2 g Tryptose, 1.5 g yeast extract; 0.05 M sodium phosphate pH 6.8 and 0.005 g MnCl₂), nutrient agar, and nutrient broth, alcohol, spirits, C media (a mixture of corn, rice, and soybeans). The tools used include petri dishes, test tubes, erlenmeyer glass, needles ose, phase contrast microscopes, bunsen lamp.

2.1. Purification of *Bacillus thuringiensis*

To obtain pure *B. thuringiensis* performed as follows, one ml *B. thuringiensis* culture in nutrient broth media resuspended into 9 ml of sterile distilled water and pasteurized at 80 ° C for 30 minutes. For the selection of *B. thuringiensis* one ml each suspension was added to 10 ml Luria-Bertani (Merck, Germany) broth (1.0% Tryptone, 0.5% Yeast Extract, 1.0% Sodium Chloride (NaCl), pH 7.0) by buffer with 0, 25 M sodium acetate pH 6.8. The suspension was heated at 30 ° C for four hours and then heated at a temperature of 80 ° C for 3 minutes. The suspension is diluted and cultured on the media T3 (per liter: 3 g tryptone, 2 g Tryptose, 1.5 g yeast extract; 0.05 M

sodium phosphate pH 6.8 and 0.005 g MnCl₂), then incubated at 30 °C for 24 hour (Travers *et al.*, 1987). Colonies that show the same morphology were selected and examined under a phase-contrast microscope to determine the presence of parasporal inclusion and spores. All isolates of *B. thuringiensis* was transferred into the medium Nutrient Agar to be slanted.

2.2. Propagation of *Bacillus thuringiensis* Berliner

C Media (a mixture of corn, rice, and soybeans) until smooth, then filtered using a sieve, in order to obtain a solid powder. 100 g of powdered solid medium boiled in 500 ml of distilled water to obtain a suspension medium, then filtered using a sieve. Filtered results readily used for propagation of *B. thuringiensis*. Bacteria used comes from the isolation of the exploration activities that have the pathogenicity of *B. thuringiensis* highest among all the bacteria *B. thuringiensis* tested. Insect pathogens propagated using media Nutrient Broth (NB) was to move the bacteria in pure culture in media NA slant aged 2 days to NB media in erlenmeyer using ose needle aseptically. Bacterial cultures were incubated for 48 hours at room temperature while shaken using a shaker. Two milliliters of *B. thuringiensis* cultures in NB media put into 50 ml of C medium, then shaken by using a shaker for one week. *Bacillus thuringiensis* is ready for field trials.

2.3. Research methods

Tests used a randomized block design with 5 treatments and 4 replications. The treatments were a) Control (application by water); b) Application *B. thuringiensis* using a concentration of 2 cc / l of water; c) Application *B. thuringiensis* using a concentration of 4 cc / l of water; d) Application *B. thuringiensis* using a concentration of 6 cc / l of water; e) Application *B. thuringiensis* using a concentration of 8 cc / l of water. Testing was conducted in farmer's land plot with an area the size of 2 x 4 m, the observed variables consisting of the amount of each species of arthropods found in experimental plots each treatment.

Variables observed consisted of the amount of each species of arthropods found in experimental plots and the estimated percentage of leaf damage to each leaf cultivation, further defined the overall category of attack to get the intensity of mustard leaf damage for each experimental unit. Observations arthropods using a fitfall trap, a yellow trap, light traps and insect netting with 10 double swing. Fitfal trap laid diagonally much as 3 pieces, while the yellow traps and light traps placed in the middle of the experimental plots respectively of the piece.

The intensity of the damage is determined by the following formula:

$$P = \frac{\sum ni.vi}{Z.N} \times 100 \%$$

Where :

P : intensity of leaf damage

N: the number of damaged leaves for each category of attack

v : numeric value category of attack

Z : numeric value category highest attack.

Categories attacks are :

0 = no attack at all

1 = damage > 0 - <20%

2 = damage 20% - <40%

3 = damage 40% - <60%

4 = damage 60% - <80%

5 = 80% damage - <100%

2.4 Data analysis

Data were analyzed using analysis of randomized block design variants, while the difference between the treatment effect is determined using LSD test. Agroekosistem stability is determined by considering Diversity Index, species richness Index, Dominance Index, and the similarity Index, as follows:

1. Dominance Index (C)

$$C = \sum (ni / N) 2$$

ni: total number of individuals of a species

N: total number of individuals of all species

2. The diversity index (H') by Shannon - Weaver (Southwood, 1978; Ludwig and Reynolds, 1988)

$$H' = - \ln \sum pi pi$$

pi: proportion of the i-th species in the total sample

3. The similarity index (E) according to Piloni (Ludwig and Reynolds, 1988)

$$E = H' / \ln S$$

H': diversity index

S: kind entirely

4. Species richness Index (R) according to Margalef (Ludwig and Reynolds, 1988).

$$R = \frac{S-1}{\ln N}$$

S: kind entirely

N: total number

3. Results and Discussion

3.1. Mustard Leaf damage

From the observation showed that the bacteria *B. thuringiensis* application can reduce the intensity of mustard leaf damage caused by leaf-eating pests of mustard. The highest damage was found in the mustard crop just sprayed with water or controls (24.70%), while crops that suffered damage which the smallest is the mustard crop is sprayed with *B. thuringiensis* with a concentration of 6 ml / l of water (8.80%) and 8 ml/l of water (7.60%) (Table 1).

Table 1: Average percentage of mustard leaf damage by leaf-eating pest of mustard

Treatments	The average percentage of leaf damage by the mustard leaf eaters (%)
Control (applied by water)	24.70 a
Application <i>B. thuringiensis</i> used a concentration of 2 cc / l of water	13.00 ab
Application <i>B. thuringiensis</i> used a concentration of 4 cc / l of water	11.20 bc
Application <i>B. thuringiensis</i> used a concentration of 6 cc / l of water	8.80 cd
Application <i>B. thuringiensis</i> used a concentration of 8 cc / l of water	7,60 d

Description: The average percentage of mustard leaf damage by insects or leaf eaters in the same column differ significantly based on the LSD test with a confidence level of 95%.

Applications effect of *B. thuringiensis* treatment by a concentration of 2 cc/l of water against of mustard leaf damage by pests compared to the application only of water (control). This is due to a concentration of 2 cc / l of water yet can be deadly of mustard leaf-eating pests optimally because of the number of doses consumed by the of mustard leaf-eating pests are still low, so most of the pest is still not death, but the effect of *B. thuringiensis* applications visible at the time of application *B. thuringiensis* enhanced concentration to 4 cc / l of water, and the effect increases with increasing the growing concentration of *B. thuringiensis*.

Effect of application *B. thuringiensis* against the decrease in the intensity of mustard leaf damage caused by leaf-eating pests of mustard looks after the concentration is increased to 4 cc/l of water and achieve a reduction in crop damage lowest of mustard is the of mustard crop concentration of the treated 6 cc/l of water and 8 cc/ l of water. This is due to the higher concentration of *B. thuringiensis*, the higher the cells or spores of *B. thuringiensis* were consumed leaf-eating pests. According Gazali *et. al.* (2015), the higher the concentration of *B. thuringiensis* which is applied to the mustard plant more also *P. xylostella* caterpillars are dying. The most effective concentration to reduce caterpillar populations of *P. xylostella* was 4 cc / l of water. Studies Don-Fronk (1971), found that application of *B. thuringiensis* microbial insecticide spraying at intervals of seven days is very effective in controlling pests of cabbage. According Sympathy (1985), that the deposit of *B. thuringiensis* for seven days after the application is still able to kill larvae of *P. xylostella* and *C. binotalis* . According Gazali *et al.* (1999) the higher dose of *B. thuringiensis* given on *P. xylostella* caterpillars increasingly *P. xylostella* infected and die. At the time of the research environment is highly favorable conditions for the development or proliferation of *B. thuringiensis*. This is in accordance with the opinion of Hilbert and Piggot (2004) *B. thuringiensis* ready to perform when the proliferation of environmental conditions such as temperature and nutrient availability support, while formation spore has proved triggered by internal factors and external including signals for hunger nutrition, cell density, and cell cycle progression. So that the environmental conditions that favor the process of infection of *B. thuringiensis* against of mustard leaf-eating pests sooner.

3.2 Agro-ecosystem stability

From the analysis of arthropod populations in cropping of mustard application by *B. thuringiensis* found that the arthropod diversity index, dominance index, index of species similarity and species richness index values obtained as shown in Table 2.

Table 2, indicating that the stability of agro-ecosystems are the highest found in of mustard crop treated with a concentration of *B. thuringiensis* spraying 4 cc/l is 1.867, while the lowest agro-ecosystem stability is the of mustard crop spraying treated by solution of *B. thuringiensis*

concentration of 8 cc/l is 1.445. The higher stability of the of mustard crop agroecosystem treated 4 cc/l due to the planting of mustard treated 4 cc/l cause the index value of species richness higher that resulted in higher values of diversity index.

Table 2: Average value of arthropod diversity index, dominance index, index of species similarity and index of species richness on of mustard crop treated with various concentrations of a solution of *B. thuringiensis*

Treatments	Diversity index	dominance index	Index of species similarity	Species richness Index
Control (applied by water)	1,603	0,303	0,717	2,313
Application <i>B. thuringiensis</i> used a concentration of 2 cc / l of water	1,744	0,217	0,778	2,247
Application <i>B. thuringiensis</i> used a concentration of 4 cc / l of water	1,867	0,256	0,742	2,848
Application <i>B. thuringiensis</i> used a concentration of 6 cc / l of water	1,748	0,074	0,742	2,526
Application <i>B. thuringiensis</i> used a concentration of 8 cc / l of water	1,455	0,355	0,689	1,883

According to Odum (1993) states that diversity is determined by two things: the level of species richness and similarity. The more types teridentifikasi then even higher species richness. While the degree of similarity is the distribution of all individuals that exist in a community. The higher the level of species richness and similarity, the higher the diversity index. Price (1997) states that an increasing number of food chain in an ecosystem will have an impact on improving the stability of the ecosystem. Dindal and Clifford (1977) adds that the stability of the ecosystem can be formed by an organism steady condition and is shown by the balance against the interference of external factors.

Pielou (1975) states that the high environmental stability was preceded by a high diversity. A community of more complex the higher the stability of the community system, so that a high diversity will lead to a high stability of the community. Oka (1995) explains that if a predator is only dependent on a prey species, then the consequences will be very volatile both populations, especially when they are both in a simple environment, so it can lead to the destruction of both populations. Interactions will be more stable if there are two or more species of prey, because if the prey species that the number is very down, then the other prey species may be increased in number because it is not noticed by predators. So thus planting mustard is applied to *B. thuringiensis* with a concentration of 4 cc/l highest stability of the ecosystem compared mustard crop being treated in addition to 4 cc/l. Index of species diversity and level of species richness in this experiment is still relatively low, according to Suana and Haryanto (2007), The level of diversity is low when the value of the diversity index $1 < H < 2$, and richness levels are low if the richness index level of species has $R < 3,5$. The lower the index value of diversity in cropping of mustard

treated with a concentration of *B. thuringiensis* 8 cc/l, due to the dominance index value is higher.

According to Odum (1993), which controlled biological communities are affected by a single species or group of species that dominate the environment and the organism is dominant, resulted in a high dominance index. Diversity will tend to be low in the ecosystem who are physically

restrained and regulated high in biological ecosystems. Croft (1990) states that the predators and parasitoids have large amounts on fauna communities in most agro-ecosystems. So the side effects of the application of *B. thuringiensis* directly or indirectly cause a significant change in the quantity of energy and the flow of nutrients in the ecosystem. Comparison of the effects between the treatment of the population variables can be seen in Figure 1.

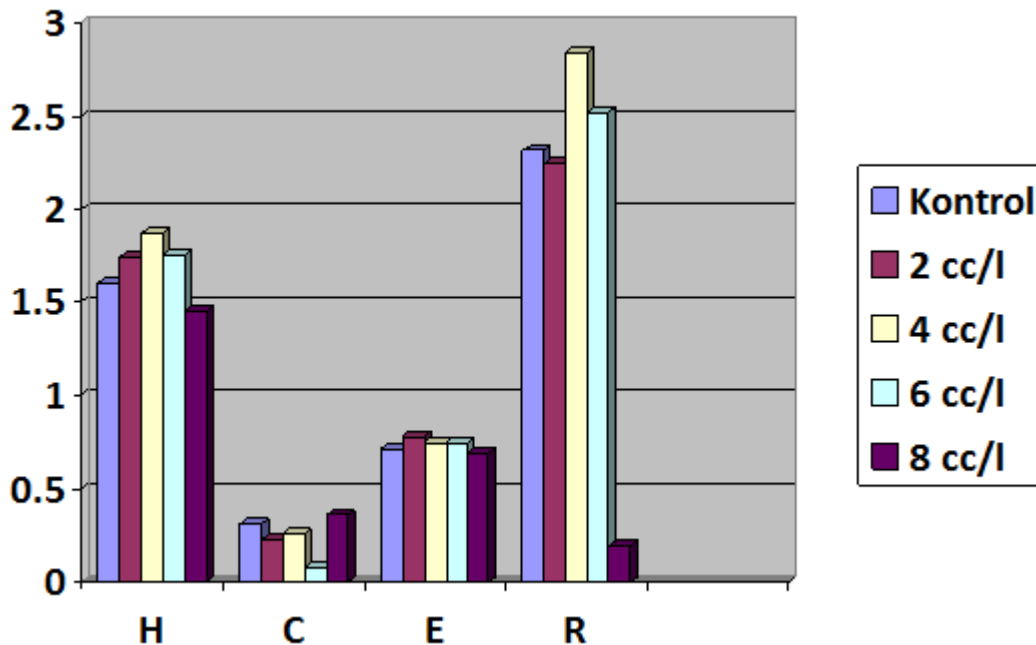


Figure 1: Graph of the comparison between the treatment of the population variable

Description: H = diversity index; C = Dominance Index; E = similarity Index of species; R = Richness Index of species.

4. Conclusions

From the research results can be summarized as follows:

- 1) Application *B. thuringiensis* can reduce the intensity of the damage caused by leaf-eating pests in the crop of mustard of mustard.
- 2) The concentration of *B. thuringiensis* most likely to decrease the intensity of damage is the concentration of 6 cc/l and 8 cc/l.
- 3) Cropping mustard has the highest stability of the ecosystem are planting of mustard treated *B. thuringiensis* application concentration of 4 cc/l lead diversity index 1.867.

5. Future Scope

The results of this study help to retain the quality and quantity of production of mustard, as well as health and environmental quality of mustard cropping ecosystems. Further research must be done on the field application of several different types of ecosystems crops that can be widely applied.

References

- [1] Croft, B. A. 1990. Arthropod Biological Control Agents and Pesticides. John Wiley & Sons, Inc., New York.
- [2] Dindal, D. L. and Clifford C. W. 1977. Community Structure and Role of Macroinvertebrate Decomposers in the Rehabilitation of Limestone Quarry. *In* Limstone Quarries : Responses to Land Use Pressure Allied Chem. Corp. (Eds. E. J. Perry and N. A. Richards), pp. 72-99. SUNY Coll. Environm. Sci. and Foretry, New York.
- [3] Don-Fronk, W. 1971. Vegetable crop insect. Pp. 375-402. *In*. R. E. Pfadt (ed.) Fundamental of applied entomology. Mac Millan Publishing Co., Inc., New York.
- [4] Gazali, A., Jaelani, A., and Ilhamiyah. 2015. Patogenicity of *Bacillus thuringiensis* which Isolated from Tidal Ecosystem against Diamond Backmoth Larvae, *Plutella xylostella* Linn. Asian Journal of Applied Sciences (AJAS) (ISSN: 2321 – 0893). 3(3): 513-518.
- [5] Gazali, A., Rachmadi HT., dan Ridwan. 1999. Patogenisitas *Bacillus thuringiensis* Berl. yang diisolasi dari tanah hutan di kabupaten Hulu Sungai Tengah terhadap ulat *Plutella xylostella* Linn., J. Entomol. Kalimantan: 1 (1): 13-19.
- [6] Hilbert, DW., and Piggot, PJ. 2004. Compartmentalization of gene expression during *Bacillus subtilis* spore formation. *Microbiol. Mol. Biol. Rev.* 68(2):234–262
- [7] Ludwig, J. A. and Renold, J.F. 1988. Statistical Ecology. John Wiley & Sons. New York.
- [8] Odum, E.P. 1993. Dasar-dasar Ekologi. Penerjemah Tjahjono Samingan. Gadjah Mada University Press. Yogyakarta.

- [9] Oka, I. N. 1995. Pengendalian Hama Terpadu dan Implementasinya di Indonesia. Gadjah Mada University Press. Yogyakarta.
- [10] Pielou, E. C. 1975. Ecological Diversity. John Wiley & Sons, Inc. New York.
- [11] Price, P. W. 1997. Insect Ecology. Third Edition. John Wiley & Sons, Inc. New York.
- [12] Simpati, I. K. 1985. Bactospein efficacy to control of diamondback moth, *Plutella xylostella* Linn. (Plutellidae) and *Crocidolomia binotalis* Zell. (Pylalidae). Thesis. KPK program of UGM-UNIBRAW. Malang.
- [13] Southwood, T. R. E. 1978. Ecological Methods. Second Edition. Chapman and Hall., New York.
- [14] Suana, I. W., and Haryato, H. 2007. Biodiversity Spiders in Rice Ecosystems and poly monoculture on the island of Lombok. Journal of Biological Science UNUD Denpasar, 11(1).
- [15] Travers, R. S., Martin, P. A. W. and Reichelderfer, C. F., 1987, Selective process for efficient isolation of soil *Bacillus* species. *Appl. Environ. Microbiol.*, **53** : 1263-1266.

Author Profile



Akhmad Gazali received the B.S., M.S., and Doctor degrees in agriculture entomology from Lambung Mangkurat University Faculty of agriculture in 1987, Post Graduate Program of Gadjah Mada University in agriculture entomology in 1992, and Post Graduate Program of Brawijaya University in agriculture science in 2004. 1988-now, he stayed in Faculty of Agriculture Lambung Mangkurat University, Ministry of Research, Technology and High Education of Indonesia



Ilhamiyah received the B.S., M.S. degrees in agriculture entomology from Lambung Mangkurat University Faculty of agriculture in 1990, and Post Graduate Program of Brawijaya University in Master of Management in 2002, 1994-now, she stayed in Faculty of Agriculture Islamic University of Muhammad Arsyad Al Banjary, Ministry of Research, Technology and High Education of Indonesia



Achmad Jaelani. received the B.S., degrees in Faculty of Animal Husbandry Science from Padjadjaran University 1993, Post Graduate Program of Bogor Agriculture Institute in Animal Husbandry Science in 1997, and Post Graduate Program of Bogor Agriculture Institute in Animal Husbandry Science in 2007. 1988-now, he stayed in Faculty of Agriculture Islamic University of Muhammad Arsyad Al Banjary, Ministry of Research, Technology and High Education of Indonesia