

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
[Home Page](#)



DR.RER.NAT ARLI ADITYA PARIKES

Associate Editor

Department of Bioinformatics School of Life Sciences Indonesia
International Institute for Life Sciences Jl. Pulomas Barat Kav.88
Jakarta 13210
Email: arli.parikesit@i3l.ac.id
[Home Page](#)

ASSOCIATE EDITOR



MARWAN MAHMOOD SALEH

Associate Editor

Anbar-Ramadi- Habbaniya- 4-4-17
Email: bio.marwan92@gmail.com
[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
[Home Page](#)



HARDIK PATHAK

Associate Editor

222 pashupatinath nagar, jaipur
Email: hardikaeshu@gmail.com
[Home Page](#)



DHANANJAY BABANRAO DESHMUKH

Associate Editor

Ashvin college of pharmacy manchi hill ashvi Bk sangamner
Ahmednagar
Email: ghananjaydeshmukh777@gmail.com
[Home Page](#)



MARIIA SHANAIDA

Associate Editor

46001, Ternopil, Voli Str., 1. Ukraine
Email: 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
[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.umezor@unizik.edu.ng
[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
[Home Page](#)



DR. PRANAV KUMAR PRABHAKAR

Associate Editor

Department of Transdisciplinary Research, Division of Research &
Development,LovelyProfessional University, Phagwara, Punjab,
India-144402
Email: prabhakar.iitm@gmail.com
[Home Page](#)



DR SHAEESTA K. BHAVIKATTI

Associate Editor

College of Dentistry, King Khalid University, Abha, Saudi Arabia
Email: drshaeesta@gmail.com
[Home Page](#)



EBAA ADNAN AZOOZ

Associate Editor

Iraq, Najaf
Email: ebaaadnan.ed12p@uokufa.edu.iq
[Home Page](#)



DR KARTEEK ESWARA

Associate Editor

T2,staff quarters, ksr Institutions, ksr kalvi nagar, Tiruchengode-
637215, Tamilnadu
Email: karteekeswara@gmail.com
[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
[Home Page](#)



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



HUSSEIN O.M. AL-DAHMOshi
[Associate Editor](#)
Iraq, Babylon Province Hilla City
Email: dr.dahmoshi83@gmail.com
[Home Page](#)



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



DR. GURJEET KAUR
[Associate Editor](#)
Amity Institute of Biotechnology Amity University Uttar Pradesh
Lucknow India
Email: gkaur@lko.amity.edu
[Home Page](#)



DR. BELLAMKONDA RAMESH
[Associate Editor](#)
Department of Food Technology, Vikrama Simhapuri University,
Nellore, Andhra Pradesh, India-524320
Email: rammygp@gmail.com

[Home Page](#)

[Home Page](#)



K. MAHALINGAN
[Associate Editor](#)
RR College of Pharmacy, RR Nagar, Chickabanawara, Bangalore-
560090
Email: kmahalingan@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
[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
[Home Page](#)



DR ANUPAM KR SACHAN
[Associate Editor](#)
Dayanand Dinanath College, Institute of Pharmacy, Kanpur Nagar,
Uttar Pradesh-208027
Email: anupamkrsachan@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
[Home Page](#)



MANIKANDAN K
[Associate Editor](#)
SRM College of Pharmacy SRM Institute of Science and
Technology Kattankulathur, Kancheepuram
Email: gurumani12@gmail.com
[Home Page](#)



SHANKAR BALU KALBHARE
[Associate Editor](#)
YSPM'S Yashoda Technical Campus, Satara 415003
Email: kirankal786@gmail.com



DR. PAVAN KUMAR
[Associate Editor](#)
Koneru Lakshmaiah Education Foundation KLEF
Email: pavankmaths@gmail.com

[Home Page](#)



ASHEESH SINGH

[Associate Editor](#)

M-303, Swastik city near Pooja park, Lambha turning Narol-
Ahemdabad-382405
Email: asheesh_parihar@yahoo.com
[Home Page](#)



SWARNIMA PANDEY

[Associate Editor](#)

Goel Institute of Pharmacy & Sciences ,Faizabad road lucknow
226028
Email: yesgoldi@gmail.com
[Home Page](#)



DR. PARUL JOHRI

[Associate Editor](#)

C-1/167 indra nagar kanpur
Email: 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



DR.K.B.BHASKAR

[Associate Editor](#)

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



DIMPLE NAGPAL

[Associate Editor](#)

Chitkara University,Punjab
Email: dimplenagpal009@gmail.com
[Home Page](#)



DR VINAYAKUMAR KADIBAGIL

[Associate Editor](#)

BELUR ROAD, 2ND CROSS ABHI Building
Email: DRVINAYAKADIBAGIL@GMAIL.COM
[Home Page](#)



DR. ATUL KABRA

[Associate Editor](#)

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

[Home Page](#)



DUMPALA LAKSHMIPRASUNA RAJESH

[Associate Editor](#)

Sumandeep Pharmacy college AT & PO: PIPARIA, WAGHODIA
ROAD, TA: WAGHODIA, VADODARA- 391760
Email: mlakshmiprasuna2015@gmail.com
[Home Page](#)



DR. S. BALASUBRAMANIAN

[Associate Editor](#)

National Centre for Coastal Research Chennai.
Email: sakthivelbala.s@gmail.com
[Home Page](#)



PROF. DR. NAGHAM MAHMOOD ALJAM

[Associate Editor](#)

Professor, Ph.D, Organic Chemistry , Iraq
dr.nagham_mj@yahoo.com
Email: 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
[Home Page](#)



MOHD IBRAHIM ALARAJ

[Associate Editor](#)

Airport St. Amman, Jordan
Email: 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
[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
[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

[Home Page](#)



VJ'S COLLEGE OF PHARMACY Diwancheruvu Rajahmundry,
andhra pradesh Pin 533296
Email: luckympharma09@gmail.com
[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
[Home Page](#)



DR. GARIMA MISHRA

[Associate Editor](#)

Department of Pharmacy, College of Health Sciences, Debre Tabor
University, Ethiopia
Email: gp_nmr2002@yahoo.co.in
[Home Page](#)



DR GOVINDH BODDETI

[Associate Editor](#)

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



DR. PRADEEP SINGH

[Associate Editor](#)

Department of Pharmacy, College of Health Sciences, Debre Tabor
University, Ethiopia
Email: pradeep_2682@yahoo.co.in
[Home Page](#)



DR DURGESH RANJAN KAR

[Associate Editor](#)

BENGAL SCHOOL OF TECHNOLOGY A COLLEGE OF
PHARMACY SUGHANDHA CHUCHURA DIST- HOOGLY WEST
BENGAL INDIA
Email: durgesh176@gmail.com
[Home Page](#)



DR. DAVID PAUL

[Associate Editor](#)

St.James College of Pharmaceutical Sciences St.James Medical
Academy River Bank, Chalakudy Kerala, India-680307
Email: davidpaulred@gmail.com
[Home Page](#)

MORTHA LAKSHMI PRASANNA

[Associate Editor](#)



[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
[Home Page](#)



DR.S.SASIKALA

[Associate Editor](#)

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



DR. A.K. JHA

[Associate Editor](#)

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



DR. VIBHA YADAV

[Associate Editor](#)

Covington, LA, USA
Email: editor.rjpt@gmail.com
[Home Page](#)



DR. NAGHAM MAHMOOD ALJAMALI

[Associate Editor](#)

college Education , department , IRAQ.
Email: dr.nagham_mj@yahoo.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
[Home Page](#)



DR. R. B. KAKADE

[Associate Editor](#)

Professor, Uni. Dept. of Pharmaceutical Sci., RTM Nagpur
University, Nagpur India
Email: drkakde@yahoo.com
[Home Page](#)



DR. U.S. MAHADEVA RAO

[Associate Editor](#)

Kuala Terengganu, Malaysia
Email: raousm@gmail.com
[Home Page](#)

WISSAM ZAM

CHANDRASEKARAN V M

[Associate Editor](#)



124 Technology Tower VIT University Vellore 632014 (TN)
 Email: vmcsn@yahoo.com
[Home Page](#)



Associate Editor
 University Institute of Pharmacy Pt. Ravishankar Shukla University
 Raipur(C.G.)
 Email: deependraiop@gmail.com
[Home Page](#)



NAEEM HASAN KHAN
Associate Editor
 Faculty of Pharmacy, AIMST University, 08100 Bedong, Kedah
 D.A., Malaysia.
 Email: naeemshirazi@hotmail.com
[Home Page](#)



DR S RAJESHKUMAR
Associate Editor
 Nanotherapy Lab School of Biosciences and Technology, VIT,
 Vellore
 Email: ssrajeshkumar@hotmail.com
[Home Page](#)



DR. DEEPANSH SHARMA
Associate Editor
 Block 28, Room No. 202 Department of Biosciences, Lovely
 Professional University
 Email: deepanshsharma@gmail.com
[Home Page](#)



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

DR. DEEPENDRA SINGH

BEHZAD FOROUTAN



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



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



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

EDITORS



DR AVINASH B DAREKAR
 KVNNSPS, Institute of Pharmaceutical Education and Research,
 Canada Corner,Nashik, Maharashtra-422002.
 Email: avibdarekar@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
[Home Page](#)



PRAVEEN KUMAR SHARMA
 Department of Chemistry, Lovely Professional University,
 Phagwara, Punjab,India-144411
 Email: 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
[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@smist.edu.in
[Home Page](#)



DR SHAIK HARUN RASHEED

professor & Head Srikrupa Institute of Pharmaceutical Sciences
Velikatta, siddipet -502277 Telangana.
Email: shaikharunrasheed@gmail.com
[Home Page](#)



DR. ASHISH KUMAR

Professor and HOD, Department of Chemistry, Lovely Professional
University, Jalandhar road Phagwara
Email: drashishchempu@gmail.com
[Home Page](#)



DR. GAURAV TIWARI

G-23, Department of Pharmacy, PSIT, NH-2, Kalpi Road, Bhaunti
Kanpur 209305
Email: dr.gauravtiwari@psit.in
[Home Page](#)



DR.ZEYAD KADHIM OLEIWI

najaf-iraq
Email: 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
[Home Page](#)



YAHIA MOHAMMAD MOUALLA

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

MOHANAD MOUSA KAREEM
Babylon University
Email: mohanad_1972@yahoo.com



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
[Home Page](#)



ABDULRAHMAN R.MAHMOOD

*Department of Chemistry, College of Education for Pure
Sciences/(Ibn-Al-Haitham), University of Baghdad, Baghdad, Iraq.
Email: abdooaljumaaily@gmail.com
[Home Page](#)



DR. SUSHIL KUMAR MIDDHA

Maharani Lakshmi Ammanni College For Women, 18th Cross,
Malleswaram, Bangalore-12
Email: drsushilmiddha@gmail.com
[Home Page](#)



MUNIM R. ALI

Al-Mustansiriyah University Biology depart./college of Science
Iraq/Baghdad
Email: mnumbio77@yahoo.com
[Home Page](#)



[Home Page](#)



ADAMIYAH FADHIL ABBAS ALZUBAIDI

Iraq / Diyala / Baqubah Diyala university / education college / pure
science
Email: adwa_a2000@YAHOO.COM
[Home Page](#)



MOUSHIRA ZAKI

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



DR. AMIT KUMAR CHATURVEDI

Department Of Chemistry, J.S.University , Shikohabad (U.P.)
Email: 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
[Home Page](#)



AVINASH BABURAO THALKARI
Vasant Pharmacy College Kaji Affiliated by MSBTE Mumbai
Email: avinashthalkari@rediffmail.com
[Home Page](#)



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
[Home Page](#)



RAJESH L. DUMPALA
Alembic Pharma Campus, Alembic Rd, Subhanpura, Vadodara,
Gujarat 390003
Email: rdumpala64@gmail.com
[Home Page](#)



DR GURVINDER SINGH
School of Pharmaceutical Sciences, Lovely Professional
University, Phagwara, Punjab
Email: guri_ph@yahoo.co.in
[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
[Home Page](#)



DR.SUSHANT KUMAR
UTTAR PRADESH UNIVERSITY OF MEDICAL SCIENCES,
SAIFAI, ETWAH, UTTAR PRADESH
Email: K.SUSHANT25@GMAIL.COM
[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
[Home Page](#)



MR. PARESH ASHOK PATIL
Jay ambe Nivas, Gujar galli, Shahada Dist-Nandurbar
Email: rcp.pareshatil@gmail.com
[Home Page](#)

DR PRASHANT L. PINGALE



VAMSIKRISHAN BIRUPANENI
4401 manchester avenue, Apt#53, CA, 95207.
Email: 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
[Home Page](#)



DR V. PALANISINGH
Puduvadi, Ulagamatti post Sivagangai Dist, Tamil Nadu PIN
630410
Email: vpalanisingham@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
[Home Page](#)



NASIR MUWFAQ YOUNIS
University of Mosul _College of Nursing
Email: nasir.muwfaq@uomosul.edu.iq
[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
[Home Page](#)



SANDIP SEN
SRIKRUPPA INSITUTE OF PHARMACEUTICAL SCIENCES,
VELIKATTA, KONDAPKKA, SIDDIPET-502277
Email: sandipsen2010@gmail.com
[Home Page](#)



BASIL A. ABBAS
University of Basrah, Basrah, Iraq
Email: basil.abbas@uobasrah.edu.iq
[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
[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
[Home Page](#)

Email: rajitha.galla@gmail.com
[Home Page](#)



DR PRASENJIT MONDAL
Vaageswari institute of Pharmaceutical Sciences, Ramakrishna
colony, Karimnagar, Telangana, India
Email: prasenjitmyname@gmail.com
[Home Page](#)



ASHISH GUPTA
Flat no.E113,Nariman Point, Mahalaxmi Nagar Indore MP
Email: ashishgupta@acropolis.edu.in
[Home Page](#)



DR ANJU THAWARE
Associate professor, Dept of samhita Siddhant ,MGACRCH,salod
wardha ,(DMIMSU,wardha) Maharashtra ,India
Email: anju.samhita@dmimsu.edu.in
[Home Page](#)



HUSAM AL-HRAISHAWI
195 Little Albany St,
Email: hra10@scarletmail.rutgers.edu
[Home Page](#)



DR. NITIN SHARMA
Department of Biotechnology Chandigarh Group of Colleges,
Landran, Mohali- 140307
Email: nitin.3994@cgc.edu.in
[Home Page](#)



TUHIN SARKAR
Jakir Hossain Institute of Pharmacy, Vill. & P.O.- Miapur, Dist.-
Murshidabad, Pin: 742225, West Bengal.
Email: gantuhin@gmail.com
[Home Page](#)



PROF. GALLA RAJITHA
Prof. G. Rajitha, Professor, Institute of PharmaceuticalTechnology,
Sri Padmavati Mahila Visvavidyalayam, Tirupati - 517502, Andhra
Pradesh, India



BHUPENDRA G. PRAJAPATI
Ganpat Vidyanagar, Mahesna 384012
Email: bhupen27@gmail.com
[Home Page](#)



DR K RAJYALAKSHMI
Department of Pharmaceutical Chemistry, Vignan Pharmacy
College, Vadlamudi, Guntur, A.P.
Email: drkr13579@gmail.com
[Home Page](#)



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



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



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



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



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



DR. PRAVIN KUMAR SHARMA
Acropolis Institute of Pharmaceutical Education and Research,
Indore
Email: praveensharma910@gmail.com
[Home Page](#)

DR. RAJIV DUTTA



DR. FORAT YASIR ALJABERI
Chemical Engineering Department, College of Engineering, Al-
Muthanna University, Samawa, Iraq
Email: furatyasir@mu.edu.iq
[Home Page](#)



DR. L. NANDHAKUMAR
Kastooribha gandhi Pharmacy college Namakkal, Rasipuram
Email: drndkumar12@gmail.com
[Home Page](#)



PROF. DR. RAJIV DUTTA
SHOBHIT UNIVERSITY, GANGOH
Email: director.sbt@gmail.com
[Home Page](#)



AHMED ALI MHAWESH
Baghdad/Iraq Al-Ghadeer Quarter
Email: 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
[Home Page](#)



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



ALAA HUSSEIN AL-DARRAJI
Iraq-Misan
Email: alaa.hussein@uomisan.edu.iq
[Home Page](#)



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



DR. DINANATH TUKARAM GAIKWAD
223, Shamrao Kumbhar Nagar, Nanapatil Nagar, Kolhapur, Maharashtra, India
Email: gdinanath@gmail.com
[Home Page](#)



BEHZAD FOROUTAN
Department of Pharmacology School of Medicine Shahroud University of Medical Sciences Shahroud, IRAN
Email: behzad_foroutan@hotmail.com
[Home Page](#)



MAJIDA HAMEED KHAZAAL
Kufa University
Email: 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
[Home Page](#)



DR. P. DWARAKANADHA REDDY
Annamacharya College of Pharmacy, Rajampet-516126, Andhra Pradesh, India
Email: 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
[Home Page](#)



DR. AMIT ROY
Principal, Columbia Institute of Pharmacy, Raipur CG India
Email: wakratund@gmail.com
[Home Page](#)



P. PARTHIBAN
Centre for R&D, PRIST University, Thanjavur-613403, India
Email: 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
[Home Page](#)



DR. P. KUMARAVEL
Assistant Professor, Department of Biotechnology, Vysya College, Masinaickenpatty, Salem- 636103. Tamil Nadu, India.
Email: 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
[Home Page](#)



Email: ihsanelshahiri@yahoo.com
[Home Page](#)



DR. AJAY V. PATHAK
House No.33 Ravindra nagar Nagpur-440022 Maharashtra, INDIA
Email: a.pathak4@gmail.com
[Home Page](#)



DR.JAYASSHREE SEN
J.N.M.C.&A.V.B.R.H.,Sawangi,Wardha,Maharashtra 442007
Email: jayashree_sen@rediffmail.com
[Home Page](#)



AYUSH DOGRA
department of electronics and communications, panjab university chandigarh
Email: ayush123456789@gmail.com
[Home Page](#)



IMAD
University of Babylon
Email: imad_dna@yahoo.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@lpu.co.in
[Home Page](#)



RIM M. HARFOUCH
Al Andalus university, Qadmus, Tartous, Syria
Email: 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
[Home Page](#)

IHSAN HABIB DAKHIL
Engineering College, Al-Muthanna University, Iraq

REVIEWERS



DR. SUBHASHIS DEBNATH
Seven Hills College of Pharmacy Venkatramapuram, Tirupati-517561
Email: subhashis.ooty@gmail.com
[Home Page](#)



K SUJANA
university college of pharmaceutical sciences Acharya Nagarjuna university
Email: sujana_36@yahoo.co.in
[Home Page](#)



GAURAV KUMAR
Department of Microbiology School of Bioengineering and Biosciences Lovely Professional University Phagwara, 144411, Punjab, India
Email: gau_ravkr@yahoo.com
[Home Page](#)



DR.P.BRINDHA DEVI
Vels University, Velan Nagar, PV Vaithiyalingam Road, Pallavaram
Email: pbrindhadevi@gmail.com
[Home Page](#)



RUCHI VERMA
manipal college of pharmaceutical sciences, manipal university, karnataka, India.
Email: ruchi.verma@manipal.edu
[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
[Home Page](#)



DR. KETAN VINODLAL SHAH
201, Rudrax Apartment, Guruprasad Society, Nehind Telephone exchange, Krishnanagar Main road, Rajkot
Email: ketan421981@gmail.com
[Home Page](#)



ZAIN BAAITY
Syria, Latakia
Email: zein_syria@hotmail.com
[Home Page](#)



LAITH AHMED NAJAM
Mosul University, College of Science, Physics Dept., Mosul
Email: Prof.lai2014@gmail.com
[Home Page](#)



VEEREN DEWOOLKAR
4824 Washtenaw Ave, Apt C1, Ann Arbor, MI 48108
Email: veerenrx@gmail.com
[Home Page](#)



NEERAN OBIED JASIM
University of AL-Qadisiyah college of Pharmacy Iraq
Email: neran.jasim@qu.edu.iq
[Home Page](#)



MAHMOUD NAJIM ABID
Mustansiriyah University, College of Science, Department of Chemistry
Email: mahmoudaljjibouri@gmail.com
[Home Page](#)



NILESH PATEL
B/103, Snehkunj Elegance, Behind Shivalay Parisar
Kudasan, Gandhinagar-382421, Gujarat
Email: nilesh33.emcure@gmail.com



SURENDRA KUMAR GAUTAM
Kamla Nehru Institute of Management & Technology, NH96
Faizabad Bypass Road Faridpur Campus
Email: 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: urrakshith@jssuni.edu.in
[Home Page](#)



RAMU SAMINENI
H.NO-1-123-A; C/O SIVARAMAKRISHNA SAMINENI
MANDEPUDI, AMARAVATHI
Email: samineni.ramu@gmail.com
[Home Page](#)



DHAVAL PATEL
A-104, Maruti Aamrakunj, Sargasan, Gandhinagar-382421
Email: dhaval.nine@gmail.com
[Home Page](#)

AKHIL NAGAR

[Home Page](#)



NEERAN OBIED JASIM
university of AL-Qadisiyah -college of science-Iraq
Email: neran.jasim@qu.edu.iq
[Home Page](#)



MARWAN MAHMOOD SALEH
Anbar-Ramadi- Habbaniya- 4-4-17
Email: ah.marwan_bio@uoanbar.edu.iq
[Home Page](#)



PALLAVI LAXMAN PHALKE
Parul University, Limda, Waghodiya. Vadodara-391760, Gujarat India.
Email: falkepallavi@gmail.com
[Home Page](#)



DR. ANUP S. HENDRE
Biochemistry Department Krishna Institute of Medical Sciences, Malkapur Karad. Dist-Satara.
Email: anupviews@gmail.com
[Home Page](#)



R C PATEL INSTITUTE OF PHARMACEUTICAL EDUCATION AND RESEARCH
Email: 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
[Home Page](#)



ANAS TARIK NAFEI
Baghdad, Qadissiyah Express way
Email: anasalhamdany@yahoo.com
[Home Page](#)



DR.KUMARASWAMY GULLAPELLI
STREET NUMBER 4 , BHAVANI NAGAR , NACHARAM, HYDERABAD NACHARAM, Hyderabad, Telangana, pincode: 500076
Email: kumargullapelli001@gmail.com
[Home Page](#)



RADHWAN AL-ZIDAN
Almothana district, Mosul, Iraq
Email: radhwan.alzidan@uomosul.edu.iq
[Home Page](#)



YAHIA M. MOUALLA

faculty of pharmacy, Tishreen university, Latakia, Syria
Email: yahia.moualla@tishreen.edu.sy
[Home Page](#)



SUHAS SURESH AWATI

Assistant Professor, Dr. Shivajirao Kadam College of Pharmacy,
Kasabe Digraj, Bagavat, Tal- Miraj, Dist- Sangli, Maharashtra.
416301
Email: 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
[Home Page](#)



DR NASEEF PP

Vice Principal, Moulana College of Pharmacy, Near Angadippuram
Railway Station, Malappuram, Kerala, India 679321
Email: dmaseefpp@gmail.com
[Home Page](#)



3/31 periyar street, ramapuram chennai 600089
Email: 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
[Home Page](#)



KARTHIKEYAN T

registrar nimhans
Email: 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
[Home Page](#)



AAMINAH NAJMUS SAHAR

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



DR. RAHUL RADHAKRISHNAN

Manasam, Edavattom, Chirakkara (PO), Kollam, Kerala
Email: drrahulpharmd@gmail.com
[Home Page](#)



RIM M. HARFOUCH

0624 Albaath street, Latakia, Syria
Email: rimharf@yahoo.com
[Home Page](#)

ARUN A



ZAINAB HAITHAM FATHI

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



DR. OM PRAKASH RANJAN

Faculty of Pharmacy, Sachchidanad Sinha College, Aurangabad,
Bihar.
Email: 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
[Home Page](#)



VISHAL KUMAR BISWKARMA

KSCP, Subharti University, Meerut, Uttar Pradesh, India
Email: 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
[Home Page](#)



Sal Institute of Pharmacy, Ahmedabad
Email: anar.patel@sal.edu.in
[Home Page](#)



RANJAN KUMAR SINGH
g d memorial college of pharmacy, kbhb, jodhpur.342005
Email: xsingh8@gmail.com
[Home Page](#)



GANESH BARKADE
Dr. Vithalrao Vikhe Patil Foundation's College of Pharmacy,
Ahmednagar, MH, India-414111 Vikhe Patil Foundation
Email: ganeshbarkade7@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
[Home Page](#)



DR. VEDAMURTHY JOSHI
Associate professor, Sri Adichunchanagiri College of Pharmacy,
BG Nagara Nagamangala Tq Mandya dist Karnata
Email: vedamurthyjoshi@gmail.com
[Home Page](#)



DR. BISWARANJAN RAY
Associate prof, Dept. of Pharmacology, College of Pharmaceutical
Sciences, Puri, Odisha
Email: crabiswa@gmail.com
[Home Page](#)



AVINASH BABURAO THALKARI
Kanadi Road Kaij Vasant Pharmacy College Kaij Kanadi Road Kaij
Email: avinashthalkari@gmail.com
[Home Page](#)



DR. P. PRAVEEN REDDY
Vivekananda Degree and PG College, Karimnagar-505001,
Telangana
Email: microprr@gmail.com
[Home Page](#)

ANAR J PATEL



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



MUTHUKUMAR KUMAR.S
45, U.K. Thevar Street, Sular, Coimbatore-641402
Email: pharmmuthu@gmail.com
[Home Page](#)



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



D CHANDRA SEKHAR NAIK
KVSR Siddhartha college of pharmaceutical sciences poly clinical
road Vijayawada-10
Email: chandu.desavath@gmail.com
[Home Page](#)



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



BHARAT MISHRA
Nirmala college of pharmacy, Nirmala Hills, Muvattupuzha,
Ernakulam, Kerala, India
Email: bharatekansh@gmail.com
[Home Page](#)



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



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

DR. V.K. EVANJELENE
16, Anbu Nagar, gorimedu, Salem - 636 008



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



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



PRATHEEP THANGARAJ
Department of Biotechnology, PRIST Deemed to be University, Thanjavur-613403, India.
Email: pratheetp@gmail.com
[Home Page](#)



SHAIMAA AHMAD HASSAN
AlKarkh University of science / Baghdad / Iraq
Email: dr.shaimaa_altaee@kus.edu.iq
[Home Page](#)



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



ABDUL AZEEM
Research Scholar, Electrical Engineering Department Jamia Millia Islamia-New Delhi
Email: 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
[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
[Home Page](#)



DR ANUP NAHA
Manipal College of Pharmaceutical Sciences, MAHE, Manipal, Karnataka-576104
Email: anupnaha@gmail.com
[Home Page](#)



EIMAN SHAHROUR
lattakia- syria
Email: eimanm.shahroure@gmail.com
[Home Page](#)



DR. DEVAKUMAR DINESH
Department of Zoology, Bharathiar University Coimbatore-641046 Tamilnadu India
Email: devadinesh4041@gmail.com
[Home Page](#)



AUDUMBAR DIGAMBAR MALI
At. Po. Andhalgaon, Tal-mangalwedha, Dist- Solapur, Pin Code:-413305, Maharashtra, India.
Email: maliaudu442@gmail.com
[Home Page](#)



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



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



MAUSAMI VAGHELA
New College Wadi-3, B/H Punjab Honda, Opp. sitvan Flat, Kalwad Road, Rajkot.
Email: mausami_2123@yahoo.com
[Home Page](#)

KOTESHWARA MUDIGONDA



Suven Life Sciences Limited, Hyderabad, India
Email: koteshwara_mudigonda@yahoo.com
[Home Page](#)



DR. SWAMY C T
51, Anna Arch Rd,NSK Nagar, Anna Nagar, AA Hospital Campus
Email: swamyc23@gmail.com
[Home Page](#)



KHUDHAIR ABBAS KAREEM AL-RUDAI
Iraq, Baghdad
Email: khudhair.2010@yahoo.com
[Home Page](#)



BALJEET YADAV
1202 H, Coralwood Sector 84, Gurugram INDIA
Email: 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
09422284082 , 09960646693
Email: nilimat_iop@bkc.met.edu
[Home Page](#)



A/P-Andhalgaon, Pin No. -413 305 Tal- Mangalwedha, Dist-
Solapur, Maharashtra, India
Email: 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 Phone No: +60-
1136293386 (Malaysia); +91-9988040886 (India) Malaysia Office:
+60-44298000 (Extn: 1281 / 1284);
Email: arunachalammu@gmail.com
[Home Page](#)



MUKUL SHARMA
Faculty of Pharmacy, Medi-Caps University, Indore
Email: 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
[Home Page](#)

PRASHANT PANDEY



SNIGDHO DAS
Flat No.6,Ira Appartments-2,Jadunath Ukil Road, Kudghat
Email: snigdho1991@gmail.com
[Home Page](#)



DR SUDARSAN BISWAL
O/o the Asst. Drugs Controller, Bhubaneswar Circle II,
Bhubaneswar, Khordha, Odisha, India
Email: drsbiswal@gmail.com
[Home Page](#)



NAZIYA IQBAL KHAN
38 Sahyadri nagar Isbavi Pandharpur 413307 Solapur
Maharashtra
Email: naziya.aara@gmail.com
[Home Page](#)



DR GYANENDRA KUMAR SHARMA
Anand College of Pharmacy, Agra
Email: gyanendrasharma.acp@sgei.org
[Home Page](#)

MISS.MALI SUNAYANA MALLAPPA



Department of Pharmaceutical Sciences, Babasaheb Bhimrao
Ambedkar University, Lucknow
Email: mrpandeyprashant@gmail.com
[Home Page](#)



PATHAN HUJEB AFSAR KHAN
Shreeyash Institute of Pharmaceutical Education and Research
Aurangabad, Maharashtra, India.
Email: pathanhujeb@gmail.com
[Home Page](#)



DR. SHIKHA MAHESHWARI
Pushpanjali Enclave Pitampura Delhi
Email: 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
[Home Page](#)



PRASHANT PANDEY
Department of Pharmaceutical Sciences, Babasaheb Bhimrao
Ambedkar University (A Central University), Lucknow, Uttar
Pradesh, India
Email: drpandeyprashant@outlook.com

[Home Page](#)



ALI MAHMOOD RAYSHAN
Iraq, Karbala, City Center
Email: alireshan@g.alzahu.edu.iq
[Home Page](#)



MR. TUSHAR PRADIP DUKRE
At- Malwadi; Post- Bota.
Email: tusharpd23@gmail.com
[Home Page](#)



DUKRE TUSHAR PRADIP
At- Satral, Post- Songaon, Tal- Rahuri, District-Ahmednagar,
413711
Email: tusharpd23@gmail.com
[Home Page](#)



DR. DATTATRAYA MANOHAR SHINKA
Rajiv Nagar Nashik Vaibhav Colony
Email: dattashinkar@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
[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
[Home Page](#)



RUPALI NIRMAL
Sahajanandnagar
Email: rupalinirmalcpn@gmail.com
[Home Page](#)



DR. SIVARAMAN DHANASEKARAN
Pandit Deendayal Energy University, Gandhinagar, Gujarat
Email: sivaramand83@gmail.com
[Home Page](#)

RISHU YADAV
352/1 n.I.c. Kidwai Nagar Kanpur
Email: rishu.yadav789@gmail.com



[Home Page](#)



SWATI GOKUL TALELE
Sandip Institute of Pharmaceutical Sciences, Nashik
Email: swatitalele77@gmail.com
[Home Page](#)



DR. YASMIN HAMID MOMIN
Annasaheb Dange College of B.Pharmacy, Ashta 416301
Email: mullays413@gmail.com
[Home Page](#)



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



DR. EKA INDRA SETYAWAN
Department of Pharmacy Udayana University
Email: ekaindrasetyawan@unud.ac.id
[Home Page](#)



DR. MOHAN GANDHI BONTHU
V. V. Institute of Pharmaceutical Sciences, Gudlavalleru, Krishna
District 521356.
Email: bmgandhipharma@gmail.com
[Home Page](#)

ARTICLES IN VOLUME - 16, ISSUE - 2

Online Since: Tuesday, Feb 28, 2023 [Views: 10872]

Hepatocorrective effects of Hydroethanolic Extract of Cocos nucifera L. sprout and Borassus flabellifer Sprout in Carbon tetrachloride (CCl₄) induced hepatotoxic rats

Author(s): P. Sumi, K. Thangavelu, S. Senthil Kumari

DOI: [10.52711/0974-360X.2023.00082](https://doi.org/10.52711/0974-360X.2023.00082)

Views: 0 (pdf), 561 (html)

Access:  Closed Access

Cite: P. Sumi, K. Thangavelu, S. Senthil Kumari. Hepatocorrective effects of Hydroethanolic Extract of Cocos nucifera L. sprout and Borassus flabellifer Sprout in Carbon tetrachloride (CCl₄) induced hepatotoxic rats. *Research Journal of Pharmacy and Technology* 2023; 16(2):483-8. doi: 10.52711/0974-360X.2023.00082

[Read More](#)

Isolation of Betulinic Acid from Byttneria herbacea (Malvaceae)

Author(s): Sanjeeb K. Kar, Uma S. Mishra, Prasanna K. Dixit, Shubhrata Nayak

DOI: [10.52711/0974-360X.2023.00091](https://doi.org/10.52711/0974-360X.2023.00091)

Views: 0 (pdf), 223 (html)

Access:  Closed Access

Cite: Sanjeeb K. Kar, Uma S. Mishra, Prasanna K. Dixit, Shubhrata Nayak. Isolation of Betulinic Acid from Byttneria herbacea (Malvaceae). *Research Journal of Pharmacy and Technology* 2023; 16(2):535-8. doi: 10.52711/0974-360X.2023.00091

[Read More](#)

Characterization and Antibacterial Evaluation of New Complexes of Nicotinamide semicarbazone Manganese (II), Zinc (II), Silver (I) Synthesizes

Author(s): Amal M. Ali, Heba A. Mohammed, Zeena U. Jasim, Rana R. Abed

DOI: [10.52711/0974-360X.2023.00092](https://doi.org/10.52711/0974-360X.2023.00092)

Views: 0 (pdf), 169 (html)

Access:  Closed Access

Cite: Amal M. Ali, Heba A. Mohammed, Zeena U. Jasim, Rana R. Abed. Characterization and Antibacterial Evaluation of New Complexes of Nicotinamide semicarbazone Manganese (II), Zinc (II), Silver (I) Synthesizes. *Research Journal of Pharmacy and Technology* 2023; 16(2):539-4. doi: 10.52711/0974-360X.2023.00092

[Read More](#)

HS-GC Method Development and Validation for the Estimation of Class-2 Residual Solvents in Ivabradine

Author(s): A. Lakshmi Sai Durga, B. Ramya Kuber

DOI: [10.52711/0974-360X.2023.00093](https://doi.org/10.52711/0974-360X.2023.00093)

Views: 0 (pdf), 136 (html)

Access:  Closed Access

Cite: A. Lakshmi Sai Durga, B. Ramya Kuber. HS-GC Method Development and Validation for the Estimation of Class-2 Residual Solvents in Ivabradine. *Research Journal of Pharmacy and Technology* 2023; 16(2):545-9. doi: 10.52711/0974-360X.2023.00093

[Read More](#)

Study of Coagulation parameters in HIV patients and its relation to CD4 counts and ART status

Author(s): Seemitr Verma, Ruchee Khanna, Vishwapriya Godkhindi, Anjali Vijay S, Shashidhar V, S M Zeeshan

DOI: [10.52711/0974-360X.2023.00083](https://doi.org/10.52711/0974-360X.2023.00083)

Views: 0 (pdf), 126 (html)

Access:  Closed Access

Cite: Seemitr Verma, Ruchee Khanna, Vishwapriya Godkhindi, Anjali Vijay S, Shashidhar V, S M Zeeshan. Study of Coagulation parameters in HIV patients and its relation to CD4 counts and ART status. *Research Journal of Pharmacy and Technology* 2023; 16(2):489-4. doi: 10.52711/0974-360X.2023.00083

[Read More](#)

Preparation, Identification and Evaluation of Biological Activity of some new β -Lactam compounds derived from Schiff bases

Author(s): Nadia Sadiq Majeed , Fatima Naeem Abdul-Hussein

DOI: [10.52711/0974-360X.2023.00101](https://doi.org/10.52711/0974-360X.2023.00101)

Views: 0 (pdf), 119 (html)

Access:  Closed Access

Cite: Nadia Sadiq Majeed , Fatima Naeem Abdul-Hussein. Preparation, Identification and Evaluation of Biological Activity of some new β -Lactam compounds derived from Schiff bases. *Research Journal of Pharmacy and Technology* 2023; 16(2):593-6. doi: 10.52711/0974-360X.2023.00101

[Read More](#)

Correlation between C-MYC and BAX expression with various Ann Arbor stages in B-cell large cell type of Non-Hodgkin lymphoma

Author(s): Ariadna Anggi Pasang, Alphania Rahniayu, Nila Kurniasari, I Ketut Sudiana, Willy Sandhika, Anny Setijo Rahaju, Dyah Fauziah, Siprianus Ugroseno Yudho Bintoro

DOI: [10.52711/0974-360X.2023.00102](https://doi.org/10.52711/0974-360X.2023.00102)

Views: 0 (pdf), 109 (html)

Access:  Closed Access

Cite: Ariadna Anggi Pasang, Alphania Rahniayu, Nila Kurniasari, I Ketut Sudiana, Willy Sandhika, Anny Setijo Rahaju, Dyah Fauziah, Siprianus Ugroseno Yudho Bintoro. Correlation between C-MYC and BAX expression with various Ann Arbor stages in B-cell large cell type of Non-Hodgkin lymphoma. *Research Journal of Pharmacy and Technology* 2023; 16(2):597-2. doi: 10.52711/0974-360X.2023.00102

[Read More](#)

Preparation of Millet Adai and Assessment of its Nutritional Value

Author(s): M. Vijaya Kumar, Arun.A, Kanimozhi. S

DOI: [10.52711/0974-360X.2023.00103](https://doi.org/10.52711/0974-360X.2023.00103)

Views: 0 (pdf), 152 (html)

Access:  Closed Access

Cite: M. Vijaya Kumar, Arun.A, Kanimozhi. S. Preparation of Millet Adai and Assessment of its Nutritional Value. *Research Journal of Pharmacy and Technology* 2023; 16(2):603-7. doi: 10.52711/0974-360X.2023.00103

[Read More](#)

RESEARCH ARTICLE

Correlation between C-MYC and BAX expression with various Ann Arbor stages in B-cell large cell type of Non-Hodgkin lymphoma

Ariadna Anggi Pasang¹, Alphania Rahniayu¹, Nila Kurniasari^{1*}, I Ketut Sudiana¹, Willy Sandhika¹, Anny Setijo Rahaju¹, Dyah Fauziah¹, Siprianus Ugroseno Yudho Bintoro²

¹Department of Anatomical Pathology, Faculty of Medicine, Airlangga University, Surabaya, Indonesia.

²Department of Internal Medicine, Faculty of Medicine, Airlangga University, Surabaya, Indonesia.

*Corresponding Author E-mail: nila-k@fk.unair.ac.id

ABSTRACT:

Diffuse large B-cell lymphoma (DLBCL) is one of the B-cell large cell types of non-Hodgkin lymphoma (NHL) that has poor prognosis with highly variable clinical course. Various prognostic factors have been proposed to predict this, but the results were variable. *C-MYC* is a proto-oncogen that can cause overexpression leading to the increased of tumor cells proliferation. *BAX* is a main proapoptotic member of the BCL-2 family proteins that regulates apoptotic function. The study aimed to analyze correlation of c-MYC and BAX protein with various Ann Arbor stages in B-cell large cell type of NHL. This cross-sectional study was performed on 39 formalin fixed paraffin-embedded tissue of patients diagnosed as B-cell large cell type of NHL during January 2017 - December 2019 in Anatomical Pathology Laboratory at Dr. Soetomo General Hospital, Surabaya. To assess the expression of c-MYC and BAX, the immunohistochemistry examination was performed. Immunoeexpression of C-MYC and BAX were evaluated according to the number of positive tumor cells divided by the total number of tumor cells and calculated in percentage. There was no difference in C-MYC ($p = 0.877$) and BAX ($p = 0.093$) expression with various Ann Arbor stages in B-cell large cell type of NHL. There was no correlation between c-MYC with BAX expression in various Ann Arbor stages in B-cell large cell type of NHL ($r_s = 0.206$, $p = 0.209$). This indicated that C-MYC and BAX expression alone could not to be used as parameters to predict the outcome of the B-cell large cell type of NHL via Ann Arbor stages.

KEYWORDS: B-cell large cell type of NHL, c-MYC, BAX, Ann Arbor staging.

INTRODUCTION:

Non-Hodgkin lymphoma (NHL) is the most common hematological malignancy in the worldwide¹. There is a significant increase in the prevalence of lymphoma per 100,000 population, which made NHL one of the most important malignancies and has contributed to the increased prevalence of malignancy. In Indonesia, non-Hodgkin lymphoma, Hodgkin lymphoma and leukemia are the sixth rank of malignancy². The most common type of NHL is DLBCL³.

The history of patients, physical examination, laboratory tests, and radiological examination can be done to determine the anatomic staging of NHL, in addition to definitive evidence by biopsy. The Ann Arbor staging is based on the pattern of tumor spread and this staging is important for standard management in lymphoma, as it plays role in patients' treatment selection and can help to stratify patients according to the risk factor profiles. The Ann Arbor staging system is considered simple and concise to use for NHL staging^{4,5}. Determination of NHL diagnosis at Dr. Soetomo General Hospital, Surabaya is carried out through the careful of anamnesis, physical examination and radiological examination via USG and CT-scan for staging based on the Ann Arbor system.

Cellular and molecular variation underlying DLBCL are also important as the prognostic variables. Gene translocation and/or C-MYC overexpression in DLBCL have been intensively researched and can be used as the prognostic markers⁶. C-MYC overexpression can activate the transcription of several genes causing in increased of tumor cells proliferation⁷. Apoptosis can also be induced by overexpression of C-MYC. C-MYC overexpression causes the activation of ARF-p53 pathway, resulting in increased of BAX protein and then occurs apoptosis⁸. If there is no apoptosis, then it will cause the proliferation of tumor cells and chemotherapy resistance⁹.

At this time, studies of c-MYC and BAX expression related to the clinical stages of NHL are still limited, especially in Indonesia. This study aimed to analyze the correlation of c-MYC and BAX expressions with various Ann Arbor stages in B-cell large cell type of NHL.

MATERIALS AND METHODS:

Research design:

This study was an observational analytic study with cross-sectional approach. Samples in this study were 39 paraffin blocks from patients diagnosed as B-cell large cell type of NHL during January 2017 until December 2019 in Anatomical Pathology Laboratory at Dr. Soetomo General Hospital, Surabaya, which met the inclusion criteria. The Ann Arbor stages assessment was performed by collecting data via medical records which included patient's clinical data and radiological examination.

Immunohistochemistry staining:

Immunohistochemistry staining was performed to detect the expression of C-MYC and BAX. The block samples of paraffin were cut into 4µm sections with microtome, deparaffinized three times using xylol each for 5 minutes then rehydrated using 96%, 90% and 80% ethanol, each for 2 minutes. Slides were immersed into the 3% hydrogen peroxide for 15 minutes, then warmed using *Target Retrieval Solution (TRS)/buffer citrate* at pH of 6 in the microwave for 15 minutes and washed with PBS for 5 minutes. After that, the tissue sections were incubated with monoclonal antibodies for c-MYC (dilution 1:100, Biocare Medical) and BAX (dilution 1:100, Boster Biological Technology) overnight. Secondary antibody was applied for 10 minutes at room temperature. Meyer Hematoxylin was used to counterstain the sections. Last process was dehydrated with 95% alcohol. This study had been approved by the Committee of Health Research Ethic at Dr. Soetomo General Academic Hospital, Surabaya, Indonesia

(0451/LOE/301.4.2/IV/202).

Evaluation of immunohistochemistry expression:

C-MYC was positive if expressed in $\geq 40\%$ of tumor cells nuclei and negative if expressed in $< 40\%$ of tumor cells nuclei. While BAX was considered positive if expressed in tumor cells cytoplasm.

Statistical analysis:

SPSS software was used to process the data obtained. The imunoexpression of c-MYC was statistically analyzed using Mann Whitney test and BAX using independent sample T-test. Correlation between c-MYC and BAX were analyzed using Spearman test.

RESULTS AND DISCUSSION:

Most samples in this study were aged between 61 to 70 years, with the mean age was 55.18 years. Most samples (64.1%) were male (25 samples). The location of the samples in this study mostly were from the neck lymph node (43.6%, 17 samples), and (17.9%, 7 samples) were from extranodal location. Most samples (30.8%) were in stage IIIB of Ann Arbor (12 samples). The distribution of the samples according to Ann Arbor stages are described in Table 1. The samples in this study used the Ann Arbor staging classification which were divided into 4 stages. Ann Arbor staging classification was used to divide according to the absence (A) or presence (B) of B-symptoms related to the disease, such as: fever with temperature $> 38^{\circ}\text{C}$, sweating at night, and within 6 months of weight loss $> 10\%$ ¹⁰.

Table 1. Distribution of the samples according to Ann Arbor stages

Ann Arbor stages	Number of cases
IA	3
IB	6
IBE	6
IIA	1
IIIB	6
IIIBE	1
IIIA	2
IIIB	12
IIIBE	1
IVA	1
IVB	0
Total	39

The stages group above were grouped again into limited stages (stages I and II) and advanced stages (stages III and IV), with or without clinical symptoms (B-symptoms). Limited stage was the most stage in this study (59%, 23 samples).

C-MYC expression is depicted in Figure 1. Based on Mann Whitney test, there was no difference of c-MYC expression with various Ann Arbor stages in B-cell large

cell type of NHL ($p = 0.877$) (Table 2). Based on Spearman correlation test, there was no significant correlation of c-MYC expression with various Ann Arbor stages in B-cell large cell type of NHL ($p = 0.877$). These results showed that c-MYC expression was not related to clinical stages in B- cell large cell type of NHL ($p > 0.05$) (Figure 3A).

BAX expression is depicted in Figure 2. Based on independent sample T-test, there was no difference of BAX expression with various Ann Arbor stages in B- cell large cell type of NHL ($p = 0.093$) (Table 3). Based on Pearson correlation test, there was no significant correlation of BAX expression with various Ann Arbor stages in B-cell large cell type of NHL ($p = 0.093$). These results showed that BAX expression was not related to the clinical stages in B- cell large cell type of NHL ($p > .05$) (Figure 3B). There was no correlation between c-MYC and BAX expressions ($p = 0.209$) (Figure 3C). This indicated that the level of c-MYC expression did not affect the BAX expression in various Ann Arbor stages in B-cell large cell type of NHL.

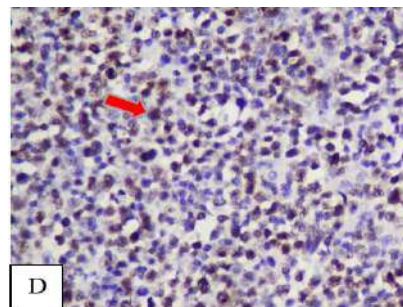
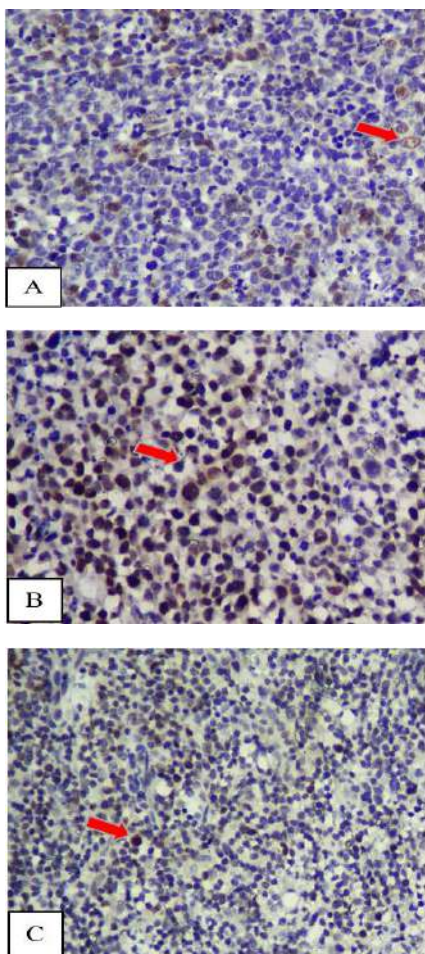
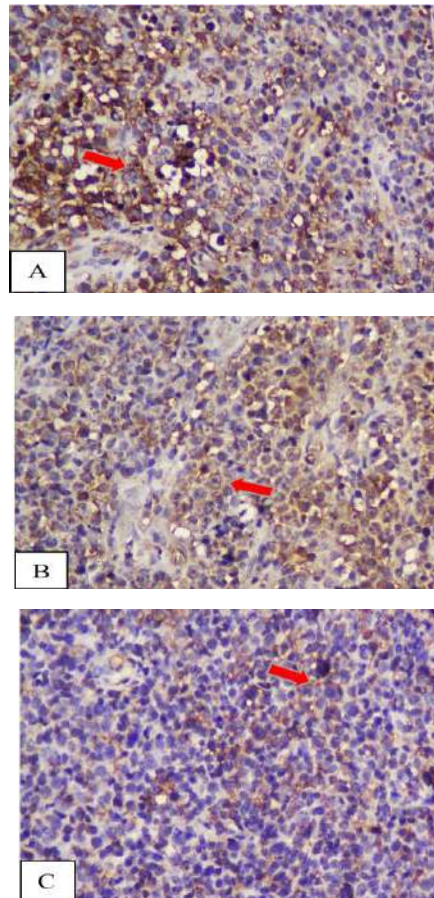


Figure 1: C-MYC expression in the nucleus of tumor cells (red arrow). C-MYC expression in limited stage (A and B). A: Expressed in 25% of tumor cells; B: Expressed in 65% of tumor cells. C-MYC expression in advanced stage (C and D). C: Expressed in 20% of tumor cells; D: Expressed 60% of tumor cells (all in 400x magnification).

Table 2. C-MYC expression in various Ann Arbor stages of B-cell large cell type of NHL

Ann Arbor Stages	c-MYC expression		Min	Max	Median	p
	Positive	Negative				
Limited	10 (25.6%)	13 (33.3%)	3.3	85	30	0.8
Advanced	7 (17.9%)	9 (23.1%)	7.5	70	27.5	77



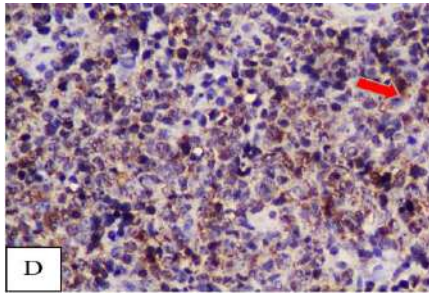


Figure 2: BAX expression in the cytoplasm of tumor cells (red arrow). BAX expression in limited stage (A and B). A: Expressed in 65% of tumor cells; B: Expressed in 85% of tumor cells. BAX expression in advanced stage (C and D). C: Expressed in 65% of tumor cells; D: Expressed 60% of tumor cells (all in 400x magnification).

The Ann Arbor staging system is based on the pattern of tumor spread and this staging is important for standard management in lymphoma. This staging is divided into 4 stages. Stage I and II may be different in some situations but both have the same treatment. The same therapy is also performed to the patients in stage III and IV. Thus, there is a basis for reclassifying as limited (stages I and II) or advanced stage (stages III and IV) for therapy purposes¹⁰. The Ann Arbor staging classification is used to divide based on the absence or presence of B-symptoms related to the disease, but the clinical stages are often not recorded or inaccurate. The clinical stages do not appear to be related with the prognostic outcome. Therefore, the clinical stages do not need to be applied because they do not affect the management of NHL patients⁵.

C-MYC is a proto-oncogene and transcription factor that can regulate the cell proliferation, metabolism, differentiation, and apoptosis. The poor prognosis in NHL caused by overexpression and translocation of *c-MYC* because of *MYC-IGH* chromosome rearrangement¹¹. Activation of several signaling pathways can also induce the upregulation of *c-MYC* expression resulting in tumor cells proliferation¹².

This study showed that there was no difference of *c-MYC* expression with various Ann Arbor stages in B-cell large cell type of NHL. The result of this study may be because the limited and advanced of Ann Arbor stages do not determine the aggressiveness of a disease, but the clinical stages are more precisely the basis for selecting therapy. The Ann Arbor staging cannot explain the underlying biologic heterogeneity of NHL¹³. Study by Kramer et al. (1998) also revealed that there was no significant correlation between *c-MYC* expression and disease stage ($p > 0.05$)¹⁴. However, the different result was obtained from Chang et al. (2000) study who reported that high clinical stage was associated with

overexpression of *c-MYC* ($p < 0.005$)¹⁵.

In addition, a few studies reported that Ann Arbor staging could not determine the overall survival in NHL^{16,17}. *C-MYC* gene translocation and rearrangement are more associated with poor prognosis in NHL than clinical staging¹¹. Although many studies reported that the poor prognosis is associated with overexpression of *c-MYC*, but several studies found that the underlying mechanism may be related to other genetic alterations, and the effects of *c-MYC* overexpression alone were not significantly associated with poor prognosis. A review mentioned that double-expressors of DLBCL (*c-MYC* and *BCL-2* coexpression) were the poor prognostic marker in DLBCL. The advanced stages, high international prognostic index (IPI) score, and relapsed disease were more common in patients of DLBCL with double expression¹⁸.

BAX is a main proapoptotic member of the BCL-2 family proteins that regulates apoptotic function. BAX can be a regulator of apoptosis in both the extrinsic and intrinsic pathways. BAX can suppress the tumor growth and decreased of BAX level is related to chemotherapy resistance⁹.

There was no difference of BAX expression with various Ann Arbor stages in B-cell large cell type of NHL in this study. BAX expression is not a major independent prognostic factor in NHL and BAX expression alone cannot be used as a prognostic marker¹⁹. Study by Gascoyne et al. (1997) found that there was an association between BAX and BCL-2 that was related to prognosis. For example, if the patients had negative expression of BAX and BCL-2, they also had much lower overall survival (OS) when compared to patients who had positive of BAX expression, but the expression of BCL-2 was negative. The interpretation of this results revealed that loss of BAX and BCL-2 expression was an indication of deregulated apoptosis control resulting in more aggressive of tumor growth²⁰. The different result was obtained from Yin et al. (2001) study who reported that there was a significant correlation of BAX immunonegative tumors with shorter overall survival²¹.

BAX has an important role in the p53-induced apoptotic pathway that can suppress the oncogenic transformation of *c-MYC* and *E1A*. However, upregulation of BAX is not the only protein that determines apoptosis, because there are other proteins such as NOXA and PUMA, which are more commonly correlated with p53-induced apoptosis than BAX protein²². The Ann Arbor staging has been used for risk stratification before therapy dan

for therapy selection in NHL. BAX expression and Ann Arbor staging are not related because the staging cannot fully explain the biologic as well as the variation of cellular and molecular factors of the tumor¹⁵.

There was no correlation between c-MYC and BAX expressions ($p > 0.05$). This indicated that the level of c-MYC expression did not affect the BAX expression in various Ann Arbor stages in B-cell large cell type of NHL. Study by Soucie et al. (2001) reported that there was no difference in BAX protein expression detected, either in the presence or absence of c-MYC. This study also revealed that c-MYC expression did not change the BAX expression during growth and apoptosis process^{23,24,25,26,27,28,29}.

Deregulation of c-MYC causes not only tumor cells proliferation but also apoptosis in partnership with ARF and p53. C-MYC can induce the expression of ARF, which causes apoptosis through the p53 activation, wherein this p53 stimulates BAX activity. However, both of c-MYC and ARF can trigger apoptosis without p53 wherein ARF will directly bind to c-MYC to inhibit hyperproliferation and transformation. ARF is important on c-MYC to stimulate the transcription of target gene, *Egr1*. *Egr1* is also important for p53 independent c-MYC-induced apoptosis. The transcriptional induction *Egr1* by c-MYC depends on the ability of ARF to alter the c-MYC activity from proliferative to apoptotic protein without p53^{24,30,31,32,33,34,35}.

CONCLUSION:

There was no difference between c-MYC and BAX expression with various Ann Arbor stages in B-cell large cell type of NHL. This indicated that C-MYC and BAX expression alone could not to be used as parameters to predict the outcome of the B-cell large cell type of NHL via Ann Arbor stages.

ACKNOWLEDGEMENTS:

The authors would like to thank to Dr. Budi Utomo, for statistical analysis and to all lectures in the Department of Anatomical Pathology, Faculty Medicine, Universitas Airlangga who have helped in this research.

CONFLICTS OF INTEREST:

The authors declare that they have no conflict of interest.

REFERENCES:

1. Thandra KC, Barsouk A, Saginala K, Padala SA, Rawla P. Epidemiology of non-Hodgkin's lymphoma. *Med.Sci.* 2021;5:1-9
2. Salma RS, Sedana MP, Yudho SU. CHOP and R-CHOP therapeutic responses in non-Hodgkin lymphoma patients in Dr. Soetomo General Hospital Surabaya. *Biomolecular and Health Science Journal.* 2018;1(2):93. doi: 10.20473/bhsj.v1i2.9244

3. Li S, Young KH, Medeiros LJ. Diffuse large B-cell lymphoma. *Pathology.* 2018;50(1):74-87. doi: 10.1016/j.pathol.2017.09.006
4. Armitage, JO. Staging non-Hodgkin lymphoma. *CA Cancer J Clin.* 2005;55:368-376
5. Munakata W, Terauchi T, Maruyama D, Nagai H. Revised staging system for malignant lymphoma based on the Lugano classification. *Japanese Journal of Clinical Oncology.* 2019;49(10):895-900. doi: 10.1093/jjco/hyz111
6. Alizadeh AA, Elsen MB, Davis RE, Ma C, Lossos IS, Rosenwald A, et al. Distinct types of diffuse large B-cell lymphoma identified by gene expression profiling. *Nature.* 2000;403(6769):503-511. doi: 10.1038/35000501
7. Cai Q, Medeiros LJ, Xu X, Young KH. MYC-driven aggressive B-cell lymphomas: Biology, entity, differential diagnosis, and clinical management. *Oncotarget.* 2015;6(36):38591-38616. doi: 10.18632/oncotarget.5774
8. Eischen CM, Roussel MF, Korsmeyer SJ, Cleveland JL. Bax loss impairs Myc-induced apoptosis and circumvents the selection of p53 mutations during Myc-mediated lymphomagenesis. *Molecular and Cellular Biology.* 2001;21(22):7653-7662. doi: 10.1128/mcb.21.22.7653-7662.2001
9. Liu Z, Ding Y, Ye N, Wild C, Chen H, Zhou J. Direct activation of Bax protein for cancer therapy. *Medicinal Research Reviews.* 2016;36(2):313-341. doi: 10.1002/med.21379
10. Cheson BD. Staging and response assessment in lymphomas: The new Lugano classification. *Chinese Clinical Oncology.* 2015;4(1):1-9. doi: 10.3978/j.issn.2304-3865.2014.11.03
11. Xu-Monette ZY, Dabaja BS, Wang X, Tu M, Manyam GC, Tzankov A, et al. Clinical features, tumor biology, and prognosis associated with MYC rearrangement and Myc overexpression in diffuse large B-cell lymphoma patients treated with Rituximab-CHOP. *Modern Pathology.* 2015;28(12):1555-1573. doi: 10.1038/modpathol.2015.118
12. Pfeifer M, Grau M, Lenze D, Wenzel SS, Wolf A, Wulf BW, et al. PTEN loss defines a PI3K/AKT pathway-dependent germinal center subtype of diffuse large B-cell lymphoma. *Proceedings of the National Academy of Sciences of the United States of America.* 2013;110(30):12420-12425. doi: 10.1073/pnas.1305656110
13. Xie Y, Bulbul MA, Ji L, Inouye CM, Groshen SG, Tulpule A, et al. P53 expression is a strong marker of inferior survival in de novo diffuse large B-cell lymphoma and may have enhanced negative effect with MYC coexpression: A single institutional clinicopathologic study. *American Journal of Clinical Pathology.* 2014;141(4):593-604. doi: 10.1309/AJCPHMZ6VHF0WQV
14. Kramer MH, Hermans J, Wijburg E, Philippo K, Geelen E, van Krieken JH, et al. Clinical relevance of BCL2, BCL6, and MYC rearrangements in diffuse large B-cell lymphoma. *Blood.* 1998;92(9):3152-3162. doi: 10.1182/blood.v92.9.3152
15. Chang CC, Liu YC, Cleveland RP, Perkins SL. Expression of c-Myc and p53 correlates with clinical outcome in diffuse large B-cell lymphomas. *American Journal of Clinical Pathology.* 2000;113(4):512-518. doi: 10.1309/yhfe-r65b-d3lk-3ggv
16. Tae MK, Park YH, Lee SY, Kim JH, Kim DW, Im SA, et al. Local tumor invasiveness is more predictive of survival than international prognostic index in stage IE/IIe extranodal NK/T-cell lymphoma, nasal type. *Blood.* 2005;106(12):3785-3790. doi: 10.1182/blood-2005-05-2056
17. Kim YR, Kim JS, Min YH, Yoon DH, Shin HJ, Mun YC, et al. Prognostic factors in primary diffuse large B-cell lymphoma of adrenal gland treated with rituximab-CHOP chemotherapy from the consortium for improving survival of lymphoma (CISL). *Journal of Hematology and Oncology.* 2012;5:1-9. doi: 10.1186/1756-8722-5-49
18. Xia Y, Zhang X. The spectrum of MYC alterations in diffuse large B-cell lymphoma. *Acta Haematologica.* 2020;143(6):520-528. doi: 10.1159/000505892

19. Pagnano KB, Silva MD, Vassallo J, Aranha FJ, Saad ST. Apoptosis-regulating protein and prognosis in diffuse large B-cell non-Hodgkin's lymphomas. *Acta Haematologica*. 2002;107(1):29–34. doi: 10.1159/000046626
20. Gascoyne RD, Krajewska M, Krajewski S, Connors JM, Reed, JC. Prognostic significance of Bax protein expression in diffuse aggressive non-Hodgkin's lymphoma. *Blood*. 1997;90(1):244–251. doi: 10.1182/blood.v90.1.244
21. Yin HF, Okada N, Takagi M. Comparison of apoptosis and apoptosis-related gene products between extranodal oral B-cell lymphoma and maxillofacial nodal B-cell lymphoma. *Journal of Oral Pathology and Medicine*. 2001;30(3):141–147. doi: 10.1034/j.1600-0714.2001.300303.x
22. Juin P, Hunt A, Littlewood T, Griffiths B, Swigart LB, Korsmeyer S, Evan, G. C-myc functionally cooperates with Bax to induce apoptosis. *Molecular and Cellular Biology*. 2002;22(17):6158–6169. doi: 10.1128/mcb.22.17.6158-6169.2002
23. Soucie EL, Annis MG, Sedivy J, Filmus J, Leber B, Andrews DW, et al. Myc potentiates apoptosis by stimulating bax activity at the mitochondria. *Molecular and Cellular Biology*. 2001;21(14):4725–4736. doi: 10.1128/mcb.21.14.4725-4736.2001
24. Boone DN, Qi Y, Li Z, Hann SR. Egr1 mediates p53-independent c-Myc-induced apoptosis via a noncanonical ARF-dependent transcriptional mechanism. *Proceedings of the National Academy of Sciences of the United States of America*. 2011;108(2):632–637. doi: 10.1073/pnas.1008848108
25. Venkatesh P, Kulandaivelu U, Koteswara Rao GSN, Chakravarthi G, Alavala RR, Rajesh B. Development and validation of a stability-indicating UPLC method for determination of Darolutamide in its tablet formulation. *Research Journal of Pharmacy and Technology*. 2022; 15(1):165-0. DOI: 10.52711/0974-360X.2022.00027
26. Kiran GS, Sahithi Puja U, Kumar DP, Pravalika A, Sai CB. Translocation of C-MYC gene by expressed eighty percentage of Tumour cells cause abdominal Burkitt's lymphoma during the third phase of chemotherapy it Relapsed: A Case report and Literature. *Research Journal of Pharmacy and Technology*. 2020; 13(12):5754-5756. DOI: 10.5958/0974-360X.2020.01002.1
27. Shukla RK, Nandan K, Shukla A, Kaur A, Deepanshu Rana. Review on Traditional uses, Biological activities, Phytoconstituents of *Bombax ceiba* Linn. *Research Journal of Pharmacy and Technology*. 2020; 13(11):5607-5612. DOI: 10.5958/0974-360X.2020.00978.6
28. Mandzii TP, Grycyk AR. Research of the Morphological and Anatomical structure of leaf of *Pinus sylvestris* L. and *Pinus mugo* Turra. *Research Journal of Pharmacy and Technology*. 2019; 12(5):2465-2467. DOI: 10.5958/0974-360X.2019.00413.X
29. Bhargava S, Shah MB. Evaluation of Hypoglycemic activity of different extracts of *Bombax ceiba* L. leaves. *Research Journal of Pharmacy and Technology*. 9(3): Mar., 2016; Page 205-208. DOI: 10.5958/0974-360X.2016.00036.6
30. Yusuf-Babatunde AM, Osuntokun OT, Ige OO, Solaja OO. Secondary metabolite Constituents, Antimicrobial Activity and Gas chromatography-Mass spectroscopy Profile of *Bombax buonopozense* P. Beauv. (Bombacaceae) Stem bark Extract. *Res. J. Pharmacognosy and Phytochem*. 2019; 11(2):87-92. DOI: 10.5958/0975-4385.2019.00016.5
31. Meena AK, Nain J, Garg N, Rao MM. Review on Ethnobotany and Phytopharmacology of *Bombax ceiba*. *Research J. Pharmacognosy and Phytochemistry* 2011; 3(2): 57-61 .
32. Yunoo M, Bharadwaj C, Sandeep V, Rajesh S, Krishna C. Determination of Itraconazole in Bulk and Capsule Dosage Form by a Validated Isocratic RP-HPLC Method. *Asian J. Research Chem* 8(4): April 2015; Page 236-240. DOI: 10.5958/0974-4150.2015.00041.3
33. Sampath Kumar N, Madhurambal G. Quercetagenin Glycoside from the Flowers of *Bombax ceiba*. *Asian J. Research Chem*. 3(1): Jan.-Mar. 2010; Page 78-80.
34. Fadholly A, Ansori ANM, Utomo B. Anticancer Effect of Naringin on Human Colon Cancer (WiDr Cells): In Vitro Study. *Research Journal of Pharmacy and Technology*. 2022; 15(2):885-8. DOI: 10.52711/0974-360X.2022.0014.
35. Annise Proboningrat, Shara Jayanti, Amaq Fadholly, Arif N. M. Ansori, Naimah Putri, Muhammad K. J. Kusala, Sri A. Sudjarwo, Fedik A. Rantam, Agung Budianto Achmad. The Cytotoxicity of Ethanolic Extract of *Allium cepa* L. on HeLa Cell Lines. *Research Journal of Pharmacy and Technology*. 2021; 14(9):4969-2. DOI: 10.52711/0974-360X.2021.00864



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 2020 1.3 ⓘ

SJR 2020 0.225 ⓘ

SNIP 2020 0.883 ⓘ

View all documents > Set document alert Save to source list

CiteScore CiteScore rank & trend Scopus content coverage

Improved CiteScore methodology ⓘ

CiteScore 2020 counts the citations received in 2017-2020 to articles, reviews, conference papers, book chapters and data papers published in 2017-2020, and divides this by the number of publications published in 2017-2020. [Learn more >](#)

CiteScore 2020

$$1.3 = \frac{4,407 \text{ Citations 2017 - 2020}}{3,364 \text{ Documents 2017 - 2020}}$$

Calculated on 05 May, 2021

CiteScoreTracker 2021 ⓘ

$$1.2 = \frac{4,351 \text{ Citations to date}}{3,567 \text{ Documents to date}}$$

Last updated on 04 December, 2021 • Updated monthly

CiteScore rank 2020 ⓘ

Category	Rank	Percentile
Pharmacology, Toxicology and Pharmaceutics	#11/25	58th
Pharmacology, Toxicology and Pharmaceutics (miscellaneous)		
Medicine	#166/246	32nd

View CiteScore methodology > CiteScore FAQ > Add CiteScore to your site ↗

About Scopus

- What is Scopus
- Content coverage
- Scopus blog
- Scopus API

Language

- 日本語に切り替える
- 切换到简体中文
- 切换到繁體中文
- Русский язык

Customer Service

- Help
- Contact us

Research Journal of Pharmacy and Technology

COUNTRY

India



Universities and research
institutions in 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

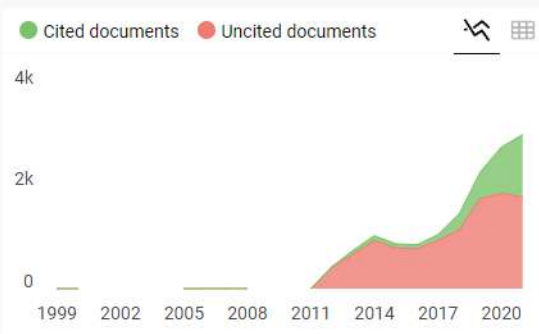
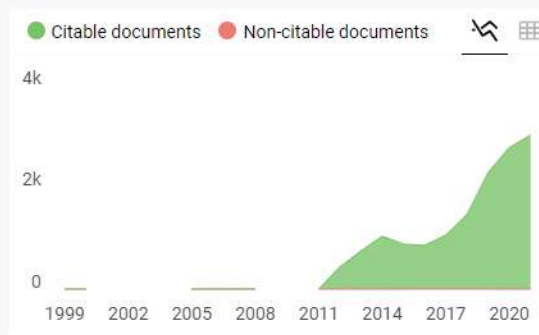
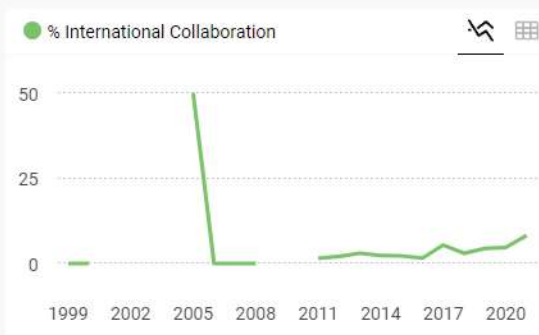
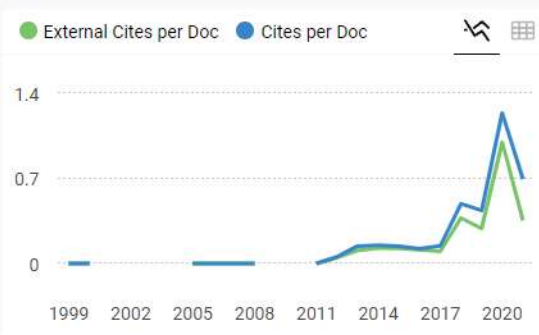
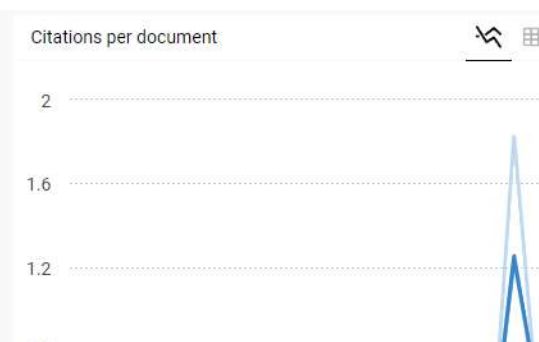
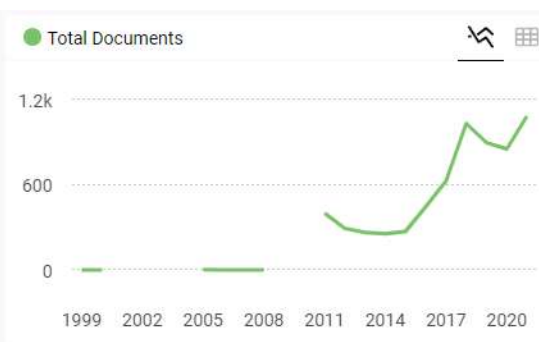
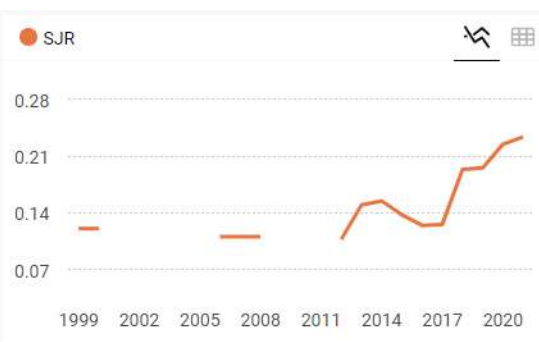
1997, 2005, 2011-2021

INFORMATION

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

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

Q3 Pharmacology (medical) best quartile

SJR 2021 0.23

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.scimaç
```

SCImago Graphica

Explore, visually communicate and make sense of data with our **new data visualization tool**.

Additional information or promotional text for SCImago Graphica, including contact details or a call to action.

SURAT EXEMPTION
(" LETTER OF EXEMPTION ")

Ref. No. : 0451/LOE/301.4.2/IV/2021

Judul Protokol Penelitian : HUBUNGAN EKSPRESI C-MYC DAN BAX PADA BERBAGAI STADIUM
ANN ARBOR PADA NON-HODGKIN LYMPHOMA B-CELL LARGE CELL
TYPE

Dokumen yang disetujui : 0680/120/IV/2021 (versi: 3)

Tanggal terbit : 30 April 2021

Berlaku sampai : 30 April 2022

Peneliti Utama : Nila Kurniasari, dr., Sp.PA (K)

Peneliti Lain : 1. Alphania Rahniayu, dr., Sp.PA (K)
2. Dr. Siprianus Ugroseno Yudho Bintoro, dr., Sp.PD., K-HOM., FINASIM
3. Ariadna Anggi Pasang, dr

Instalasi/Tempat Penelitian : RSUD Dr. Soetomo

Komite Etik Penelitian Kesehatan RSUD Dr Soetomo menyatakan bahwa dokumen diatas sesuai dengan The Office for Human Research Protections (OHRP) dibawah persyaratan the U.S. Department of Health and Human Services (HHS) Regulasi 45 CFR bagian 46 untuk exempt review.



Prof. Dr. Hendy Hendaro dr., SpOG(K)
Ketua Panel I

Dra. Siti Farida SpFRS, Apt
Sekretaris Panel I