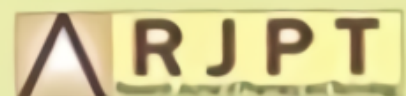


ISSN- 0974-3618 (Print)  
ISSN- 0974-360X (Online)

# Research Journal of Pharmacy and Technology

# RJPT

An International Peer-reviewed  
Journal of Pharmaceutical Sciences



## EDITOR IN CHIEF

---



DR. MRS. MONIKA S. DAHARWAL

[Editor In Chief](#)

A & V Publications, RJPT House, Lokmanya GrihNirman Society, Rohanipuram, In-front of Sector- 1, Pt. Deendayal Upadhyay Nagar, Raipur 492 010. (CG) India

Email: [editor.rjpt@gmail.com](mailto:editor.rjpt@gmail.com)

[Home Page](#)

## ASSOCIATE EDITOR

---



MARWAN MAHMOOD SALEH

[Associate Editor](#)

Anbar-Ramadi- Habbaniya- 4-4-17

Email: [bio.marwan92@gmail.com](mailto:bio.marwan92@gmail.com)

[Home Page](#)



DHANANJAY BABANRAO DESHMUKH

[Associate Editor](#)

Ashvin college of pharmacy manchi hill ashvi Bk sangamner Ahmednagar

Email: [dhananjaydeshmukh777@gmail.com](mailto:dhananjaydeshmukh777@gmail.com)

[Home Page](#)



DR.RER.NAT ARLI ADITYA PARIKES

[Associate Editor](#)

Department of Bioinformatics School of Life Sciences Indonesia International Institute for Life Sciences JI. Pulomas Barat Kav.88 Jakarta 13210

Email: [arli.parikesit@i3l.ac.id](mailto:arli.parikesit@i3l.ac.id)

[Home Page](#)



DR G KUMARASWAMY

[Associate Editor](#)

Dr.Kumara Swamy. Gandla Prof.& HeadDept.of Pharmaceutical AnalysisCare College of Pharmacy, Warangal, Telangana.Mobile: +91-9000973789

Email: [kumaraswamy.gandla@gmail.com](mailto:kumaraswamy.gandla@gmail.com)

[Home Page](#)



HARDIK PATHAK

[Associate Editor](#)

222 pashupatinath nagar, jaipur

Email: [hardikaeshu@gmail.com](mailto:hardikaeshu@gmail.com)

[Home Page](#)



MARIIA SHANAIDA

[Associate Editor](#)

46001, Ternopil, Voli Str., 1. Ukraine

Email: [shanyda-mi@ukr.net](mailto:shanyda-mi@ukr.net)

[Home Page](#)



DR. G. MANIKANDAN

[Associate Editor](#)

Dr. G.Manikandan Assistant Professor Department of Botany Sri Kaliswari College (Autonomous)  
Sivakasi - 626130 Tamil Nadu India

Email: [rgmani.19@gmail.com](mailto:rgmani.19@gmail.com)

[Home Page](#)



DR.S.MOHANASUNDARAM

[Associate Editor](#)

Department of Biochemistry, Sri Sankara Arts and Science College (Autonomous), Kanchipuram -  
631561, Tamilnadu, India

Email: [sbmohan2007@gmail.com](mailto:sbmohan2007@gmail.com)

[Home Page](#)



DR SHAEESTA K. BHAVIKATTI

[Associate Editor](#)

College of Dentistry, King Khalid University, Abha, Saudi Arabia

Email: [drshaeesta@gmail.com](mailto:drshaeesta@gmail.com)

[Home Page](#)



DR KARTEEK ESWARA

[Associate Editor](#)

T2,staff quarters, ksr Institutions, ksr kalvi nagar, Tiruchengode-637215, Tamilnadu

Email: [karteekeswara@gmail.com](mailto:karteekeswara@gmail.com)

[Home Page](#)

DR. CHUKWUEBUKA EMMANUEL UMEYO

[Associate Editor](#)



Department of Pharmaceutics and Pharmaceutical Technology, Faculty of Pharmaceutical Sciences, Nnamdi Azikiwe University, Awka, Anambra State, Nigeria  
Email: [ec.umeyor@unizik.edu.ng](mailto:ec.umeyor@unizik.edu.ng)  
[Home Page](#)



DR. PRANAV KUMAR PRABHAKAR  
[Associate Editor](#)  
Department of Transdisciplinary Research, Division of Research & Development, Lovely Professional University, Phagwara, Punjab, India-144402  
Email: [prabhakar.iitm@gmail.com](mailto:prabhakar.iitm@gmail.com)  
[Home Page](#)



EBAA ADNAN AZOOZ  
[Associate Editor](#)  
Iraq, Najaf  
Email: [ebaaadnan.ed12p@uokufa.edu.iq](mailto:ebaaadnan.ed12p@uokufa.edu.iq)  
[Home Page](#)



PROF. VIJAY D. MENDHULKAR  
[Associate Editor](#)  
Prof. and Head, Department of Botany The Institute of Science 15- Madame Cama Road Fort, Mumbai  
Email: [drmendhulkar@gmail.com](mailto:drmendhulkar@gmail.com)  
[Home Page](#)



DR. SUBRAT KUMAR PATTANAYAK  
[Associate Editor](#)  
Department of Chemistry NIT Raipur -492010, India  
Email: [skpiitbbs@gmail.com](mailto:skpiitbbs@gmail.com)  
[Home Page](#)



DR. UPENDRA PRASAD TRIPATHY  
[Associate Editor](#)  
JAYKAYPUR[PAPRI], RAYAGADA, ODISHA  
Email: [uptripathy@gmail.com](mailto:uptripathy@gmail.com)  
[Home Page](#)



SONAM BHATIA  
[Associate Editor](#)  
Dept. of Pharmaceutical Sciences, Faculty of Health Science, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj, India  
Email: [sonamniper.bhatia@gmail.com](mailto:sonamniper.bhatia@gmail.com)

[Home Page](#)



DR. GURJEET KAUR

[Associate Editor](#)

Amity Institute of Biotechnology Amity University Uttar Pradesh Lucknow India

Email: [gkaur@lko.amity.edu](mailto:gkaur@lko.amity.edu)

[Home Page](#)



HUSSEIN O.M. AL-DAHMOshi

[Associate Editor](#)

Iraq, Babylon Province Hilla City

Email: [dr.dahmoshi83@gmail.com](mailto:dr.dahmoshi83@gmail.com)

[Home Page](#)



DR. BISWAJIT BASU

[Associate Editor](#)

Dr. Biswajit Basu. Associate Professor. Department of Pharmaceutics. Bengal School of Technology, Sugandha, Delhi Road, Hooghly – 712 102, West Bengal India.

Email: [bbasu.pharma@gmail.com](mailto:bbasu.pharma@gmail.com)

[Home Page](#)



BIMESH KUMAR

[Associate Editor](#)

BLOCK-4B, ROOM NO 203, SCHOOL OF PHARMACEUTICAL SCIENCES, LOVELY PROFESSIONAL UNIVERSITY, PHAGWARA, PUNJAB, 144411

Email: [bimlesh1pharm@gmail.com](mailto:bimlesh1pharm@gmail.com)

[Home Page](#)



DR. BELLAMKONDA RAMESH

[Associate Editor](#)

Department of Food Technology, Vikrama Simhapuri University, Nellore, Andhra Pradesh, India-524320

Email: [rammygp@gmail.com](mailto:rammygp@gmail.com)

[Home Page](#)



K. MAHALINGAN

[Associate Editor](#)

RR College of Pharmacy, RR Nagar, Chickabanawara, Bangalore- 560090

Email: [kmahalingan@gmail.com](mailto:kmahalingan@gmail.com)

[Home Page](#)



DR. RUPESH K. GAUTAM

[Associate Editor](#)

MM School of Pharmacy, MM University, Ambala-Chandigarh Highway, Sadopur-Ambala (India)  
-134007

Email: [drrupeshgautam@gmail.com](mailto:drrupeshgautam@gmail.com)

[Home Page](#)



DR LINU MOHAN P

[Associate Editor](#)

Professor Department of Pharmacy Practice Al Shifa College of Pharmacy Perinthalmanna-  
Kerala- India

Email: [linumohanp@alshifacollegeofpharmacy.ac.in](mailto:linumohanp@alshifacollegeofpharmacy.ac.in)

[Home Page](#)



SHANKAR BALU KALBHARE

[Associate Editor](#)

YSPM'S Yashoda Technical Campus, Satara 415003

Email: [kirankal786@gmail.com](mailto:kirankal786@gmail.com)

[Home Page](#)



R.SUNDARALINGAM

[Associate Editor](#)

Assistant Professor, Department of Microbiology, Madras Christian College (Autonomous),  
Tambaram, Chennai - 600059. Tamilnadu

Email: [sundaralingam@mcc.edu.in](mailto:sundaralingam@mcc.edu.in)

[Home Page](#)



DR ANUPAM KR SACHAN

[Associate Editor](#)

Dayanand Dinanath College, Institute of Pharmacy, Kanpur Nagar, Uttar Pradesh-208027

Email: [anupamkrsachan@gmail.com](mailto:anupamkrsachan@gmail.com)

[Home Page](#)



MANIKANDAN K

[Associate Editor](#)

SRM College of Pharmacy SRM Institute of Science and Technology Kattankulathur,  
Kancheepuram

Email: [gurumani12@gmail.com](mailto:gurumani12@gmail.com)

[Home Page](#)



DR. PAVAN KUMAR

[Associate Editor](#)

Koneru Lakshmaiah Education Foundation KLEF

Email: [pavankmaths@gmail.com](mailto:pavankmaths@gmail.com)

[Home Page](#)



ASHEESH SINGH

[Associate Editor](#)

M-303, Swastik city near Pooja park, Lambha turning Narol-Ahmedabad-382405

Email: [asheesh\\_parihar@yahoo.com](mailto:asheesh_parihar@yahoo.com)

[Home Page](#)



SWARNIMA PANDEY

[Associate Editor](#)

Goel Institute of Pharmacy & Sciences ,Faizabad road lucknow 226028

Email: [yesgoldi@gmail.com](mailto:yesgoldi@gmail.com)

[Home Page](#)



DR. PARUL JOHRI

[Associate Editor](#)

C-1/167 indra nagar kanpur

Email: [pjohri@lko.amity.edu](mailto:pjohri@lko.amity.edu)

[Home Page](#)



MORTEZA SAKI

[Associate Editor](#)

Department of Microbiology, Faculty of Medicine Ahvaz Jundishapur University of Medical Sciences Ahvaz

Email: [mortezasaki1981@gmail.com](mailto:mortezasaki1981@gmail.com)

[Home Page](#)



DUMPALA LAKSHMIPRASUNA RAJESH

[Associate Editor](#)

Sumandeep Pharmacy college AT & PO: PIPARIA,WAGHODIA ROAD, TA: WAGHODIA, VADODARA- 391760

Email: [mlakshmiprasuna2015@gmail.com](mailto:mlakshmiprasuna2015@gmail.com)

[Home Page](#)

DR. S. BALASUBRAMANIYAN

[Associate Editor](#)

National Centre for Coastal Research Chennai.



Email: [sakthivelbala.s@gmail.com](mailto:sakthivelbala.s@gmail.com)  
[Home Page](#)



PROF. DR. NAGHAM MAHMOOD ALJAM  
[Associate Editor](#)  
Professor, Ph.D, Organic Chemistry , Iraq [dr.nagham\\_mj@yahoo.com](mailto:dr.nagham_mj@yahoo.com)  
Email: [dr.nagham\\_mj@yahoo.com](mailto:dr.nagham_mj@yahoo.com)  
[Home Page](#)



ARIF NUR MUHAMMAD ANSORI  
[Associate Editor](#)  
Universitas Airlangga, Surabaya, Indonesia.  
Email: [arif.nma-17@fkh.unair.ac.id](mailto:arif.nma-17@fkh.unair.ac.id)  
[Home Page](#)



DR.K.B.BHASKAR  
[Associate Editor](#)  
33B, kannadhasan street, new balaji nagar, selaiyur , chennai.  
Email: [jaibhaskar15@gmail.com](mailto:jaibhaskar15@gmail.com)  
[Home Page](#)



DIMPLE NAGPAL  
[Associate Editor](#)  
Chitkara University,Punjab  
Email: [dimplenagpal009@gmail.com](mailto:dimplenagpal009@gmail.com)  
[Home Page](#)



DR VINAYAKUMAR KADIBAGIL  
[Associate Editor](#)  
BELUR ROAD, 2ND CROSS ABHI Building  
Email: [DRVINAYKADIBAGIL@GMAIL.COM](mailto:DRVINAYKADIBAGIL@GMAIL.COM)  
[Home Page](#)



DR. ATUL KABRA  
[Associate Editor](#)  
University Institute of Pharma Sciences Chandigarh University Mohali, Punjab  
Email: [atul.kbr@gmail.com](mailto:atul.kbr@gmail.com)  
[Home Page](#)





MOHD IBRAHIM ALARAJ  
[Associate Editor](#)  
Airport St. Amman, Jordan  
Email: [ibrahim\\_naseem@yahoo.com](mailto:ibrahim_naseem@yahoo.com)  
[Home Page](#)



RAVINANDAN A P  
[Associate Editor](#)  
Mr. Ravinandan A P, M. Pharm, MBA, FSASS, (Ph.D.) Assistant Professor, Clinical Pharmacist and Research Scholar Department of Pharmacy Practice Sree Siddaganga College of Pharmacy In Collaboration with Siddaganga Hospital and Research Centre BH Road, Tumkur, Karnataka, India  
Email: [ravinandanap@gmail.com](mailto:ravinandanap@gmail.com)  
[Home Page](#)



DR. PUTTA RAJESH KUMAR  
[Associate Editor](#)  
Dr. Putta Rajesh Kumar, C/o: Amdapur X Road, Yenkapally, Moinabad, Ranga Reddy, Hyderabad, Telangana 500075 INDIA Mobile: 0-949-072-1376  
Email: [prkbpc@gmail.com](mailto:prkbpc@gmail.com)  
[Home Page](#)



DR. SRIKANTH JEYABALAN  
[Associate Editor](#)  
Department of Pharmacology Sri Ramachandra Faculty of Pharmacy Sri Ramachandra Institute of Higher Education & Research (DU) Porur, Chennai , Tamil Nadu - 600 116  
Email: [srikanth.j@sriramachandra.edu.in](mailto:srikanth.j@sriramachandra.edu.in)  
[Home Page](#)



PROF.B.RAMYA KUBER  
[Associate Editor](#)  
Prof.B.Ramya Kuber, Professor of Pharmacognosy Institute of Pharmaceutical Technology, Sri Padmavati Mahila Visvavidyalayam(Women's University), Tirupati-517502, Andhra Pradesh,India.  
Email: [rkuberpharma@yahoo.com](mailto:rkuberpharma@yahoo.com)  
[Home Page](#)



DR GOVINDH BODDETI  
[Associate Editor](#)  
Door Number: 1-1-33/A, New Venkojipalem  
Email: [govindhbd@gmail.com](mailto:govindhbd@gmail.com)  
[Home Page](#)



DR DURGESH RANJAN KAR

[Associate Editor](#)

BENGAL SCHOOL OF TECHNOLOGY A COLLEGE OF PHARMACY SUGHANDHA  
CHUCHURA DIST- HOOGHLY WEST BENGAL INDIA

Email: [durgesh176@gmail.com](mailto:durgesh176@gmail.com)

[Home Page](#)



MORTHA LAKSHMI PRASANNA

[Associate Editor](#)

VJ'S COLLEGE OF PHARMACY Diwancheruvu Rajahmundry, andhra pradesh Pin 533296

Email: [luckympharma09@gmail.com](mailto:luckympharma09@gmail.com)

[Home Page](#)



DR. GARIMA MISHRA

[Associate Editor](#)

Department of Pharmacy, College of Health Sciences, Debre Tabor University, Ethiopia

Email: [gp\\_nmr2002@yahoo.co.in](mailto:gp_nmr2002@yahoo.co.in)

[Home Page](#)



DR. PRADEEP SINGH

[Associate Editor](#)

Department of Pharmacy, College of Health Sciences, Debre Tabor University, Ethiopia

Email: [pradeep\\_2682@yahoo.co.in](mailto:pradeep_2682@yahoo.co.in)

[Home Page](#)



DR. DAVID PAUL

[Associate Editor](#)

St.James College of Pharmaceutical Sciences St.James Medical Academy River Bank,  
Chalaky Kerala, India-680307

Email: [davidpaulred@gmail.com](mailto:davidpaulred@gmail.com)

[Home Page](#)



DR.S.SASIKALA

[Associate Editor](#)

Head and Associate professor Department of Computer Science with Cognitive Systems  
Hindusthan College of Arts and Science, Coimbatore – 641028, Tamilnadu, India.

Email: [iamsasikalamohit@gmail.com](mailto:iamsasikalamohit@gmail.com)

[Home Page](#)

DR. A.K. JHA

[Associate Editor](#)



Principal, Shri Shakaracharya College of Pharma. Sciences, Bhilai CG India  
Email: [jhaak@rediffmail.com](mailto:jhaak@rediffmail.com)  
[Home Page](#)



DR. NAGHAM MAHMOOD ALJAMALI  
[Associate Editor](#)  
college Education , department , IRAQ.  
Email: [dr.nagham\\_mj@yahoo.com](mailto:dr.nagham_mj@yahoo.com)  
[Home Page](#)



DR. R. B. KAKADE  
[Associate Editor](#)  
Professor, Uni. Dept. of Pharmaceutical Sci., RTM Nagpur University, Nagpur India  
Email: [drkakde@yahoo.com](mailto:drkakde@yahoo.com)  
[Home Page](#)



WISSAM ZAM  
[Associate Editor](#)  
Al-Andalus University of Medical Sciences/Faculty of Pharmacy-Tarous, Syria  
Email: [w.zam@au.edu.sy](mailto:w.zam@au.edu.sy)  
[Home Page](#)



DR. VIBHA YADAV  
[Associate Editor](#)  
Covington, LA, USA  
Email: [editor.rjpt@gmail.com](mailto:editor.rjpt@gmail.com)  
[Home Page](#)



DR. S. ASHUTOSH KUMAR  
[Associate Editor](#)  
Department of Pharmacy, Tripura University (A Central University) Suryamaninagar, West Tripura,  
Tripura- 799022.  
Email: [ashu.mpharm2007@gmail.com](mailto:ashu.mpharm2007@gmail.com)  
[Home Page](#)



DR. U.S. MAHADEVA RAO  
[Associate Editor](#)  
Kuala Terengganu, Malaysia  
Email: [raousm@gmail.com](mailto:raousm@gmail.com)  
[Home Page](#)



CHANDRASEKARAN V M

[Associate Editor](#)

124 Technology Tower VIT University Vellore 632014 (TN)

Email: [vmcsn@yahoo.com](mailto:vmcsn@yahoo.com)

[Home Page](#)



NAEEM HASAN KHAN

[Associate Editor](#)

Faculty of Pharmacy, AIMST University, 08100 Bedong, Kedah D.A., Malaysia.

Email: [naeemhshirazi@hotmail.com](mailto:naeemhshirazi@hotmail.com)

[Home Page](#)



DR. DEEPANSH SHARMA

[Associate Editor](#)

Block 28, Room No. 202 Department of Biosciences, Lovely Professional University

Email: [deepanshsharma@gmail.com](mailto:deepanshsharma@gmail.com)

[Home Page](#)



DR. S. SARAF

[Associate Editor](#)

Professor, University Institute of Pharmacy , PT. Ravishankar Shukla University, Raipur-492010

CG India Vice- President, Pharmacy Council of India, New Delhi

Email: [shailendrasarf@rediffmail.com](mailto:shailendrasarf@rediffmail.com)

[Home Page](#)



DR. DEEPENDRA SINGH

[Associate Editor](#)

University Institute of Pharmacy Pt. Ravishankar Shukla University Raipur(C.G.)

Email: [deependraiop@gmail.com](mailto:deependraiop@gmail.com)

[Home Page](#)



DR S RAJESHKUMAR

[Associate Editor](#)

Nanotherapy Lab School of Biosciences and Technology, VIT, Vellore

Email: [ssrajeshkumar@hotmail.com](mailto:ssrajeshkumar@hotmail.com)

[Home Page](#)

VASUNDHRA KASHYAP PHD, MBA, MS



Associate Editor  
66 Lowden Avenue, Somerville, MA 02144 USA  
Email: [vk76@cornell.edu](mailto:vk76@cornell.edu)  
[Home Page](#)



ROMAN LYSIUK  
Associate Editor  
Department of Pharmacognosy and Botany, Danylo Halytsky Lviv National Medical University,  
Pekarska,69., Lviv, Ukraine, 79010  
Email: [pharmacognosy.org.ua@ukr.net](mailto:pharmacognosy.org.ua@ukr.net)  
[Home Page](#)



BEHZAD FOROUTAN  
Associate Editor  
Department of Pharmacology, School of Medicine, Shahroud University of Medical Sciences,  
Shahroud, Iran  
Email: [behzad\\_foroutan@hotmail.com](mailto:behzad_foroutan@hotmail.com)  
[Home Page](#)

## ACADAMIC EDITOR

---



DR. BHARTI AHIRWAR  
Associate Professor, SLT Institute of Pharm. Sciences, Guru Ghasidas University, Bilaspur CG  
India  
Email: [ah\\_bharti@yahoo.com](mailto:ah_bharti@yahoo.com)  
[Home Page](#)



SUDHISH A. RAI  
RJPT House, Lokmanya GrihNirman Society, Rohanipuram, In-front of Sector- 1, Pt. Deendayal  
Upadhyay Nagar, Raipur 492 010. (CG) India  
Email: [sudhishrai7337@gmail.com](mailto:sudhishrai7337@gmail.com)  
[Home Page](#)



DR. ASHOK A. HAJARE  
Professor and Head, Department of Pharm. Tech., Bharati Vidyapeeth College of Pharmacy,  
Kolhapur (M. S.), India Pin - 416013  
Email: [ashok.hajare@bharativedyapeeth.edu](mailto:ashok.hajare@bharativedyapeeth.edu)  
[Home Page](#)



SANYAM GANDHI

International Regulatory Strategy Lead Takeda Pharmaceutical Company Ltd., 1 Kingdon St., Paddinton, London, W2 6BD England  
Email: [askforsanyam@gmail.com](mailto:askforsanyam@gmail.com)  
[Home Page](#)



DR. AJAY KUMAR MEENA

Captain Srinivasa Murthy Regional Ayurveda Drug Development Institute, Arumbakkam, Chennai – 600 106  
Email: [ajaysheera@gmail.com](mailto:ajaysheera@gmail.com)  
[Home Page](#)

## EDITORS

---



DR AVINASH B DAREKAR

KVNNSPS, Institute of Pharmaceutical Education and Research, Canada Corner, Nashik, Maharashtra-422002.  
Email: [avibdarekar@gmail.com](mailto:avibdarekar@gmail.com)  
[Home Page](#)



PRAVEEN KUMAR SHARMA

Department of Chemistry, Lovely Professional University, Phagwara, Punjab, India-144411  
Email: [pk\\_pandit1982@yahoo.com](mailto:pk_pandit1982@yahoo.com)  
[Home Page](#)



DR SUDIP KUMAR MANDAL

Dr. B. C. Roy College of Pharmacy & Allied Health Sciences, Durgapur, West Bengal, India  
Email: [gotosudip79@gmail.com](mailto:gotosudip79@gmail.com)  
[Home Page](#)



DR K MANIKANDAN

Dr.K.Manikandan, M.Pharm., Ph.D., Associate Professor, SRM College of Pharmacy, SRM University, Kattankulathur, Kancheepuram - 603203 Mobile Number - 0 9444708710  
Email: [manikank2@srmist.edu.in](mailto:manikank2@srmist.edu.in)  
[Home Page](#)



DR SHAIK HARUN RASHEED

professor & Head Srikrupa Institute of Pharmaceutical Sciences Velikatta, siddipet -502277  
Telangana.

Email: [shaikharunrasheed@gmail.com](mailto:shaikharunrasheed@gmail.com)

[Home Page](#)



DR. ASHISH KUMAR

Professor and HOD, Department of Chemistry, Lovely Professional University, Jalandhar road  
Phagwara

Email: [drashishchemlpu@gmail.com](mailto:drashishchemlpu@gmail.com)

[Home Page](#)



DR. SHAKTA MANI SATYAM

Department of Pharmacology, Melaka Manipal Medical College (Manipal Campus), Manipal  
Academy of Higher Education, Manipal- 576104, District- Udupi, State- Karnataka (India)

Email: [smsatyam21@gmail.com](mailto:smsatyam21@gmail.com)

[Home Page](#)



ABDULRAHMAN R. MAHMOOD

\*Department of Chemistry, College of Education for Pure Sciences/(Ibn-Al-Haitham), University of  
Baghdad, Baghdad, Iraq.

Email: [abdooljumaily@gmail.com](mailto:abdooljumaily@gmail.com)

[Home Page](#)



DR. SUSHIL KUMAR MIDDHA

Maharani Lakshmi Ammanni College For Women, 18th Cross, Malleswaram, Bangalore-12

Email: [drsushilmiddha@gmail.com](mailto:drsushilmiddha@gmail.com)

[Home Page](#)



MUNIM R. ALI

Al-Mustansiriyah University Biology depart./college of Science Iraq/Baghdad

Email: [mnumbio77@yahoo.com](mailto:mnumbio77@yahoo.com)

[Home Page](#)



DR. GAURAV TIWARI

G-23, Department of Pharmacy, PSIT, NH-2, Kalpi Road, Bhaunti Kanpur 209305

Email: [dr.gauravtiwari@psit.in](mailto:dr.gauravtiwari@psit.in)

[Home Page](#)



DR. ZEYAD KADHIM OLEIWI  
najaf-iraq  
Email: [zeyadkadhim@alkafeel.edu.iq](mailto:zeyadkadhim@alkafeel.edu.iq)  
[Home Page](#)



ASSIST. PROF. DR. AMAL TALIB A  
Dept. Clinical Laboratory Sciences/ Faculty of Pharmacy/ University of Babylon, Iraq.  
Email: [amal.atiyah@yahoo.com](mailto:amal.atiyah@yahoo.com)  
[Home Page](#)



YAHIA MOHAMMAD MOUALLA  
Alsham private university, Latakia  
Email: [Yahiamoualla@hotmail.com](mailto:Yahiamoualla@hotmail.com)  
[Home Page](#)



MOHANAD MOUSA KAREEM  
Babylon University  
Email: [mohanad\\_1972@yahoo.com](mailto:mohanad_1972@yahoo.com)  
[Home Page](#)



ADAWIYA FADHIL ABBAS ALZUBAIDI  
Iraq / Diyala / Baqubah Diyala university / education college / pure science  
Email: [adwa\\_a2000@YAHOO.COM](mailto:adwa_a2000@YAHOO.COM)  
[Home Page](#)



MOUSHIRA ZAKI  
El Bhouth ST.  
Email: [moushiraz@yahoo.com](mailto:moushiraz@yahoo.com)  
[Home Page](#)



DR. AMIT KUMAR CHATURVEDI  
Department Of Chemistry, J.S.University , Shikohabad (U.P.)  
Email: [achaturvedi794@gmail.com](mailto:achaturvedi794@gmail.com)  
[Home Page](#)





DR. MANOJ KUMAR JENA

Department of Biotechnology, School of Bioengineering and Biosciences, Lovely Professional University, Phagwara-144411, Punjab, India

Email: [manoj.20283@lpu.co.in](mailto:manoj.20283@lpu.co.in)

[Home Page](#)



AVINASH BABURAO THALKARI

Vasant Pharmacy College Kaij Affiliated by MSBTE Mumbai

Email: [avinashthalkari@rediffmail.com](mailto:avinashthalkari@rediffmail.com)

[Home Page](#)



RAJESH L. DUMPALA

Alembic Pharma Campus, Alembic Rd, Subhanpura, Vadodara, Gujarat 390003

Email: [rdumpala64@gmail.com](mailto:rdumpala64@gmail.com)

[Home Page](#)



ABDULRAHMAN R. MAHMOOD

\*Department of Chemistry, College of Education for Pure Sciences/(Ibn-Al-Haitham), University of Baghdad, Baghdad, Iraq.

Email: [abdulrahman.r.m@ihcoedu.uobaghdad.edu.iq](mailto:abdulrahman.r.m@ihcoedu.uobaghdad.edu.iq)

[Home Page](#)



DR. T.C. VENKATESWARULU

Department of Bio-Technology, Vignan's Foundation for Science, Technology & Research, Vadlamudi-522213, Andhra Pradesh

Email: [venki\\_biotech327@yahoo.com](mailto:venki_biotech327@yahoo.com)

[Home Page](#)



DR PRASHANT L. PINGALE

Associate Professor of Pharmaceutics, GES's Sir Dr. M. S. Gosavi College of Pharmaceutical Education and Research, Nashik-422005, Maharashtra, India

Email: [prashantpingale@gmail.com](mailto:prashantpingale@gmail.com)

[Home Page](#)



DR GURVINDER SINGH

School of Pharmaceutical Sciences, Lovely Professional University, Phagwara, Punjab

Email: [guri\\_ph@yahoo.co.in](mailto:guri_ph@yahoo.co.in)

[Home Page](#)



DR.SUSHANT KUMAR

UTTAR PRADESH UNIVERSITY OF MEDICAL SCIENCES, SAIFAI, ETWAH, UTTAR PRADESH

Email: [K.SUSHANT25@GMAIL.COM](mailto:K.SUSHANT25@GMAIL.COM)

[Home Page](#)



MR. PARESH ASHOK PATIL

Jay ambe Nivas,Gujar galli, Shahada Dist-Nandurbar

Email: [rcp.pareshpatil@gmail.com](mailto:rcp.pareshpatil@gmail.com)

[Home Page](#)



VAMSIKRISHAN BIRUPANENI

4401 manchester avenue, Apt#53,CA,95207.

Email: [vamsikrishan99@gmail.com](mailto:vamsikrishan99@gmail.com)

[Home Page](#)



DR. SUNIL KUMAR

122 Ground Floor Research Block A Post Graduate Institute of Medical education and Research

Email: [drsunikumarjaswal@gmail.com](mailto:drsunikumarjaswal@gmail.com)

[Home Page](#)



SANDEEP PODDAR

Lincoln University College, Wisma Lincoln, No. 12-18, Off Jalan Perbandaran, SS6/12 Kelana Jaya, Selangor D. E. , Malaysia

Email: [sandeepoddar@lincoln.edu.my](mailto:sandeepoddar@lincoln.edu.my)

[Home Page](#)



DR ZAKIR HUSSAIN

Dr Zakir hussain S/o MD.UNUS Rtd Express mail guard SCRLY Near mohammadia masjid, Satyanarayana pet GUNTAKAL-515801 ANANTAPUR DIST ANDHRA PRADESH-INDIA

Email: [zakirhussains765@gmail.com](mailto:zakirhussains765@gmail.com)

[Home Page](#)



BASIL A. ABBAS

University of Basrah, Basrah, Iraq

Email: [basil.abbas@uobasrah.edu.iq](mailto:basil.abbas@uobasrah.edu.iq)

[Home Page](#)



DR V. PALANISINGH

Puduvadi, Ulagampatti post Sivagangai Dist, Tamil Nadu PIN 630410

Email: [vpalanisingh@gmail.com](mailto:vpalanisingh@gmail.com)

[Home Page](#)



NASIR MUWFAQ YOUNIS

University of Mosul \_College of Nursing

Email: [nasir.mufaq@uomosul.edu.iq](mailto:nasir.mufaq@uomosul.edu.iq)

[Home Page](#)



SANDIP SEN

SRIKRUPPA INSITUTE OF PHARMACEUTICAL SCIENCES, VELIKATTA, KONDAPKKA,  
SIDDIPET-502277

Email: [sandipen2010@gmail.com](mailto:sandipen2010@gmail.com)

[Home Page](#)



DR. BISWA MOHAN SAHOO

Roland Institute of Pharmaceutical Sciences (Biju Patnaik University of Technology Nodal Centre  
of Research) Berhampur-760010, Odisha, India

Email: [drbiswamohansahoo@gmail.com](mailto:drbiswamohansahoo@gmail.com)

[Home Page](#)



DR.MATADEEN BHARTI

Department of Fluorosis Chief Medical and Health Office Dhar District Dhar MP India pin code  
454001

Email: [drmdbharti@gmail.com](mailto:drmdbharti@gmail.com)

[Home Page](#)



DR PRASENJIT MONDAL

Vaageswari institute of Pharmaceutical Sciences, Ramakrishna colony, Karimnagar, Telangana,  
India

Email: [prasenjitmyname@gmail.com](mailto:prasenjitmyname@gmail.com)

[Home Page](#)



DR ANJU THAWARE

Associate professor, Dept of samhita Siddhant ,MGACRCH,salod wardha ,(DMIMSU,wardha)  
Maharashtra ,India

Email: [anju.samhita@dmimsu.edu.in](mailto:anju.samhita@dmimsu.edu.in)

[Home Page](#)



DR. NITIN SHARMA

Department of Biotechnology Chandigarh Group of Colleges, Landran, Mohali- 140307

Email: [nitin.3994@cgc.edu.in](mailto:nitin.3994@cgc.edu.in)

[Home Page](#)



PROF. GALLA RAJITHA

Prof. G. Rajitha, Professor, Institute of Pharmaceutical Technology, Sri Padmavati Mahila Visvavidyalayam, Tirupati - 517502, Andhra Pradesh, India

Email: [rajitha.galla@gmail.com](mailto:rajitha.galla@gmail.com)

[Home Page](#)



ASHISH GUPTA

Flat no.E113,Nariman Point, Mahalaxmi Nagar Indore MP

Email: [ashishgupta@acropolis.edu.in](mailto:ashishgupta@acropolis.edu.in)

[Home Page](#)



HUSAM AL-HRAISHAWI

195 Little Albany St,

Email: [hra10@scarletmail.rutgers.edu](mailto:hra10@scarletmail.rutgers.edu)

[Home Page](#)



TUHIN SARKAR

Jakir Hossain Institute of Pharmacy, Vill. & P.O.- Miapur, Dist.- Murshidabad, Pin: 742225, West Bengal.

Email: [gantuhin@gmail.com](mailto:gantuhin@gmail.com)

[Home Page](#)



BHUPENDRA G. PRAJAPATI

Ganpat Vidyanagar, Mahesna 384012

Email: [bhupen27@gmail.com](mailto:bhupen27@gmail.com)

[Home Page](#)

DR K RAJYALAKSHMI

Department of Pharmaceutical Chemistry, Vignan Pharmacy College, Vadlamudi, Guntur, A.P.



Email: [drkrl3579@gmail.com](mailto:drkrl3579@gmail.com)  
[Home Page](#)



SOURAVH BAIS  
474 VIP PARASPAR NAGAR  
Email: [souravh2008.123@rediffmail.com](mailto:souravh2008.123@rediffmail.com)  
[Home Page](#)



DR. D.S.JAYALAKSHMI  
Sathyabama Institute of Science and Technology (deemed to be University), Rajiv Gandhi Salai,  
OMR  
Email: [jayaanand10@gmail.com](mailto:jayaanand10@gmail.com)  
[Home Page](#)



DR. PARTHA NIYOGI  
SCHOOL OF PHARMACY THE NEOTIA UNIVERSITY SARISHA, DIAMOND HARBOUR WEST  
BENGAL- 743 368  
Email: [partha.niyogi@tnu.in](mailto:partha.niyogi@tnu.in)  
[Home Page](#)



DR. RAJIV DUTTA  
Shobhit Institute of Engineering & Technology (Deemed-to-be-University) NH-58, Modipuram  
Meerut, UP-250110. India  
Email: [director.sbt@gmail.com](mailto:director.sbt@gmail.com)  
[Home Page](#)



PRAVEEN KUMAR UPPALA  
LIG 163 Alakananda colony, Vizianagaram, Andhra Pradesh  
Email: [praveen.chintu32@gmail.com](mailto:praveen.chintu32@gmail.com)  
[Home Page](#)



RAMAKRISHNA REDDY H  
#32, Shiva shakti, 4th Cross, KBL Elite layout, J.P.Nagar 8th Phase, Bangalore-560108,  
Karnataka state, India.  
Email: [rkreddy\\_h@yahoo.co.in](mailto:rkreddy_h@yahoo.co.in)  
[Home Page](#)



DR. PRAVIN KUMAR SHARMA

Acropolis Institute of Pharmaceutical Education and Research, Indore

Email: [praveensharma910@gmail.com](mailto:praveensharma910@gmail.com)

[Home Page](#)



DR. FORAT YASIR ALJABERI

Chemical Engineering Department, College of Engineering, Al-Muthanna University, Samawa, Iraq

Email: [furatyasir@mu.edu.iq](mailto:furatyasir@mu.edu.iq)

[Home Page](#)



DR. L. NANDHAKUMAR

Kastooribha Gandhi Pharmacy college Namakkal, Rasipuram

Email: [drndkumar12@gmail.com](mailto:drndkumar12@gmail.com)

[Home Page](#)



PROF. DR. RAJIV DUTTA

SHOBHIT UNIVERSITY, GANGOH

Email: [director.sbt@gmail.com](mailto:director.sbt@gmail.com)

[Home Page](#)



AHMED ALI MHAWESH

Baghdad/Iraq Al-Ghadeer Quarter

Email: [alshammariahmed.a.m@gmail.com](mailto:alshammariahmed.a.m@gmail.com)

[Home Page](#)



DR JAGDISH KAKADIYA

Department of Pharmacology, Parul Institute of Pharmacy and Research, Parul University, Vadodara, Gujarat, India

Email: [jagdishkakadiya@gmail.com](mailto:jagdishkakadiya@gmail.com)

[Home Page](#)



MAJIDA HAMEED KHAZAAL

Kufa University

Email: [majdahamed69@yahoo.com](mailto:majdahamed69@yahoo.com)

[Home Page](#)



DR. SHOBHIT KUMAR

Dr. Shobhit Kumar, Associate Professor, Department of Pharmaceutical Technology, Meerut Institute of Engineering and Technology (MIET), NH-58, Delhi-Roorkee Highway, Meerut-250005, Uttar Pradesh, India. Tel: +91 9675598375 E-mail: shobhitkmr87@gmail.com  
shobhit.kumar@miet.ac.in  
Email: [shobhit.kumar@miet.ac.in](mailto:shobhit.kumar@miet.ac.in)  
[Home Page](#)



DR. P. DWARAKANADHA REDDY

Annamacharya College of Pharmacy, Rajampet-516126, Andhra Pradesh, India  
Email: [dwarakanadhareddyperam@gmail.com](mailto:dwarakanadhareddyperam@gmail.com)  
[Home Page](#)



PROF. MATOLE VINOD KALIDAS

Shivai Charitable trust's College of Pharmacy, Koregaonwadi Tal. Omerga Dist. Dharashiv Maharashtra India  
Email: [matole7414@gmail.com](mailto:matole7414@gmail.com)  
[Home Page](#)



SANKARGANESH

3/478, Ajith nagar, Sathankuppam, Kelambakkam-603103, Chennai, TN  
Email: [bilisankar@gmail.com](mailto:bilisankar@gmail.com)  
[Home Page](#)



ALAA HUSSEIN AL-DARRAJI

Iraq-Misan  
Email: [alaa.hussein@uomisan.edu.iq](mailto:alaa.hussein@uomisan.edu.iq)  
[Home Page](#)



MANISH KUMAR

SD College, Barnala-148101, Punjab, India.  
Email: [manish@sdcollegeinstitutions.org](mailto:manish@sdcollegeinstitutions.org)  
[Home Page](#)



DR. DINANATH TUKARAM GAIKWAD

223, Shamrao Kumbhar Nagar, Nanapatil Nagar, Kolhapur, Maharashtra, India  
Email: [gddinanath@gmail.com](mailto:gddinanath@gmail.com)  
[Home Page](#)



BEHZAD FOROUTAN

Department of Pharmacology School of Medicine Shahroud University of Medical Sciences

Shahroud, IRAN

Email: [behzad\\_foroutan@hotmail.com](mailto:behzad_foroutan@hotmail.com)

[Home Page](#)



DR. AMIT ROY

Principal, Columbia Institute of Pharmacy, Raipur CG India

Email: [wakratund@gmail.com](mailto:wakratund@gmail.com)

[Home Page](#)



P. PARTHIBAN

Centre for R&D, PRIST University, Thanjavur-613403, India

Email: [parthisivam@yahoo.co.in](mailto:parthisivam@yahoo.co.in)

[Home Page](#)



PROF. D. K. TRIPATHI

Principal, Rungta Institute of Pharmaceutical Sci. and Research, Bhilai CG India

Email: [editor.rjpt@gmail.com](mailto:editor.rjpt@gmail.com)

[Home Page](#)



DR. P. KUMARAVEL

Assistant Professor, Department of Biotechnology, Vysya College, Masinaickenpatty, Salem-636103. Tamil Nadu, India.

Email: [kumaravelbiotech@gmail.com](mailto:kumaravelbiotech@gmail.com)

[Home Page](#)



DR GIRISH PAI K

Faculty - Dept of Pharmaceutics Manipal college of pharmaceutical sciences Manipal University, Madhav Nagar Manipal - 576104, Karnataka State, India

Email: [girish.pai@manipal.edu](mailto:girish.pai@manipal.edu)

[Home Page](#)



DR. AJAY V. PATHAK

House No.33 Ravindra nagar Nagpur-440022 Maharashtra, INDIA

Email: [a.pathak4@gmail.com](mailto:a.pathak4@gmail.com)

[Home Page](#)





AYUSH DOGRA

department of electronics and communications, panjab university chandigarh

Email: [ayush123456789@gmail.com](mailto:ayush123456789@gmail.com)

[Home Page](#)



DR. PRATIBHA VYAS

Department of Microbiology, College of Basic Sciences and Humanities, Punjab Agricultural University, Ludhiana-141004, Punjab, India.

Email: [pratibha.19064@pu.co.in](mailto:pratibha.19064@pu.co.in)

[Home Page](#)



IHSAN HABIB DAKHIL

Engineering College, Al-Muthanna University, Iraq

Email: [ihsanelshahiri@yahoo.com](mailto:ihsanelshahiri@yahoo.com)

[Home Page](#)



DR. JAYASSHREE SEN

J.N.M.C.&A.V.B.R.H., Sawangi, Wardha, Maharashtra 442007

Email: [jayashree\\_sen@rediffmail.com](mailto:jayashree_sen@rediffmail.com)

[Home Page](#)



IMAD

University of Babylon

Email: [imad\\_dna@yahoo.com](mailto:imad_dna@yahoo.com)

[Home Page](#)

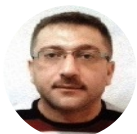


RIM M. HARFOUCH

Al Andalus university, Qadmus, Tartous, Syria

Email: [rimharfouch@au.edu.sy](mailto:rimharfouch@au.edu.sy)

[Home Page](#)



MOHAMMAD JAWAD AL-JASSANI

Department of Microbiology, College of Science, Al-Karkh University of Science, Iraq.

Email: [pcr2000@yahoo.com](mailto:pcr2000@yahoo.com)

[Home Page](#)

## REVIEWERS

---



DR. SUBHASHIS DEBNATH

Seven Hills College of Pharmacy Venkatramapuram, Tirupati- 517561

Email: [subhashis.ooty@gmail.com](mailto:subhashis.ooty@gmail.com)

[Home Page](#)



GAURAV KUMAR

Department of Microbiology School of Bioengineering and Biosciences Lovely Professional University Phagwara, 144411, Punjab, India

Email: [gau\\_ravkr@yahoo.com](mailto:gau_ravkr@yahoo.com)

[Home Page](#)



RUCHI VERMA

manipal college of pharmaceutical sciences, manipal university, karnataka, India.

Email: [ruchi.verma@manipal.edu](mailto:ruchi.verma@manipal.edu)

[Home Page](#)



DR. KETAN VINODLAL SHAH

201, Rudrax Appartment, Guruprasad Society, Nehind Telephone exchange, Krishnanagar Main road, Rajkot

Email: [ketan421981@gmail.com](mailto:ketan421981@gmail.com)

[Home Page](#)



K SUJANA

university college of pharmaceutical sciences Acharya Nagarjuna university

Email: [sujana\\_36@yahoo.co.in](mailto:sujana_36@yahoo.co.in)

[Home Page](#)



DR.P.BRINDHA DEVI

Vels University, Velan Nagar, PV Vaithiyalingam Road, Pallavaram

Email: [pbrindhadevi@gmail.com](mailto:pbrindhadevi@gmail.com)

[Home Page](#)



DR VAMSHI KRISHNA TIPPAVAJHALA

Assistant Professor-Senior Scale Department of Pharmaceutics Manipal College of  
Pharmaceutical Sciences Manipal University Manipal, Karnataka, India

Email: [krissrcm@gmail.com](mailto:krissrcm@gmail.com)

[Home Page](#)



ZAIN BAAITY

Syria, Latakia

Email: [zein\\_syria@hotmail.com](mailto:zein_syria@hotmail.com)

[Home Page](#)



LAITH AHMED NAJAM

Mosul University, College of Science, Physics Dept., Mosul

Email: [Prof.lai2014@gmail.com](mailto:Prof.lai2014@gmail.com)

[Home Page](#)



VEEREN DEWOOLKAR

4824 Washtenaw Ave, Apt C1, Ann Arbor, MI 48108

Email: [veerenrx@gmail.com](mailto:veerenrx@gmail.com)

[Home Page](#)



NEERAN OBIED JASIM

University of AL-Qadisiyah college of Pharmacy Iraq

Email: [neran.jasim@qu.edu.iq](mailto:neran.jasim@qu.edu.iq)

[Home Page](#)



MAHMOUD NAJIM ABID

Mustansiriyah University, College of Science, Department of Chemistry

Email: [mahmoudaljibouri@gmail.com](mailto:mahmoudaljibouri@gmail.com)

[Home Page](#)



NILESH PATEL

B/103,Snehkunj Elegance,Behind Shivalay Parisar Kudasan,Gandhinagar-382421,Gujarat

Email: [nilesh33.emcure@gmail.com](mailto:nilesh33.emcure@gmail.com)

[Home Page](#)



NEERAN OBIED JASIM

university of AL-Qadisiyah -college of science-Iraq

Email: [neran.jasim@qu.edu.iq](mailto:neran.jasim@qu.edu.iq)

[Home Page](#)



MARWAN MAHMOOD SALEH

Anbar-Ramadi- Habbaniya- 4-4-17

Email: [ah.marwan\\_bio@uoanbar.edu.iq](mailto:ah.marwan_bio@uoanbar.edu.iq)

[Home Page](#)



PALLAVI LAXMAN PHALKE

Parul University, Limda, Waghodiya. Vadodara-391760, Gujarat India.

Email: [falkepallavi@gmail.com](mailto:falkepallavi@gmail.com)

[Home Page](#)



DR. ANUP S. HENDRE

Biochemistry Department Krishna Institute of Medical Sciences, Malkapur Karad. Dist-Satara.

Email: [anupviews@gmail.com](mailto:anupviews@gmail.com)

[Home Page](#)



SURENDRA KUMAR GAUTAM

Kamla Nehru Institute of Management & Technology, NH96 Faizabad Bypass Road Faridipur Campus

Email: [surendra\\_bkt95@yahoo.in](mailto:surendra_bkt95@yahoo.in)

[Home Page](#)



DR U R RAKSHITH

Dr U R Rakshith Lecturer JSS College of Pharmacy, JSS Academy of Higher Education and Research Shivarathreeswara Nagar, Mysuru-570015 Karnataka , India

Email: [urakshith@jssuni.edu.in](mailto:urakshith@jssuni.edu.in)

[Home Page](#)



RAMU SAMINENI

H.N0-1-123-A; C/O SIVARAMAKRISHNA SAMINENI MANDEPUDI, AMARAVATHI

Email: [samineni.ramu@gmail.com](mailto:samineni.ramu@gmail.com)

[Home Page](#)



DHAVAL PATEL

A-104, Maruti Aamrakunj, Sargasan, Gandhinagar-382421

Email: [dhaval.nine@gmail.com](mailto:dhaval.nine@gmail.com)

[Home Page](#)



AKHIL NAGAR

R C PATEL INSTITUTE OF PHARMACEUTICAL EDUCATION AND RESEARCH

Email: [akkipharma23@gmail.com](mailto:akkipharma23@gmail.com)

[Home Page](#)



SUNANDAR IHSAN

Kampus Hijau Bumi Tridharma Universitas Halu Oleo Fakultas Farmasi, Jl. H.E.A Mokodompit Anduonuhu, Kendari, Indonesia

Email: [sunandarihsan@uho.ac.id](mailto:sunandarihsan@uho.ac.id)

[Home Page](#)



ANAS TARIK NAFEI

Baghdad, Qadissiyah Express way

Email: [anasalhamdany@yahoo.com](mailto:anasalhamdany@yahoo.com)

[Home Page](#)



DR.KUMARASWAMY GULLAPELLI

STREET NUMBER 4 , BHAVANI NAGAR , NACHARAM, HYDERABAD NACHARAM, Hyderabad, Telangana, pincode: 500076

Email: [kumargullapelli001@gmail.com](mailto:kumargullapelli001@gmail.com)

[Home Page](#)



RADHWAN AL-ZIDAN

Almothana district, Mosul, Iraq

Email: [radhwan.alzidan@uomosul.edu.iq](mailto:radhwan.alzidan@uomosul.edu.iq)

[Home Page](#)



YAHIA M. MOUALLA

faculty of pharmacy, Tishreen university, Latakia, Syria

Email: [yahia.moualla@tishreen.edu.sy](mailto:yahia.moualla@tishreen.edu.sy)

[Home Page](#)



SUHAS SURESH AWATI

Assistant Professor, Dr. Shivajirao Kadam College of Pharmacy, Kasabe Digraj, Baganvat, Tal-Miraj, Dist- Sangli, Maharashtra. 416301

Email: [awatiss@gmail.com](mailto:awatiss@gmail.com)

[Home Page](#)



SHAIK FIROZ

Assistant Professor, Department of Pharmaceutics, Sree Vidyanikethan College of Pharmacy, Sree Sainath Nagar, A.Rangampet-517102.

Email: [firoz.kallur@gmail.com](mailto:firoz.kallur@gmail.com)

[Home Page](#)



DR NASEEF PP

Vice Principal, Moulana College of Pharmacy, Near Angadippuram Railway Station, Malappuram, Kerala, India 679321

Email: [drnaseefpp@gmail.com](mailto:drnaseefpp@gmail.com)

[Home Page](#)



DR. ARINDAM CHATTERJEE

School of Pharmaceutical Sciences Jaipur National University (SADTM Campus) Near RTO Office, Jaipur Agra Bypass Jagatpura, Jaipur, Rajasthan India-302017

Email: [chatterjee.arindam@hotmail.com](mailto:chatterjee.arindam@hotmail.com)

[Home Page](#)



S RAJARAJAN

Department of Pharmaceutics, Karnataka College of Pharmacy 33/2, Thirumena Halli, Hegde Nagar Main Road, Bangalore-560064

Email: [pharmking@gmail.com](mailto:pharmking@gmail.com)

[Home Page](#)



DR . RAHUL RADHAKRISHNAN

Manasam, Edavattom, Chirakkara (PO) ,Kollam, Kerala

Email: [drrahulpharmd@gmail.com](mailto:drrahulpharmd@gmail.com)

[Home Page](#)



RIM M. HARFOUCH

0624 Albaath street, Latakia, Syria

Email: [rimharf@yahoo.com](mailto:rimharf@yahoo.com)

[Home Page](#)



ARUN A

3/31 periyar street, ramapuram chennai 600089  
Email: [arunarticle2016@gmail.com](mailto:arunarticle2016@gmail.com)  
[Home Page](#)



ABDUL SALEEM MOHAMMAD

Department of Pharmaceutical Analysis and Quality Assurance, Nizam Institute of Pharmacy, Deshmukhi (V), Pochampally (M), Behind Mount Opera, Nalgonda (Dist)-508284, Telangana, India.  
Email: [mohdsaleempharma@gmail.com](mailto:mohdsaleempharma@gmail.com)  
[Home Page](#)



KARTHIKEYAN T

registrar nimhans  
Email: [karthik\\_77in@yahoo.co.in](mailto:karthik_77in@yahoo.co.in)  
[Home Page](#)



DR. PUTTA RAJESH KUMAR

Amdapur X Road, Yenkapally, Moinabad, Ranga Reddy, Hyderabad, Telangana 500075 INDIA  
Email: [prkbpc@gmail.com](mailto:prkbpc@gmail.com)  
[Home Page](#)



AAMINAH NAJMUS SAHAR

H.no: 121, Pension lane, New Bowenpally Secunderabad- 500011  
Email: [aaminahnajmus@yahoo.in](mailto:aaminahnajmus@yahoo.in)  
[Home Page](#)



ZAINAB HAITHAM FATHI

College of Pharmacy, University of Mosul  
Email: [zainabh@uomosul.edu.iq](mailto:zainabh@uomosul.edu.iq)  
[Home Page](#)



DR. OM PRAKASH RANJAN

Faculty of Pharmacy, Sachchidanad Sinha College, Aurangabad, Bihar.  
Email: [omprakasranjan@gmail.com](mailto:omprakasranjan@gmail.com)  
[Home Page](#)



SHASHIKANT SUDARSHAN UPADHYE

Annasaheb Dange College of B.Pharmacy, Ashta Tal: Walwa, Dist: Sangli 416301 , Maharashtra, India

Email: [ssupadhye7@gmail.com](mailto:ssupadhye7@gmail.com)

[Home Page](#)



VISHAL KUMAR BISWKARMA

KSCP, Subharti University, Meerut, Uttar Pradesh, India

Email: [vishalkumarbiswkarma@gmail.com](mailto:vishalkumarbiswkarma@gmail.com)

[Home Page](#)



DR. C. JANANI

Dr. C. Janani, Srimad Andavan Arts and Science College, Nelson Road, TV Kovil, Trichy-05

Email: [janabio.net@gmail.com](mailto:janabio.net@gmail.com)

[Home Page](#)



RANJAN KUMAR SINGH

g d memorial college of pharmacy, kbhb, jodhpur.342005

Email: [rxsingh8@gmail.com](mailto:rxsingh8@gmail.com)

[Home Page](#)



BIMESH KUMAR

BLOCK 4, ROOM NO 203, SCHOOL OF PHARMACEUTICAL SCIENCES, LOVELY PROFESSIONAL UNIVERSITY, PHAGWARA, PUNJAB, 144411.

Email: [bimlesh1pham@gmail.com](mailto:bimlesh1pham@gmail.com)

[Home Page](#)



DR.BISWARANJAN RAY

Associate prof, Dept. of Pharmacology, College of Pharmaceutical Sciences, Puri, Odisha

Email: [crabiswa@gmail.com](mailto:crabiswa@gmail.com)

[Home Page](#)



ANAR J PATEL

Sal Institute of Pharmacy, Ahmedabad

Email: [anar.patel@sal.edu.in](mailto:anar.patel@sal.edu.in)

[Home Page](#)





GANESH BARKADE

Dr. Vithalrao Vikhe Patil Foundation's College of Pharmacy, Ahmednagar, MH, India-414111 Vikhe Patil Foundation

Email: [ganeshbarkade7@gmail.com](mailto:ganeshbarkade7@gmail.com)

[Home Page](#)



DR. VEDAMURTHY JOSHI

Associate professor, Sri Adichunchanagiri College of Pharmacy, BG Nagara Nagamangala Tq Mandya dist Karnata

Email: [vedamurthyjoshi@gmail.com](mailto:vedamurthyjoshi@gmail.com)

[Home Page](#)



AVINASH BABURAO THALKARI

Kanadi Road Kaij Vasant Pharmacy College Kaij Kanadi Road Kaij

Email: [avinashthalkari@gmail.com](mailto:avinashthalkari@gmail.com)

[Home Page](#)



DR. P. PRAVEEN REDDY

Vivekananda Degree and PG College, Karimnagar-505001, Telangana

Email: [microppr@gmail.com](mailto:microppr@gmail.com)

[Home Page](#)



MUTHUKUMAR.S

45,U.K.Thevar Street, Suler, Coimbatore-641402

Email: [pharmuthu@gmail.com](mailto:pharmuthu@gmail.com)

[Home Page](#)



D CHANDRA SEKHAR NAIK

KVSR Siddhartha college of pharmaceutical sciences poly clinical road Vijayawada-10

Email: [chandu.desavath@gmail.com](mailto:chandu.desavath@gmail.com)

[Home Page](#)



BHARAT MISHRA

Nirmala college of pharmacy, Nirmala Hills, Muvattupuzha, Ernakulam, Kerala, India

Email: [bharatekash@gmail.com](mailto:bharatekash@gmail.com)

[Home Page](#)



MATOLE VINOD KALIDAS  
AT POST AURAD TAL.OMERGA DIST .OSMANABAD  
Email: [vinodmatole57@gmail.com](mailto:vinodmatole57@gmail.com)  
[Home Page](#)



NIRMAL THAKKER  
B-602, Tirupati Aakruti Greenz, Behind Nirma University, S.G. Highway, Ahmedabad-382481,  
Gujarat, India  
Email: [nirmalthakker117@yahoo.com](mailto:nirmalthakker117@yahoo.com)  
[Home Page](#)



JASWANTH GOWDA B.H.  
Yenepoya (Deemed to be University), Deralakatte, Mangalore, India-575018.  
Email: [jaswanth\\_14601@yenepoya.edu.in](mailto:jaswanth_14601@yenepoya.edu.in)  
[Home Page](#)



ZEINA ABDULMUNIM ALTHANOON  
Albaladiyat Quarter Mosul Iraq  
Email: [ph.zeinaalthanoon@gmail.com](mailto:ph.zeinaalthanoon@gmail.com)  
[Home Page](#)



SHIVAVEERAKUMAR  
Department of Microbiology, Davangere University, Davanagere - 577002, Karnataka  
Email: [shiv\\_math1984@rediffmail.com](mailto:shiv_math1984@rediffmail.com)  
[Home Page](#)



DR.V.K.EVANJELENE  
16, Anbu Nagar, gorimedu, Salem - 636 008  
Email: [evankutty@gmail.com](mailto:evankutty@gmail.com)  
[Home Page](#)



ASHISH TALE  
MUPS College of Pharmacy, Degaon, Tq. Risod, Dist. Washim-444506 (M.S) India  
Email: [ashishtale93@gmail.com](mailto:ashishtale93@gmail.com)  
[Home Page](#)



DR. C. JANANI

Srimad Andavan Arts and Science College, Nelson Road, TV Kovil TV kovil

Email: [janabio.net@gmail.com](mailto:janabio.net@gmail.com)

[Home Page](#)



PRATHEEP THANGARAJ

Department of Biotechnology, PRIST Deemed to be University, Thanjavur-613403, India.

Email: [pratheetp@gmail.com](mailto:pratheetp@gmail.com)

[Home Page](#)



SHAIMAA AHMAD HASSAN

AlKarkh University of science / Baghdad / Iraq

Email: [dr.shaimaa\\_altaee@kus.edu.iq](mailto:dr.shaimaa_altaee@kus.edu.iq)

[Home Page](#)



DR ANUP NAHA

Manipal College of Pharmaceutical Sciences, MAHE, Manipal, Karnataka-576104

Email: [anupnaha@gmail.com](mailto:anupnaha@gmail.com)

[Home Page](#)



EIMAN SHAHROUR

lattakia- syria

Email: [eimanm.shahrour@gmail.com](mailto:eimanm.shahrour@gmail.com)

[Home Page](#)



DR. DEVAKUMAR DINESH

Department of Zoology, Bharathiar University Coimbatore-641046 Tamilnadu India

Email: [devadinesh4041@gmail.com](mailto:devadinesh4041@gmail.com)

[Home Page](#)



AUDUMBAR DIGAMBAR MALI

At. Po. Andhalgaon, Tal-mangalwedha, Dist- Solapur, Pin Code:- 413305, Maharashtra, India.

Email: [maliaudu442@gmail.com](mailto:maliaudu442@gmail.com)

[Home Page](#)



DR. MITTAL MAHESHWARI  
A- One Pharmacy College, Ahmedabad  
Email: [mittalmaheshwary@gmail.com](mailto:mittalmaheshwary@gmail.com)  
[Home Page](#)



ABDUL AZEEM  
Research Scholar, Electrical Engineering Department Jamia Millia Islamia-New Delhi  
Email: [azeemnith@gmail.com](mailto:azeemnith@gmail.com)  
[Home Page](#)



DR. V. VADIVEL  
PG & Research Department of Botany, V.O. Chidambaram College, Tuticorin - 628008 Tamil Nadu, India  
Email: [drvvadivel@gmail.com](mailto:drvvadivel@gmail.com)  
[Home Page](#)



PROF.(DR.) KUMARASWAMY.GANDLA  
Dr.Kumara Swamy.Gandla Associate Editor of RJPT (Research journal of Pharmacy and Technology Chaitanya Deemed to be University, Hanamkonda, Warangal-Urban (Dist), Telangana 506001-India. Mobile: +91-9000973789 / +91-7801022789  
Email: [drkumaraswamygandla@gmail.com](mailto:drkumaraswamygandla@gmail.com)  
[Home Page](#)



MR. PATIL AMOL MANIK  
AT/P- KASEGAON TAL- WALWA DIST- SANGLI PIN CODE- 415404 MAHARASHTRA  
Email: [amp6389@gmail.com](mailto:amp6389@gmail.com)  
[Home Page](#)



MOH MIRZA NURYADY  
Blok HC No. 14, Jl. Intan 2, Perum GPA, Ngijo, Kec. Karangploso, Kabupaten Malang, East Java  
Email: [mirzanuryady@umm.ac.id](mailto:mirzanuryady@umm.ac.id)  
[Home Page](#)



SHAIMAA AHMAD HASSAN  
College of Remote Sensing & Geophysics, Al Karkh University of Science, Baghdad, Iraq  
Email: [dr.shaimaa\\_altaee@kus.edu.iq](mailto:dr.shaimaa_altaee@kus.edu.iq)  
[Home Page](#)



MAUSAMI VAGHELA

New College Wadi-3, B/H Punjab Honda, Opp. sitvan Flat, Kalawad Road, Rajkot.

Email: [mausami\\_2123@yahoo.com](mailto:mausami_2123@yahoo.com)

[Home Page](#)



KOTESHWARA MUDIGONDA

Suven Life Sciences Limited, Hyderabad, India

Email: [koteswara\\_mudigonda@yahoo.com](mailto:koteswara_mudigonda@yahoo.com)

[Home Page](#)



DR. SWAMY C T

51, Anna Arch Rd,NSK Nagar, Anna Nagar, AA Hospital Campus

Email: [swamyc23@gmail.com](mailto:swamyc23@gmail.com)

[Home Page](#)



KHUDHAIR ABBAS KAREEM AL-RUDAI

Iraq, Baghdad

Email: [khudhair.2010@yahoo.com](mailto:khudhair.2010@yahoo.com)

[Home Page](#)



BALJEET YADAV

1202 H, Coralwood Sector 84, Gurugram INDIA

Email: [baljeet.yadav@gdgu.org](mailto:baljeet.yadav@gdgu.org)

[Home Page](#)



DR NILIMA ABHIJEET THOMBRE

MET's Institute Of Pharmacy, Bhujbal Knowledge City, Adgaon, Nasik-422003, Maharashtra,India.

[nilimat\\_iop@bkc.met.edu](mailto:nilimat_iop@bkc.met.edu) 09422284082 , 09960646693

Email: [nilimat\\_iop@bkc.met.edu](mailto:nilimat_iop@bkc.met.edu)

[Home Page](#)



SNIGDHO DAS

Flat No.6,Ira Appartments-2,Jadunath Ukil Road, Kudghat

Email: [snigdho1991@gmail.com](mailto:snigdho1991@gmail.com)

[Home Page](#)



DR SUDARSAN BISWAL

O/o the Asst. Drugs Controller, Bhubaneswar Circle II, Bhubaneswar, Khordha, Odisha, India

Email: [drsbiswaldi@gmail.com](mailto:drsbiswaldi@gmail.com)

[Home Page](#)



NAZIYA IQBAL KHAN

38 Sahyadri nagar Isbavi Pandharpur 413307 Solapur Maharashtra

Email: [naziya.aara@gmail.com](mailto:naziya.aara@gmail.com)

[Home Page](#)



DR GYANENDRA KUMAR SHARMA

Anand College of Pharmacy, Agra

Email: [gyanendrasharma.acp@sgei.org](mailto:gyanendrasharma.acp@sgei.org)

[Home Page](#)



MISS.MALI SUNAYANA MALLAPPA

A/P-Andhalgaon, Pin No. -413 305 Tal- Mangalwedha, Dist-Solapur, Maharashtra, India

Email: [sunayanamali01@gmail.com](mailto:sunayanamali01@gmail.com)

[Home Page](#)



DR. ARUNACHALAM MUTHURAMAN

Dr. Arunachalam Muthuraman, M. Pharm., Ph.D. Associate Professor, Pharmacology Unit, Faculty of Pharmacy, AIMST University, Semeling, 08100 Bedong, Kedah Darul Aman, Malaysia.

E-mail: [arunachalammu@gmail.com](mailto:arunachalammu@gmail.com) Phone No: +60-1136293386 (Malaysia); +91-9988040886 (India) Malaysia Office: +60-44298000 (Extn: 1281 / 1284);

Email: [arunachalammu@gmail.com](mailto:arunachalammu@gmail.com)

[Home Page](#)



MUKUL SHARMA

Faculty of Pharmacy, Medi-Caps University, Indore

Email: [mukul.sharma@medicaps.ac.in](mailto:mukul.sharma@medicaps.ac.in)

[Home Page](#)



PROF. DR. NAGHAM MAHMOOD ALJAM

Professor , Department of Chemistry , Synthetic Field, Iraq.

Email: [dr.nagham\\_mj@yahoo.com](mailto:dr.nagham_mj@yahoo.com)

[Home Page](#)



PRASHANT PANDEY

Department of Pharmaceutical Sciences, Babasaheb Bhimrao Ambedkar University, Lucknow

Email: [mrpandeyprashant@gmail.com](mailto:mrpandeyprashant@gmail.com)

[Home Page](#)



PATHAN HUJEB AFSAR KHAN

Shreeyash Institute of Pharmaceutical Education and Research Aurangabad, Maharashtra, India.

Email: [pathanhujeb@gmail.com](mailto:pathanhujeb@gmail.com)

[Home Page](#)



DR. SHIKHA MAHESHWARI

Pushpanjali Enclave Pitampura Delhi

Email: [shikhamaheshwarimohta@gmail.com](mailto:shikhamaheshwarimohta@gmail.com)

[Home Page](#)



DR V N MEENA DEVI

Noorul Islam Centre for Higher Education Kumaracoil, Kanyakumari Dist. Tamilnadu 629180 India.

Email: [meenadevi@niuniv.com](mailto:meenadevi@niuniv.com)

[Home Page](#)



PRASHANT PANDEY

Department of Pharmaceutical Sciences, Babasaheb Bhimrao Ambedkar University (A Central University), Lucknow, Uttar Pradesh, India

Email: [drpandeyprashant@outlook.com](mailto:drpandeyprashant@outlook.com)

[Home Page](#)



MR. TUSHAR PRADIP DUKRE

At- Malwadi; Post- Bota.

Email: [tusharpd23@gmail.com](mailto:tusharpd23@gmail.com)

[Home Page](#)



DR. DATTATRAYA MANOHAR SHINKA

Rajiv Nagar Nashik Vaibhav Colony

Email: [dattashinkar@gmail.com](mailto:dattashinkar@gmail.com)

[Home Page](#)



PROF. SACHIN NAMDEO KOTHAWADE

Sitabai Thite College of Pharmacy, Pune-Nagar Bypass, Behind Hudco Colony, Shirur, Tal - Shirur, Dist - Pune, Pin - 412210

Email: [sachin.kothawade23@gmail.com](mailto:sachin.kothawade23@gmail.com)

[Home Page](#)



DR.SIVARAMAN DHANASEKARAN

Pandit Deendayal Energy University, Gandhinagar, Gujarat

Email: [sivaramand83@gmail.com](mailto:sivaramand83@gmail.com)

[Home Page](#)



ALI MAHMOOD RAYSHAN

Iraq, Karbala, City Center

Email: [alireshan@g.alzahu.edu.iq](mailto:alireshan@g.alzahu.edu.iq)

[Home Page](#)



DUKRE TUSHAR PRADIP

At- Satral, Post- Songaon, Tal- Rahuri, District-Ahmednagar, 413711

Email: [tusharpd23@gmail.com](mailto:tusharpd23@gmail.com)

[Home Page](#)



DR. SK. ARIFA BEGUM

Dr. Sk. Arifa Begum, Assistant Professor, KVSR Siddhartha College of Pharmaceutical Sciences, Siddhartha Nagar, Vijayawada - 520 010, Andhra Pradesh, India.

Email: [arifashaik2007@gmail.com](mailto:arifashaik2007@gmail.com)

[Home Page](#)



RUPALI NIRMAL

Sahajanandnagar

Email: [rupalinirmalcpn@gmail.com](mailto:rupalinirmalcpn@gmail.com)

[Home Page](#)



RISHU YADAV

352/1 n.l.c. Kidwai Nagar Kanpur

Email: [rishu.yadav789@gmail.com](mailto:rishu.yadav789@gmail.com)

[Home Page](#)





DR. YASMIN HAMID MOMIN

Annasaheb Dange College of B.Pharmacy, Ashta 416301

Email: [mullays413@gmail.com](mailto:mullays413@gmail.com)

[Home Page](#)



PRAVEEN KUMAR UPPALA

LIG 163, Alakananda Colony, Vizianagaram, Andhra Pradesh

Email: [praveen.chintu32@gmail.com](mailto:praveen.chintu32@gmail.com)

[Home Page](#)



DR. EKA INDRA SETYAWAN

Department of Pharmacy Udayana University

Email: [ekaindrasetyawan@unud.ac.id](mailto:ekaindrasetyawan@unud.ac.id)

[Home Page](#)



DR. MOHAN GANDHI BONTHU

V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Krishna District 521356.

Email: [bmgandhipharma@gmail.com](mailto:bmgandhipharma@gmail.com)

[Home Page](#)



SWATI GOKUL TALELE

Sandip Institute of Pharmaceutical Sciences, Nashik

Email: [swatitalele77@gmail.com](mailto:swatitalele77@gmail.com)

[Home Page](#)

# ARTICLES IN VOLUME - 17, ISSUE - 3

[Online Since: Sunday, Mar 31, 2024](#) [ [Views: 18216](#) ]

## A Viroinformatics Study: B-Cell Polytope Mapping of Envelope Protein to Develop Vaccine Candidate against Four DENV Serotype

**Author(s):** Rahadian Zainul, Viol Dhea Kharisma, Santika Lusya Utami, Nelson Chandra, Arif Nur Muhammad Ansori, Arli Aditya Parikesit, Vikash Jakhmola, Daimon Syukri, Edi Syafri, Asri Peni Wulandari, Oski Illiandri, Khoirun Nisyak, Bahrin, Asmi Citra Malina A. R. Tasakka

**DOI:** [10.52711/0974-360X.2024.00150](https://doi.org/10.52711/0974-360X.2024.00150)

**Views:** 0 (pdf), 776 (html)

**Access:**  Closed Access

**Cite:** Rahadian Zainul, Viol Dhea Kharisma, Santika Lusya Utami, Nelson Chandra, Arif Nur Muhammad Ansori, Arli Aditya Parikesit, Vikash Jakhmola, Daimon Syukri, Edi Syafri, Asri Peni Wulandari, Oski Illiandri, Khoirun Nisyak, Bahrin, Asmi Citra Malina A. R. Tasakka. A Viroinformatics Study: B-Cell Polytope Mapping of Envelope Protein to Develop Vaccine Candidate against Four DENV Serotype. *Research Journal of Pharmacy and Technology*. 2024; 17(3):973-8. doi: 10.52711/0974-360X.2024.00150

[Read More](#)

## Determination and Validation of pKa value of Atropine Sulfate using Spectrophotometry

**Author(s):** Job Herman Berkhout, Aswatha Ram H.N.

**DOI:** [10.52711/0974-360X.2024.00159](https://doi.org/10.52711/0974-360X.2024.00159)

**Views:** 0 (pdf), 444 (html)

**Access:**  Closed Access

**Cite:** Job Herman Berkhout, Aswatha Ram H.N.. *Research Journal of Pharmacy and Technology*. 2024; 17(3):1029-2. doi: 10.52711/0974-360X.2024.00159

[Read More](#)

## Mucoadhesive Buccal Tablet Formulation of Azithromycin dihydrate for treatment of Upper Respiratory Tract Infection

**Author(s):** Raju Chiluka, Gaurav Maurya, Priyal Jangla, Dinesh Suthar, Roopam Raut

**DOI:** [10.52711/0974-360X.2024.00160](https://doi.org/10.52711/0974-360X.2024.00160)

**Views:** 0 (pdf), 512 (html)

**Access:**  Closed Access

**Cite:** Raju Chiluka, Gaurav Maurya, Priyal Jangla, Dinesh Suthar, Roopam Raut. Mucoadhesive Buccal Tablet Formulation of Azithromycin dihydrate for treatment of Upper Respiratory Tract Infection. *Research Journal of Pharmacy and Technology*. 2024; 17(3):1033-9. doi: 10.52711/0974-360X.2024.00160

[Read More](#)

## Onset-To-Door and Cognitive Function in Ischemic Stroke patients

**Author(s):** Aileen Gabrielle, Olivia Mahardani Adam, Sri Mulyati, Wienta Diarsvitri

**DOI:** [10.52711/0974-360X.2024.00161](https://doi.org/10.52711/0974-360X.2024.00161)

**Views:** 0 (pdf), 291 (html)

**Access:**  Closed Access

**Cite:** Aileen Gabrielle, Olivia Mahardani Adam, Sri Mulyati, Wienta Diarsvitri. Onset-To-Door and Cognitive Function in Ischemic Stroke patients. *Research Journal of Pharmacy and Technology*. 2024; 17(3):1040-4. doi: 10.52711/0974-360X.2024.00161

[Read More](#)

## Design of Colon Specific Delivery of Sulfasalazine Loaded Nanoparticles for Inflammatory Bowel Syndrome: Application of Experimental Design

**Author(s):** Sivakumar R, Shafin P

**DOI:** [10.52711/0974-360X.2024.00199](https://doi.org/10.52711/0974-360X.2024.00199)

**Views:** 0 (pdf), 176 (html)

**Access:**  Closed Access

**Cite:** Sivakumar R, Shafin P. Design of Colon Specific Delivery of Sulfasalazine Loaded Nanoparticles for Inflammatory Bowel Syndrome: Application of Experimental Design. *Research Journal of Pharmacy and Technology*. 2024; 17(3):1272-6. doi: 10.52711/0974-360X.2024.00199

[Read More](#)

## Profile of RT-PCR for SARS-CoV-2: A Preliminary Study from COVID-19 patients in Government Medical College and Hospital, Doda, Jammu and Kashmir

**Author(s):** Sameera Akhtar, Sufhia Akhter, Shoket Ali, Imran Bashir

**DOI:** [10.52711/0974-360X.2024.00200](https://doi.org/10.52711/0974-360X.2024.00200)

**Views:** 0 (pdf), 194 (html)

**Access:**  Closed Access

**Cite:** Sameera Akhtar, Sufhia Akhter, Shoket Ali, Imran Bashir. Profile of RT-PCR for SARS-CoV-2: A Preliminary Study from COVID-19 patients in Government Medical College and Hospital, Doda, Jammu and Kashmir. *Research Journal of Pharmacy and Technology*. 2024; 17(3):1277-1. doi: 10.52711/0974-360X.2024.00200

[Read More](#)

## Black Garlic for the treatment of Tuberculosis and Diabetes mellitus

**Author(s):** Fathul Djannah, Anny Setijo Rahaju, Hamsu Kadriyan, Eva Triani, Heru Fajar Trianto, Rahadian Zainul

**DOI:** [10.52711/0974-360X.2024.00201](https://doi.org/10.52711/0974-360X.2024.00201)

**Views:** 0 (pdf), 357 (html)

**Access:**  Closed Access

**Cite:** Fathul Djannah, Anny Setijo Rahaju, Hamsu Kadriyan, Eva Triani, Heru Fajar Trianto, Rahadian Zainul. Black Garlic for the treatment of Tuberculosis and Diabetes mellitus. *Research Journal of Pharmacy and Technology*. 2024; 17(3):1282-8. doi: 10.52711/0974-360X.2024.00201

[Read More](#)

## Extrapolation Based Shelf Life Establishment of Sacubitril and Valsartan Floating Tablet as per ICH Q1e

**Author(s):** Anil Kumar Goyal, Vinesh Kumar, Seema Yadav, Radhey Shyam Kumawat, Monika Maheshwari

**DOI:** [10.52711/0974-360X.2024.00202](https://doi.org/10.52711/0974-360X.2024.00202)

**Views:** 0 (pdf), 162 (html)

**Access:**  Closed Access

**Cite:** Anil Kumar Goyal, Vinesh Kumar, Seema Yadav, Radhey Shyam Kumawat, Monika Maheshwari. Extrapolation Based Shelf Life Establishment of Sacubitril and Valsartan Floating Tablet as per ICH Q1e. *Research Journal of Pharmacy and Technology*. 2024; 17(3):1289-5. doi: 10.52711/0974-360X.2024.00202

**RESEARCH ARTICLE**

## **Black Garlic for the treatment of Tuberculosis and Diabetes mellitus**

**Fathul Djannah<sup>1</sup>, Anny Setijo Rahaju<sup>2</sup>, Hamsu Kadriyan<sup>3</sup>, Eva Triani<sup>4</sup>, Heru Fajar Trianto<sup>5</sup>,  
Rahadian Zainul<sup>6</sup>**

<sup>1</sup>Department of Anatomical Pathology, Faculty of Medicine,  
Universitas Mataram, Mataram, West Nusa Tenggara, Indonesia.

<sup>2</sup>Department of Anatomical Pathology, Faculty of Medicine,  
Universitas Airlangga, Surabaya, East Java, Indonesia.

<sup>3</sup>Department of Ear Nose and Throat (ENT), Faculty of Medicine,  
Universitas Mataram, Mataram, West Nusa Tenggara, Indonesia.

<sup>4</sup>Department of Public Health, Faculty of Medicine, Universitas Mataram,  
Mataram, West Nusa Tenggara, Indonesia Pathology.

<sup>5</sup>Departement, Faculty of Medicine, Tanjungpura University, Pontianak, West Kalimantan, Indonesia.

<sup>6</sup>Department of Chemistry, Faculty of Mathematics and Natural Sciences,  
Universitas Negeri Padang, Padang, Indonesia Center for Advanced Material Processing, Artificial Intelligence.

\*Corresponding Author E-mail: [anny\\_sr@fk.unair.ac.id](mailto:anny_sr@fk.unair.ac.id)

---

### **ABSTRACT:**

Black garlic is made from fresh garlic by thermal processing. It is produced under certain temperatures and humidity to generate a product with greater content, taste, and texture. Additionally, black garlic has many benefits, such as being an antioxidant, antibacterial, anti-inflammatory, antihypertensive, anticancer, antidiabetic, and cardiovascular protective. Thus, black garlic can be utilized as a treatment for tuberculosis and diabetes mellitus. Moreover, the ingredients in black garlic, such as SAC, polyphenols, flavonoids, tannins, and ajoene, can reduce levels of Mycobacterium TB, lessen plasma glucose levels, and increase plasma insulin in diabetes mellitus.

**KEYWORDS:** Black garlic, Tuberculosis, Diabetes mellitus.

---

### **INTRODUCTION:**

Garlic is believed to originate from Central Asia, particularly Kazakhstan, Uzbekistan, and western China. It later spread to the Mediterranean in ancient times. Presently, garlic is grown all over the world<sup>1</sup>. It is utilized not only as a cooking spice but also as a natural treatment for various diseases. Despite the numerous health benefits of garlic, some people are reluctant to eat raw garlic because of its pungent taste and smell. Raw garlic can cause gastrointestinal discomfort in some people<sup>2</sup>. For this reason, black garlic has been developed. Processing black garlic at a certain temperature produces a sweet and sour taste, a mild aroma, and a jelly-like texture<sup>2-4</sup>.

Black garlic is generally processed at different temperatures and humidity ranges. Processing conditions vary greatly depending on regional traditions and the specific features desired in the ultimate product. In addition, producing black garlic at 700C can facilitate the formation of good black garlic quality and taste compared to other temperatures<sup>3,5</sup>.

Phytochemical compounds in black garlic are higher than in fresh garlic. Several bioactive compounds increasing in black garlic include flavonoids, pyruvate, thiosulfate, phenols, and S-allylcysteine (SAC). The SAC content in black garlic varies depending on the analytical method used. Representative antioxidant compounds in black garlic include phenols and flavonoids, such as SAC, S-allylmercaptocysteine (SAMC), Diallyl sulfide (DAS), diallyl disulfide (DADS), and diallyl trisulfide (DATS)<sup>2,6</sup>.

The bioactive compounds in black garlic can increase antioxidant activity, antibacterial activity, anti-inflammatory activity, antihypertensive activity, anticancer activity, antidiabetic activity, cardiovascular protection, and so forth<sup>7</sup>. Thus, it is used as an alternative medicine for various diseases. This article discusses the process of making black garlic and its benefits for tuberculosis (TB) and diabetes mellitus (DM).

**Data Collection:**

Researchers conducted a literature search regarding the process of producing black garlic and its benefits for TB and DM from various sources, such as relevant articles, official books, and national and international journals published until August 2022. Additionally, researchers sought sources from various platforms, such as Google scholar, Medline (PubMed), NCBI, ScienceDirect, and trusted journal publishers.

**DISCUSSION:**

**Black garlic:**

Black garlic is a type of garlic product produced by heating raw garlic at a controlled temperature and humidity without any additional treatment or additives. After being processed into black garlic, the pungent odor of fresh garlic becomes mild. During the heating process, the unstable and unpleasant compounds in raw garlic are converted into stable and tasteless compounds. As a result, black garlic generally has a sweet-sour taste instead of a pungent odor and taste. Moreover, black garlic does not cause abdominal pain or other gastrointestinal discomfort<sup>3,5,8</sup>.

Black garlic first appeared in 1999 and was produced by Japanese Kamimura in Mie prefecture, Japan, who also filed a manufacturing patent of the black garlic in the Japan Patent Office. Black garlic is also called Aged garlic, which is produced at controlled temperature and humidity<sup>8</sup>.

**The benefits of black garlic for TB disease:**

Tuberculosis (TB) is caused by the bacterium called *Mycobacterium tuberculosis* (MTB)<sup>9-11</sup>. Most of the droplets containing MTB from infected patients are trapped in the upper respiratory tract and expelled by ciliated mucosal cells; only a small portion reaches the alveoli. Mycobacterium then binds to alveolar macrophage cells via complement receptors, mannose receptors, or type A scavenger receptors. After phagocytosis, mycobacterium reduces the acidity in phagosomes and cell wall components (i.e., lipoarabinomannan) and damages the Ca<sup>+</sup>/calmodulin pathway, thereby inhibiting phagosome-lysosome fusion. After successfully stopping phagosome maturation, bacilli multiplication begins, and the macrophage eventually even ruptures to release its bacilli, which are taken up by the macrophages and continue the cycle of infection that further expands the spread. During primary infection, MTB bacilli undergo hematogenous and lymphatic spread, involving the hilar and mediastinal lymph nodes to form the primary Ghon complex. Eventually, the bacilli enter the bloodstream and reach various organs<sup>12-18</sup>.

The long duration (6–12 months) and complexity of TB treatment lead to non-adherence in patients, which results in incomplete treatment and the development of drug resistance. This situation is called multidrug-resistant (MDR) and extensively drug-resistant (XDR)<sup>12,19-21</sup>. In addition, TB drugs have side effects, such as hepatotoxicity, nephrotoxicity, exanthema, arthritis, and hyperuricemia. This has led scientists to seek new alternative treatments that are effective against all forms of MTB with minimal side effects<sup>22,19,23</sup>.

Garlic is known as an alternative treatment for tuberculosis. The content in garlic can reduce the number of *Mycobacterium tuberculosis*<sup>22,24,25</sup>. Therefore, the following researches examine the benefits of garlic against tuberculosis.

**Table 1: Research on the benefits of garlic against tuberculosis**

Researchers	Preparation/dose	Research subject	Results
Nair. S.S, Gaikwad S.S, Kulkarni S.P, MukneA.P <sup>19</sup> .	Garlic extract (GE)	RAW 264.7 mouse macrophage cells infected with MTB H37Rv	- Anti-TB activity was better than isolate - The anti-TB activity of rifampicin, isoniazid, and ethambutol was still better than GE
Rajani S.D, Desai P.B, & Rajani D.P <sup>26</sup> .	Ethanol Garlic Extract	Sputum from 230 TB patients	- MTB MDR was inhibited at an EGE concentration of 2.0 mg/ml
Hanan A, Ullah MI, Usman M, Hussain S, Absar M, &Javed K <sup>27</sup> .	Ethanol Garlic Extract (EGE)	Cultural isolates (15 MDR and five non-MDR MTB)	- Most of the MDR isolates were inhibited at an EGE concentration of 2.0 mg/dl. - Non-MTB MDR was inhibited at an EGE concentration of 1.5 mg/dl - The minimum inhibitory concentration (MIC) of garlic extract ranged from 1 to 3 mg/ml; showing the inhibitory effect of garlic against both non-MDR and MDR M. tuberculosis isolates

Lindawati NY & Hartono H <sup>28</sup> .	Garlic dry extract (capsule)	Inoculum Mycobacterium (sputum culture of TB patients type BTA+2)	<ul style="list-style-type: none"> <li>- Garlic extract at a dose of 240 mg/ml (600 mg of garlic extract in capsules) had the potential to inhibit the growth of mycobacterium TB</li> <li>- In addition, higher concentrations (medium dose of 300 mg/ml and 400 mg/ml) were not sensitive to MTB.</li> </ul>
Dwivedi VP, Bhattacharya D, Singh M, et al <sup>29</sup> .	Allicin, garlic extract	MTB strain H37Rv, C57BL/6 mice, aged 6-8 weeks	<p>Allicin and garlic treatment significantly reduced the bacterial burden in macrophages</p> <p>Allicin inhibited infected cells in macrophages, reduced bacteria, cleared MTB within 45 days after treatment.</p> <p>Allicin/garlic extract could act as an immunomodulator.</p>
Shukla P & Sharma A <sup>30</sup> .	Ethanol garlic extract	Mycobacterium culture	<ul style="list-style-type: none"> <li>- Growth of MTB and MDR-MTB was inhibited</li> <li>- Having no inhibitory effect on mycobacterium other than tuberculosis (MOTT) species</li> </ul>
Nasab F, Valizadeh M, Beigomi M, & saeidi S <sup>31</sup> .	Ethanol garlic extract	50 strains of mycobacterium	<ul style="list-style-type: none"> <li>- Ethanol garlic extract was highly effective in inhibiting the growth of <i>Mycobacterium tuberculosis</i>.</li> </ul>

Nair, S.S., et al. (2017) conducted in vitro evaluation of the anti-tubercular activity of garlic extract by using the Resazurin Microtiter Plate Assay (REMA) method<sup>19</sup>. As a result, the anti-tubercular activity of garlic extract demonstrated better results than other samples/isolates when evaluated by the REMA method. Additionally, garlic extract had high anti-tuberculosis activity in macrophages and low cytotoxicity. The standard drugs, such as rifampicin and ethambutol, indicated significantly lower MICs as compared to GE by the REMA method. However, when tested in RAW 264<sup>8</sup>. mouse macrophages infected with MTB, the extract at 50µg/ml showed activity comparable to rifampicin (10 µg/ml) and significantly better than isoniazid (10µg/ml) and ethambutol (10µg/ml). Rifampicin, isoniazid, and ethambutol showed higher cytotoxicity as compared to GE at all concentrations tested. It can thus be inferred that GE had the advantage of having lower cytotoxicity than standard TB drugs. E-ajoene showed anti-TB activity at concentrations of 125-250gr/dl, and Z-ajoene was inactive at the highest concentration of 250mg/dl. This might be due to the degradation of Z-ajoene after incubation at 37°C for seven days. Mycobacteria remained in the phagosomal compartment of the macrophages. Therefore, macrophages should be activated to kill intracellular mycobacteria. In this research, the maximum concentration of GE was 150 ml/dl. Ge demonstrated better anti-tubercular activity with increasing concentrations<sup>19</sup>.

In another research, ethanol garlic extract could inhibit the growth of MTB and MDR MTB with a minimum concentration of 0.5mg/dl. EGE inhibited all MDR MTB isolates that were resistant and sensitive to second-line drugs at concentrations of 0.5 to 2.0mg/dl. Garlic showed the same effect on MDR MTB and was sensitive to second-line drugs. However, garlic had no effect on mycobacterium other than tuberculosis (MOTT)<sup>26,30</sup>. Garlic had a multi-factorial mode of action because the constituents exert their effects simultaneously. The difference in results between studies was due to

differences in garlic species in the concentrations of active constituents<sup>26</sup>.

An in vitro study conducted by Ahmad Hasan et al. revealed that Ethanol garlic extract (EGE) could inhibit MDR and MDR MTB with different concentrations of EGE (1-3mg/ml). Most of the MDR isolates were inhibited at an EGE concentration of 2.0mg/dl. Non-MTB MDR was inhibited at an EGE concentration of 1.5 mg/dl. The minimum inhibitory concentration (MIC) of garlic extract ranged from 1 to 3mg/ml; showing the inhibitory effect of garlic on Mycobacterium isolates<sup>27</sup>.

The test results for the antibacterial potency of dry garlic extract against *mycobacterium tuberculosis* showed that garlic extract at a medium dose of 240µg/ml (equivalent to 600mg garlic extract/capsule) had the potential to inhibit MTB growth, on top of that, it was more sensitive than rifampicin at a medium dose of 40µg/ml (equivalent to 100mg rifampicin/capsule). At higher doses (300µg/ml and 400µg/ml), it was even less sensitive to MTB. The higher the dose, the more resistant it was. It was suspected that other compounds dissolved in the garlic extract actually supported the proliferation of MTB bacteria. Garlic dry extract fulfilled the requirements as an ingredient in traditional medicine capsules<sup>28</sup>.

Allicin treatment significantly reduced the bacterial burden on macrophages, inhibited infected cells, lessened the percentage of infected cells, decreased MTB internalization in macrophages, reduced bacteria, and cleared MTB within 60 days after treatment. In addition, the combination treatment of isoniazid and garlic extract showed an additive effect and could clear MTB within 45 days. Meanwhile, isoniazid treatment alone could be effective for more than 60 days. These data were confirmed by histological analysis of the lungs, which revealed a reduction in the number of granulomas after garlic extract treatment. The effect of garlic extract on MDR and XDR drastically reduced the

bacterial burden, prevented skin lesions, and extended survival by more than 90 days until the end of the experiment. Meanwhile, the untreated group indicated severe skin lesions and passed away within 15 days after the MDR infection. Garlic extract promoted the generation of a protective Th1 immune response against MTB infection. Besides, allicin and garlic extracts had immunomodulatory properties. Garlic has strong antimycobacterial agents and inhibits bacterial growth either directly or through immunomodulation<sup>29</sup>. The lowest minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC) against MTB were 3.25 and 7.5ppm, respectively. Meanwhile, the highest MIC and MBC were 60 and 120ppm, respectively. Ethanol garlic extract was highly effective in inhibiting the growth of *Mycobacterium tuberculosis*<sup>31</sup>.

Garlic extract could inhibit the growth of MTB and MDR TB. This process was associated with the antioxidant and antimicrobial in garlic. To increase the active content, fresh garlic was processed to get better quality for treatment. Several studies have revealed that the processing of garlic into black garlic could change the chemical composition and bioactive compounds. In general, black garlic contains better bioactive than fresh garlic. The content in black garlic showed an increase in bioactive properties<sup>8,32,33</sup>. In addition, black garlic contains higher antioxidants than fresh garlic. The increase in antioxidant capacity could be caused by an increase in polyphenols and S-allyl cysteine, which was a derivative of alliin. In black garlic, the antioxidant content increased 2-3 times compared to fresh garlic<sup>34,32</sup>.

S-allyl cysteine is a derivative of alliin. In black garlic, S-allyl cysteine increased 2.5 to 8 times through the heating process. Sulfur oxidation of S-allyl cysteine by flavin-containing monooxygenases formed S-Allyl-l-Cysteine Sulfoxide (ACSO). ACSO could be converted to allyl sulfenic acid (2-propene-1-sulfenic acid) and amino acrylic acid by alliinase. The acrylic amino acid was then spontaneously converted to pyruvic acid and ammonia. Two molecules of allyl sulfenic acid produced diallyl thiosulfinate<sup>8</sup>.

Allicin contained in black garlic could reduce *Mycobacterium tuberculosis* and inhibit MDRMTB<sup>26</sup>. It

also suppressed the inflammatory process in TBC by increasing the performance of the glutathione peroxidase enzyme and stopping the Antigen 85B transcription process, thereby reducing the production of Reactive Oxygen Species (ROS) and inflammatory mediators<sup>35</sup>. Besides, allicin could act as an immunomodulator by increasing host immunity and reducing the side effects of taking TB drugs<sup>29</sup>. Ajoene in black garlic activated the IRE1a-JNK-ROS pathway stimulating macrophage release to carry out phagocytosis and autophagy against *Mycobacterium tuberculosis*<sup>22</sup>.

Black garlic contains tannins that may interrupt the permeability of bacterial cell walls, thereby preventing MTB growth. Similarly, alkaloid compounds contained in black garlic can inhibit bacterial growth and cause damage to peptidoglycan in bacteria<sup>20</sup>.

Black garlic has been proven to have higher antioxidant and antimycobacterial levels than fresh garlic. However, the advantages of black garlic as anti-*mycobacterium tuberculosis* have not been extensively studied. Therefore, further study is required to determine how black garlic affects the growth of MTB and MDR MTB.

**The benefits of black garlic for diabetes:**

Diabetes mellitus (DM) is a metabolic disorder characterized by chronic hyperglycemia resulting from impaired insulin secretion, insulin action, or both<sup>36</sup>. Diabetes mellitus is classified as type 1 diabetes (DMT1) caused by beta cell dysfunction and leading to insulin defect. Meanwhile, type 2 diabetes (DMT2) is generally due to progressive insulin defects against a background of insulin resistance<sup>37,38</sup>. DMT1 is considered a chronic autoimmune disorder caused by the progressive destruction of T-cells mediated by insulin-producing pancreatic B-cell. The gradual loss of B-cells' glucose sensitivity contributed to the degree of insulin deficiency, leading to hyperglycemia<sup>39-41</sup>.

Chronic hyperglycemia constitutes a major source of oxidative stress, and increased free radicals play a key role in DM pathogenesis and complications. Therefore, antioxidants are required to neutralize free radicals. Black garlic is one of the traditional treatments for DM containing antioxidants and antidiabetic agents<sup>5</sup>.

**Table 2: Research on the benefits of garlic for Diabetes Mellitus**

Researchers	Preparation/dose	Subjects	Results
Pangestu, TYI & Setyawan, AB <sup>42</sup> .	Two black garlic cloves/day	patients with DMT2	Decreasing blood sugar levels
Kim JH, Yu SH, Cho YJ, Pan JH, et al <sup>43</sup> .	200mg/kg black garlic juice	C57BL/6J male rats	Neutralizing damage due to diabetes, B-cell apoptosis, and insulin deficiency; improving glutathione antioxidant system; increasing leptin and adiponectin secretions; inhibiting hepatic gluconeogenesis; and suppressing NF-KB-mediated inflammatory signals.

Saryono, Nani D, Proverawati A, & Sarmoko <sup>44</sup> .	Steeping black garlic	6-7 weeks-old male Wistar rats	BG at doses of 13.5 g/kg and 26 g/kg could decrease the levels of pro-inflammatory cytokines (IL-18, IL-6, and TNF- $\alpha$ ) and significantly boost IFN- $\gamma$ levels.
Lee YM, Gweon OC, et al <sup>45</sup> .	Freeze-dried black garlic powder	3-weeks-old c57bl/ksl male rats	Decreasing levels of Thiobarbituric acid reactive substances (TBARS) and increasing the activities of superoxide dismutase (SOD), catalase (CAT), and glutathione peroxidase (GSH-px)
Prihanti GS, Isnaini F, Yudistia R, et al <sup>46</sup> .	Black garlic extract with a dose of 1.5 mg/200 gBW/day, 3 mg/200 gBW/day, and 6 mg/200 gBW/day	2-3 months-old male Wistar rats	Decreasing blood sugar level by 94%, total cholesterol by 79.1%, TG by 69.5%, LDL by 81.3%, SGPT by 91.4%, and SGOT by 70.6%
Ha AW, Kim WK <sup>47</sup> .	0.5%, 1.0%, and 1.5% black garlic extract	4-weeks-old male Sprague-Dawley rats.	Decreasing plasma glucose, plasma insulin, HOMA-IR, plasma TBARS levels, and TAC concentrations, increasing catalase activity, glutathione peroxidase, hepatic Nrf2, NQO1, HO-1, and GSTS2 mRNA expression levels

Research conducted by Pangestu and Setyawan in patients with DMT2 by applying treatment using two black garlic cloves indicated to have effects on reducing blood sugar levels from an average of 300.87 mg/dl to 251.47mg/dl<sup>42</sup>. S-allyl cysteine (SAC), flavonoids, and tannins act as antioxidants in black garlic, which are proven to be anti-glycemic and prevent DM complications. SAC garlic can reduce plasma glucose levels and increase plasma insulin levels<sup>42,48</sup>.

Administering black garlic juice to male rats at a dose of 200 mg/dl could neutralize damage caused by diabetes, B-cell apoptosis, and insulin deficiency. The SAC performance in this study could increase glutathione, leptin, and adiponectin secretions, inhibiting hepatic glucogenesis and suppressing Nf-kB-mediated inflammatory signals<sup>49</sup>.

Another study suggested that the administration of steeping black solo garlic to diabetic Wistar rats (STZ) induced by streptozotocin at doses of 13.5g/kg and 26 g/kg decreased IL-1, IL-6, and TNF- $\alpha$  as well as increased TNF- $\alpha$  in the experimental animals. These findings suggested the possibility of using black solo garlic as an immunomodulator and an anti-inflammatory in diabetes to avoid complications<sup>44</sup>. STZ induction produced free radicals that oxidize pancreatic cells by alkylating DNA, damaging mitochondria, and inhibiting the O-GlcNAcase enzyme. The oxidation process induced toxicity through free radical chain reaction causing an inflammatory process for organ damage triggering the release of pro-inflammatory cytokines, such as IL-1 $\beta$  and TNF- $\alpha$ <sup>39</sup>. SAC and polyphenols could neutralize free radicals and decrease TBARS levels while increasing SOD, CAT, and GSH-px activities<sup>45,48</sup>.

Black garlic extract at a dose of 1.5mg/200gBW/day, 3mg/200gBW/day, and 6mg/200gBW/day in male Wistar rats could reduce blood sugar levels by 94%, total cholesterol by 79.1%, TG by 69.5%, LDL by 81.3%, SGPT by 91.4%, and SGOT by 70.6%. In

addition, polyphenols and flavonoids could reduce oxidative stress and prevent damage to pancreatic beta cells by inhibiting the chain reaction, converting superoxide to hydrogen superoxide, and supplying hydrogen atoms to bind free radicals and dispose of them through the excretory system<sup>46</sup>.

Administering black garlic extract to white male rats at the doses of 0.5%, 1.0%, and 1.5% could reduce plasma glucose, plasma insulin, and HOMA-IR levels as well as plasma TBARS and TAC concentrations, increasing catalase activity and glutathione peroxidase, hepatic Nrf2, NQO1, HO-1, and GSTS2 mRNA expression levels<sup>47</sup>.

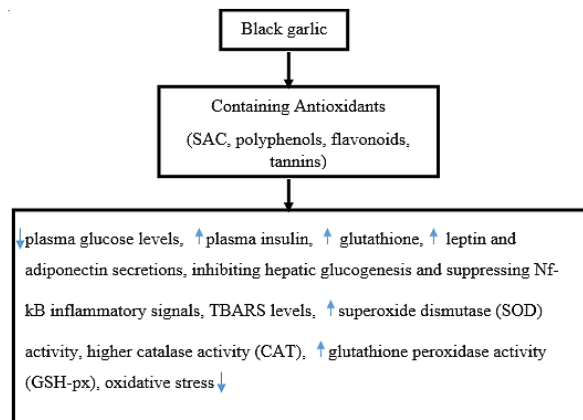


Figure 1: The benefits of black garlic for diabetes.

**CONCLUSION:**

Previous studies conclude that the ideal temperature to produce black garlic with good taste and quality is 70°C. Black garlic has several benefits over raw garlic, including a greater taste and smell, as well as the ability to decrease mycobacterium levels and drug resistance in TB. In addition, black garlic is also beneficial for DM sufferers, including reducing blood sugar levels, increasing plasma insulin, and preventing complications. Therefore, black garlic is recommended as an additional supplement for patients with TB andDM.



**REFERENCES:**

1. Shinde A, Dond S, Diwate V, Pawar S, Katkar R, Darandale S. Historical Approach Of Garlic (*Allium Sativum*) In Food, Spices And It's Phytochemicals And Therapeutic Uses In Medicine: A Review. 2020.
2. Ryu JH, Kang D. Physicochemical Properties, Biological Activity, Health Benefits, and General Limitations of Aged Black Garlic: A Review. *Molecules* (Basel, Switzerland). 2017; 22(6): 919. doi: 10.3390/molecules22060919.
3. Zhang X, Li N, Lu X, Liu P, Qiao X. Effects of temperature on the quality of black garlic. *Journal of the Science of Food and Agriculture*. 2016; 96(7): 2366-72. doi: 10.1002/jsfa.7351.
4. Bedrníček J, Laknerová I, Lorenc F, MoraesPPD, Jarošová M, Samková E, et al. The use of a thermal process to produce black garlic: Differences in the physicochemical and sensory characteristics using seven varieties of fresh garlic. *Foods* (Basel, Switzerland). 2021;10(11):2703. doi: 10.3390/foods10112703.
5. Ahmed T, Wang CK. Black Garlic and Its Bioactive Compounds on Human Health Diseases: A Review. *Molecules* (Basel, Switzerland). 2021; 26(16). doi: 10.3390/molecules26165028.
6. Lia Agustina, Emilia Gan, NinisYuliaty, Giftania W, Sudjarwo. In vitro Antiplatelet Activities of Aqueous Extract of Garlic (*Allium sativum*) and black Garlic in Human Blood. *Research Journal of Pharmacy and Technology*. 2022; 15(4): 1579-2. doi: 10.52711/0974-360X.2022.00263.
7. Shang A, Cao S-Y, Xu X-Y, Gan R-Y, Tang G-Y, Corke H, et al. Bioactive compounds and biological functions of garlic (*Allium sativum* L.). *Foods* (Basel, Switzerland). 2019; 8(7): 246. doi: 10.3390/foods8070246.
8. Jing H. Black garlic: Processing, composition change, and bioactivity. *eFood*. 2020; 1(3): 242-6. doi: 10.2991/efood.k.200617.001.
9. Djannah F, Massi MN, Hatta M, Bukhari A, Handayani I, Faruk M, et al. Virgin coconut oil and tuberculosis: A mini-review. *Pharmacognosy Journal*. 2022; 14(2): 464-469. doi:10.5530/pj.2022.14.59.
10. Alit Kumar, Rajan, Vivek Sharma. Tuberculosis: A Brief Overview. *Asian J. Pharm. Res*. 2012; 2(2): 59-62.
11. Kusumawati RL, Tania T, McNeil E, Chongsuvivatwong V. Predictors of multidrug resistance among pulmonary tuberculosis patients in a tertiary hospital in North Sumatera, Indonesia. *Bali Med J*. 2018; 7(1): 68-73.
12. Natarajan A, Beena PM, Devnikar AV, Mali S. A systemic review on tuberculosis. *The Indian journal of tuberculosis*. 2020; 67(3): 295-311. doi: 10.1016/j.ijtb.2020.02.005. Epub 2020 Feb 28.
13. Monesh O. Patil, Yogesh S. Mali, Paresh A. Patil, D. R. Karnavat. Development of Immunotherapeutic Nanoparticles for treatment of Tuberculosis. *Asian J. Pharm. Res*. 2020; 10(3): 226-232. doi: 10.5958/2231-5691.2020.00039.8.
14. Sourabh D Jain, Arun Kumar Gupta. Chemistry of Fluoroquinones in The Management of Tuberculosis (TB): An Overview. *Asian J. Pharm. Res*. 2021; 11(1): 55-59. doi: 10.5958/2231-5691.2021.00011.3.
15. Dewi DNSS, Soedarsono S, Kurmiati A, Mertaniasih NM. The specific DNA region of *esxA* gene for the target of PCR to determine *Mycobacterium tuberculosis* accurately. *Bali Med J*. 2017; 6(1): 150-5.
16. Dwija IBP, Anggraeni M, Ariantari NP. Anti Tuberculosis Activity of Forest Kedondong (*Spondias pinnata*) Stembark Extract Against Multiple Drug Resistance (MDR) Strain of *Mycobacterium Tuberculosis*. *Bali Med J*. 2016; 5(1): 23-6.
17. Yudistira A. Effect of mesenchymal stem cells on *Mycobacterium tuberculosis* growth: in vitro study. *Bali Med J*. 2018;7(3).
18. Paweninggalih RE, Mertaniasih NM, Koendhori EB, Soedarsono S. Time to detection of *Mycobacterium tuberculosis* using culture filtrate H37rv supplementation on MGIT 960 System. *Bali Med J*. 2023; 12(1): 228-34.
19. Nair SS, Gaikwad SS, Kulkarni SP, Mukne AP. *Allium sativum* Constituents Exhibit Anti-tubercular Activity In vitro and in RAW 264.7 Mouse Macrophage Cells Infected with *Mycobacterium tuberculosis* H37Rv. *Pharmacognosy magazine*. 2017; 13(Suppl 2): S209-s15. doi: 10.4103/pm.pm\_435\_16. Epub 2017 Jul 11.
20. Veronica E, Dampati PS, Bhargah V, Chrismayanti NKSD. PotensiEkstrakBawangHitamSebagaiAntituberkularMycobacterium Tuberculosis. *Gema Kesehatan*. 2021; 13(1): 9-18. doi: https://doi.org/10.47539/gk.v13i1.163.
21. Mohammed Musa Saaduddin, Sultana. G, Dhanalakshmi. Utilization of Bedaquiline among Drug Resistant-Tuberculosis patients. *Asian Journal of Pharmaceutical Research*. 2022; 12(2): 132-6. doi: 10.52711/2231-5691.2022.00020.
22. Choi J-A, Cho S-N, Lim Y-J, Lee J, Go D, Kim S-H, et al. Enhancement of the antimycobacterial activity of macrophages by ajoene. *Innate Immunity*. 2018; 24(1): 79-88. doi: 10.1177/1753425917747975.
23. Satheesh Kumar. G, Noorjahan, G. Sadhana Reddy, Syed Khundmeer Mujahid, T. Ashwini, V. Mahender Chary. Extraction, Phytochemical Studies and In-Vitro Screening of the Leaves and Flowers of *Crossandrafundibuliformis* against *Mycobacterium tuberculosis*. *Asian J. Res. Pharm. Sci*. 2018; 8(4): 247-252. doi: 10.5958/2231-5659.2018.00041.
24. Tesfaye A. Revealing the Therapeutic Uses of Garlic (*Allium sativum*) and Its Potential for Drug Discovery. *The Scientific World Journal*. 2021; 2021: 8817288. doi: 10.1155/2021/8817288.
25. Garcia S. Pandemics and Traditional Plant-Based Remedies. A Historical- Botanical Review in the Era of COVID19. *Frontiers in plant science*. 2020; 11: 571042. doi: https://doi.org/10.3389/fpls.2020.571042.
26. Rajani SD, Desai PB, Rajani DP. Antimycobacterial activity of garlic (*Allium sativum*) against multi-drug resistant and reference strain of *Mycobacterium tuberculosis*. *Int J Appl Res*. 2015; 1(13): 767-70.
27. Hannan A, Ikram Ullah M, Usman M, Hussain S, Absar M, Javed K. Anti-mycobacterial activity of garlic (*Allium sativum*) against multi-drug resistant and non-multi-drug resistant mycobacterium tuberculosis. *Pakistan Journal of Pharmaceutical Sciences*. 2011; 24(1): 81-5.
28. Lindawati NY, Hartono H. Optimasi Kapsul Bawang Putih (*Allium sativum* Linn) sebagai Terapi Alternatif Pengobatan TBC. *Jurnal Farmasi (Journal of Pharmacy)*. 2013; 2(1): 19. doi: 10.37013/jf.v2i1.16.
29. Dwivedi VP, Bhattacharya D, Singh M, Bhaskar A, Kumar S, Fatima S, et al. Allicin enhances antimicrobial activity of macrophages during *Mycobacterium tuberculosis* infection. *Journal of Ethnopharmacology*. 2019; 243: 111634. doi: 10.1016/j.jep.2018.12.008.
30. Shukla P, Sharma A. Effect of some medicinal plants on growth of *Mycobacterium tuberculosis*, multi drug resistant *Mycobacterium tuberculosis* and mycobacterium other than tuberculosis. *Journal of Microbiology, Biotechnology and Food Sciences*. 2021; 2021:199-201.
31. Fazeli-Nasab B, Valizadeh M, Beigomi M, Saeidi S. Identification of Antibiotic-Resistant Genes and Effect of Garlic Ethanolic Extract on *Mycobacterium tuberculosis* Isolated from Patients in Zabol, Iran. *Gene, Cell and Tissue*. 2021; 8(4). doi: 10.5812/gct.113202.
32. Bae SE, Cho SY, Won YD, Lee SH, Park HJ. Changes in S-allyl cysteine contents and physicochemical properties of black garlic during heat treatment. *LWT-Food Science and Technology*. 2014; 55(1): 397-402. doi: 10.1016/j.lwt.2013.05.006.
33. Botas J, Fernandes Â, Barros L, Alves MJ, Carvalho AM, Ferreira IC. A comparative study of black and white *Allium sativum* L.: nutritional composition and bioactive properties. *Molecules* (Basel, Switzerland). 2019; 24(11): 2194. doi: 10.3390/molecules24112194.
34. Toledano Medina MÁ, Merinas-Amo T, Fernández-Bedmar Z, Font R, del Río-Celestino M, Pérez-Aparicio J, et al. Physicochemical characterization and biological activities of black and white garlic: In vivo and in vitro assays. *Foods* (Basel, Switzerland). 2019; 8(6): 220. doi: 10.3390/foods8060220.
35. Hasan N, Siddiqui MU, Toossi Z, Khan S, Iqbal J, Islam N.

- Allicin-induced suppression of *Mycobacterium tuberculosis* 85B mRNA in human monocytes. *Biochemical and Biophysical Research Communications*. 2007; 355(2): 471-6. doi: 10.1016/j.bbrc.2007.01.174.
36. Vaishali. R. Undale, Sujata S. Kurkute, Srutuja S. Jadhav. Curcumin Potentiates Therapeutic Efficacy of Metformin: A Preclinical Study in STZ-NA Induced Hyperglycemia in Wistar Rats. *Research J. Pharm. and Tech.* 2020; 13(6): 2591-2596. doi: 10.5958/0974-360X.2020.00461.8.
37. Husen SA, Wahyuningsih SPA, Ansori ANM, Hayaza S, Susilo RJK, Winarni D, Punnapayak H, Darmanto W. Antioxidant Potency of Okra (*Abelmoschus esculentus* Moench) Pods Extract on SOD Level and Tissue Glucose Tolerance in Diabetic Mice. *Res J Pharm Technol.* 2019; 12(12): 5683. doi: 10.5958/0974-360X.2019.00983.1.
38. Husen SA, Setyawan MF, Syadzha MF, Susilo RJK, Hayaza S, Ansori ANM, Alamsjah MA, Ilmi ZN, Wulandari PAC, Pudjiastuti P, Awang P, Winarni D. A Novel Therapeutic effects of *Sargassum ilicifolium* Alginate and Okra (*Abelmoschus esculentus*) Pods extracts on Open wound healing process in Diabetic Mice. *Research J. Pharm. and Tech.* 2020; 13(6): 2764-2770. doi: 10.5958/0974-360X.2020.00491.6.
39. Prawitasari DS. Diabetes melitus dan antioksidan. *KELUWIH: Jurnal Kesehatan dan Kedokteran.* 2019; 1(1): 48-52. doi: <https://doi.org/10.24123/kesdok.V1i1.2496>.
40. Sakran N, Graham Y, Pintar T, Yang W, Kassir R, Willigendael EM, et al. The many faces of diabetes. Is there a need for re-classification? A narrative review. *BMC endocrine disorders.* 2022; 22(1): 1-12.
41. Husen SA, Ansori ANM, Hayaza S, Susilo RJK, Zuraidah AA, Winarni D, Punnapayak H, Darmanto W. Therapeutic Effect of Okra (*Abelmoschus esculentus* Moench) Pods Extract on Streptozotocin-Induced Type-2 Diabetic Mice. *Res J Pharm Technol.* 2019; 12(8): 3703-3708. doi: 10.5958/0974-360X.2019.00633.4.
42. Idi Pangestu TY, Setyawan AB. Pengaruh Pemberian Black Garlic terhadap Perubahan Kadar Gula Darah pada Pasien Diabetes Mellitus Tipe II di Wilayah Kerja PUSKESMAS Segiri Samarinda. *Borneo Student Research (BSR).* 2020; 1(3): 2229-34.
43. Kim DG, Kang MJ, Hong SS, Choi YH, Shin JH. Anti-inflammatory Effects of Functionally Active Compounds Isolated from Aged Black Garlic. *Phytotherapy research : PTR.* 2017; 31(1): 53-61. doi: 10.1002/ptr.5726.
44. Saryono, Nani D, Proverawati A, Sarmoko. Immunomodulatory effects of black solo garlic (*Allium sativum* L.) on streptozotocin-induced diabetes in Wistar rats. *Heliyon.* 2021; 7(12). doi: <https://doi.org/10.1016/j.heliyon.2021.e08493>.
45. Lee Y-M, Gweon O-C, Seo Y-J, Im J, Kang M-J, Kim M-J, et al. Antioxidant effect of garlic and aged black garlic in animal model of type 2 diabetes mellitus. *Nutrition Research and Practice.* 2009; 3(2): 156-61. doi: 10.4162/nrp.2009.3.2.156.
46. Isnaini F, Yudistia R, Faradilla A, Rahman M. Effect of Black Garlic Extract on Blood Glucose, Lipid Profile, and SGPT-SGOT of Wistar Rats Diabetes Mellitus Model. *Majalah Kedokteran Bandung.* 2019; 51(2): 82-7. doi: <https://doi.org/10.15395/mkb.v51n2.1657>.
47. Ha AW, Kim WK. Antioxidant mechanism of black garlic extract involving nuclear factor erythroid 2-like factor 2 pathway. *Nutr Res Pract.* 2017; 11(3): 206-13. doi: 10.4162/nrp.2017.11.3.206. Epub 2017 Apr 6. Erratum in: *Nutr Res Pract.* 2017 Aug;11(4):347.
48. Saravanan G, Ponmurugan P. Antidiabetic effect of S-allylcysteine: effect on thyroid hormone and circulatory antioxidant system in experimental diabetic rats. *Journal of Diabetes and its Complications.* 2012; 26(4): 280-5. doi: 10.1016/j.jdiacomp.2012.03.024.
49. Kim JH, Yu SH, Cho YJ, Pan JH, Cho HT, Kim JH, et al. Preparation of S-allylcysteine-enriched black garlic juice and its antidiabetic effects in streptozotocin-induced insulin-deficient mice. *Journal of Agricultural and Food Chemistry.* 2017; 65(2): 358-63. doi: 10.1021/acs.jafc.6b04948.

# Source details

## Research Journal of Pharmacy and Technology

Scopus coverage years: 1997, 2005, from 2011 to Present

Publisher: A and V Publication

ISSN: 0974-3618 E-ISSN: 0974-360X

Subject area: Pharmacology, Toxicology and Pharmaceutics: Pharmacology, Toxicology and Pharmaceutics (miscellaneous)

Medicine: Pharmacology (medical)

Source type: Journal

CiteScore 2022

1.3



SJR 2022

0.267



SNIP 2022

0.680



[View all documents >](#)

[Set document alert](#)

[Save to source list](#)

[CiteScore](#) [CiteScore rank & trend](#) [Scopus content coverage](#)

### Improved CiteScore methodology

CiteScore 2022 counts the citations received in 2019-2022 to articles, reviews, conference papers, book chapters and data papers published in 2019-2022, and divides this by the number of publications published in 2019-2022. [Learn more >](#)

CiteScore 2022

$$1.3 = \frac{4,962 \text{ Citations 2019 - 2022}}{3,848 \text{ Documents 2019 - 2022}}$$

Calculated on 05 May, 2023

CiteScoreTracker 2023

$$1.4 = \frac{5,685 \text{ Citations to date}}{4,021 \text{ Documents to date}}$$

Last updated on 05 April, 2024 • Updated monthly

### CiteScore rank 2022

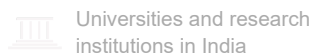
Category	Rank	Percentile
Pharmacology, Toxicology and Pharmaceutics	#17/32	48th
Pharmacology, Toxicology and Pharmaceutics (miscellaneous)		
Medicine	#188/260	27th

[View CiteScore methodology >](#) [CiteScore FAQ >](#) [Add CiteScore to your site &](#)

# Research Journal of Pharmacy and Technology

## COUNTRY

India



## SUBJECT AREA AND CATEGORY

Medicine  
Pharmacology (medical)  
Pharmacology, Toxicology and  
Pharmaceutics  
Pharmacology, Toxicology and  
Pharmaceutics  
(miscellaneous)

## PUBLISHER

A and V Publication

## H-INDEX

47

## PUBLICATION TYPE

Journals

## ISSN

0974360X, 09743618

## COVERAGE

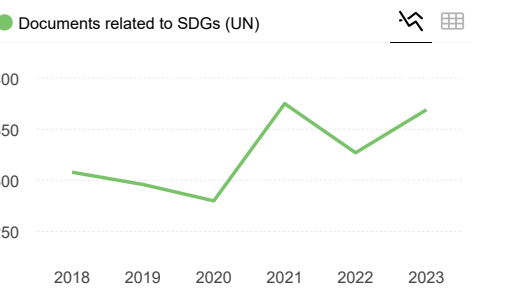
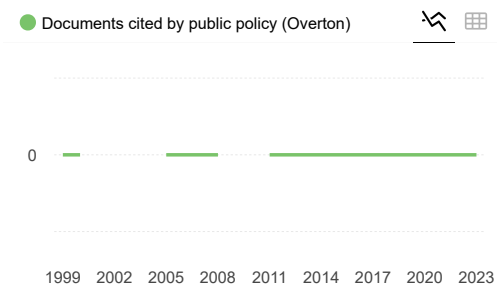
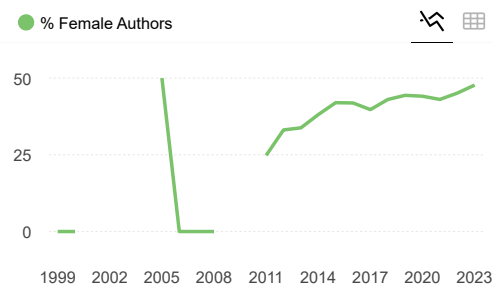
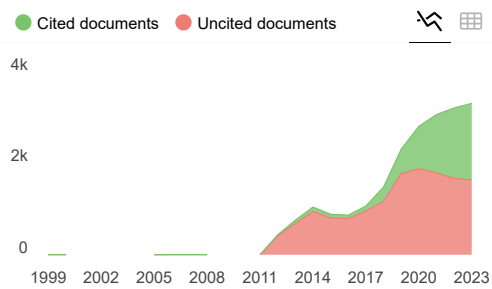
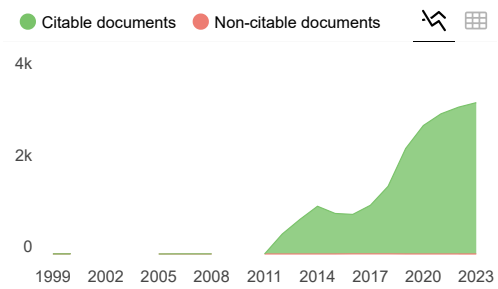
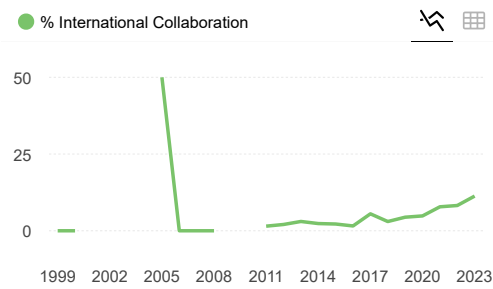
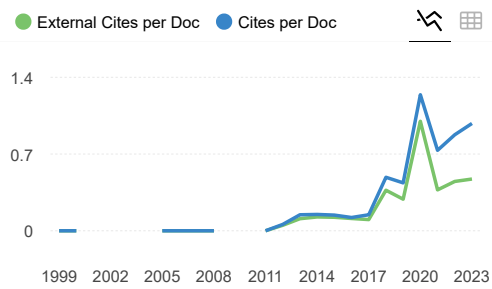
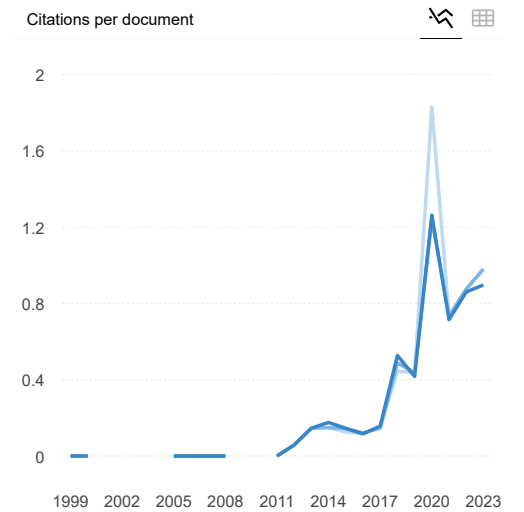
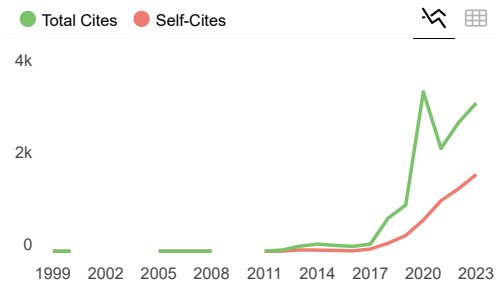
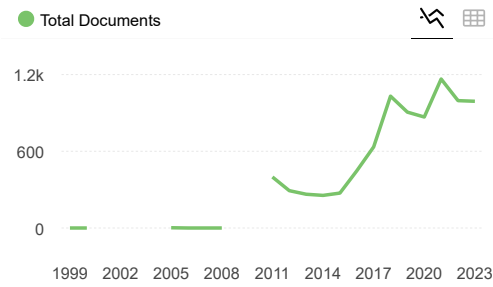
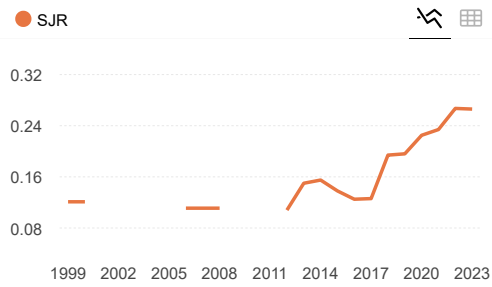
1997, 2005, 2011-2021

## INFORMATION

[Homepage](#)  
[How to publish in this journal](#)  
[editor.rjpt@gmail.com](mailto:editor.rjpt@gmail.com)

## SCOPE

Research Journal of Pharmacy and Technology (RJPT) is an international, peer-reviewed, multidisciplinary journal, devoted to pharmaceutical sciences. The aim of RJPT is to increase the impact of pharmaceutical research both in academia and industry, with strong emphasis on quality and originality. RJPT publishes Original Research Articles, Short Communications, Review Articles in all areas of pharmaceutical sciences from the discovery of a drug up to clinical evaluation. Topics covered are: Pharmaceutics and Pharmacokinetics; Pharmaceutical chemistry including medicinal and analytical chemistry; Pharmacognosy including herbal products standardization and Phytochemistry; Pharmacology: Allied sciences including drug regulatory affairs, Pharmaceutical Marketing, Pharmaceutical Microbiology, Pharmaceutical biochemistry, Pharmaceutical Education and Hospital Pharmacy.



**Research Journal of Pharmacy and Technology**

**Q2** Pharmacology, Toxicology and Pharmaceutics... best quartile

**SJR 2023**  
0.27

powered by scimagojr.com

Show this widget in your own website

Just copy the code below and paste within your html code:

`<a href="https://www.scima`

