

AJPCR

An Open Access Peer Reviewed Journal

# Asian Journal of Pharmaceutical & Clinical Research

# Editorial Board

## Editorial Board

AJPCR is committed to have dynamic and potential advisory-editorial board. Those established in the field can directly send their resume. New people are first needed to serve as referee before being considered member of advisory-editorial board. Email your resume to [editor@ajpcr.com](mailto:editor@ajpcr.com)

## Editor-in-Chief

- **Dr. Anurekha Jain**  
Dept. of Pharmaceutical Sciences, Jyoti Mahila Vidyapeeth University, Jaipur, Rajasthan  
Email: [anurekhajain@jywu.ac.in](mailto:anurekhajain@jywu.ac.in), [editor@ajpcr.com](mailto:editor@ajpcr.com)

## Associate Editor

- **Dr. Nuray Ari**  
Prof., Department of Pharmacology, Faculty of Pharmacy, Ankara University, 06100 Ankara, Turkey. Email: [ari@ankara.edu.tr](mailto:ari@ankara.edu.tr)
- **Lakshmi Narasmiha Rao Katakam**  
Analytical Development, Saptalis Pharmaceuticals LLC, Hauppauge, New York, USA 11788. Email: [klr Rao16@gmail.com](mailto:klr Rao16@gmail.com)

## Assistant Editor

- **Dr. Omotoso Abayomi Ebenezer**  
Prof., Department of Pharmaceutical & Medicinal Chemistry. Faculty of Pharmaceutical Sciences, University of Port Harcourt, Nigeria. Email: [abatoseb2001@yahoo.com](mailto:abatoseb2001@yahoo.com)
- **Dr. Vimal Kumar Jain**  
Principal, ITM School of Pharmacy, ITM Universe, Vadodara & Associate Dean, Pharmacy, GTU, Ahmedabad

## Editorial Board Members

- **Dr. Rupesh Kumar Gautam**  
Associate Prof., ADINA Institute of Pharmaceutical Sciences, Sagar, MP, India
- **Dr. Javad Sharifi Rad**  
Department of Pharmacognosy, Faculty of Pharmacy, Zabol University of Medical Sciences, P.O. Box 61615-585 Zabol, Iran
- **Dr. Sami Saqf El Hait**  
Junior Executive - Quality Control At Jamjoom Pharmaceuticals Company Limited jeddah, Saudi Arabia
- **Dr. Madhu Bala**  
Scientist 'F' and Joint Director, Institute of Nuclear Medicine and Allied Sciences (INMAS), India
- **Dr. Tushar Treembak Shelke**  
Head of Department of Pharmacology and Research Scholar, In Jspms Charak College of Pharmacy & Research, Pune, India

- **Dr. Subas Chandra Dinda**  
Professor-cum-Director: School of Pharmaceutical Education & Research (SPER), Berhampur University, Berhampur, Orissa, India.
- **Dr. Jagdale Swati Changdeo**  
Professor and Head, Department of Pharmaceutics, MAEER's Maharashtra Institute of Pharmacy, S.No.124, MIT Campus, Kothrud, Pune-411038
- **Dr. Biplab Kumar Dey**  
Principal, Department of Pharmacy, Assam down town University, Sankar Madhab Path, Panikhaiti 781026, Guwahati, Assam, India
- **Dr. Yogesh Pandurang Talekar**  
Research Associate, National Toxicology Centre
- **Dr Ravishekar N Hiremath**  
Prof and classified specialist (Community Medicine) Station Health Organisation, Chandimandir, Haryana.

## Editorial office

Asian Journal of Pharmaceutical and Clinical Research  
B-11, In front of Bima Hospital, Nai Abadi, Mandsaur 458001, MP, India  
E-mail: [editor@ajpcr.com](mailto:editor@ajpcr.com)



Online ISSN: 2455-3891

Print ISSN: 0974-2441

ICV 2021: 100.00



**Embase**

It's Embase, Not Expanded Embase, **Learn in 1 Min**

Open Journal Systems

## KEYWORDS

Analgesic  
Knowledge  
Anticancer  
Diabetes  
Antimicrobial  
Diabetes mellitus  
Antibacterial  
Antioxidant  
Obesity  
Antifungal  
Antidiabetic  
Cytotoxicity  
Validation  
Phytochemical  
Phytochemicals  
Docking  
Molecular docking  
Flavonoids  
Nil



[HOME](#) / [ARCHIVES](#) / Vol 8 Issue 2 (March - April) 2015

## Vol 8 Issue 2 (March - April) 2015

**PUBLISHED:** 01-03-2015

### CASE STUDY(S)

#### COUGH AND CHEST PAIN WITH AN UNCOMMON CAUSE

INDRANI DAS, PAYEL TALUKDAR, KALYAN DAS, SUMIT VERMA, MOLOY KANTI MAKHAL

2-3

 [VIEW ABSTRACT](#)

 [PDF](#)

 [DOWNLOAD PDF](#)

#### DICLOFENAC INDUCED ANGIOEDEMA: A CASE REPORT

HARSHAL NUTANRAO PISE, SUDHIR L. PADWAL

4-5

 [VIEW ABSTRACT](#)

 [PDF](#)

 [DOWNLOAD PDF](#)

#### MULTIDRUG-RESISTANT ACINETOBACTER BAUMANNII FROM NOSOCOMIAL URINARY TRACT INFECTION: A CASE REPORT

SREENIVASAN SRIRANGARAJ, LAVANYA SEGAR, ARUNAVA KALI

6-8

 [VIEW ABSTRACT](#)

 [PDF](#)

 [DOWNLOAD PDF](#)

#### WHEN THE RIGHT WAS WRONGÂ€: A CASE OF MISSED NEGLIGENCEÂ€

TANUJ KANCHAN, ALOK ATREYA

9-10

 [VIEW ABSTRACT](#)

 [PDF](#)

 [DOWNLOAD PDF](#)

#### MULTIPLE ADVERSE EFFECTS OF BETAMETHASONE USED AS SELF-MEDICATION: A CASE REPORT

KAVITHA PAWAR, DR. ALAMELU HARAN, DR. PRATIBHA NADIG

11-12

 [VIEW ABSTRACT](#)

 [PDF](#)

 [DOWNLOAD PDF](#)

## REVIEW ARTICLE(S)

### REVIEW OF THE TAXONOMY, ETHNOBOTANY, PHYTOCHEMISTRY, PHYTOTHERAPY AND PHYTOTOXICITY OF GERMANDER PLANT (TEUCRIUM POLIUM L.)

NIDAL AMIN JARADAT

13-19

 [VIEW ABSTRACT](#)

 [PDF](#)

 [DOWNLOAD PDF](#)

### EFFECTS OF DRUGS IN OPTIMIZING BLOOD PRESSURE AND CARDIAC OUTPUT

SRINIVAS TEJA B, KRISHNA SAI V, RAGHU RAM V, RAMA RAO NADENDLA

20-25

 [VIEW ABSTRACT](#)

 [PDF](#)

 [DOWNLOAD PDF](#)

### A REVIEW ON THE ROLE OF PPAR $\gamma$ AGONISTS AND HYBRIDS IN TYPE 2 DIABETES AND CARDIOMYOPATHY.

DEEPANWITA MAJI, SUBIR SAMANTA

26-31

 [VIEW ABSTRACT](#)

 [PDF](#)

 [DOWNLOAD PDF](#)

### MOLECULAR TARGET AND THERAPEUTIC ASPECTS OF RHEUMATOID ARTHRITIS: A REVIEW.

BISWARANJAN DAS, SUBIR SAMANTA

32-40

 [VIEW ABSTRACT](#)

 [PDF](#)

 [DOWNLOAD PDF](#)

### SYNTHESIS AND ANTIPLASMODIAL ACTIVITY OF SOME NOVEL CHALCONE DERIVATIVES

NEETU TOMAR, SHIV VARDAN SINGH, CHOTTES LAL JAIN, GAURAV VERMA, ANIRBAN PAL, VINEETA SINGH

47-50

 [VIEW ABSTRACT](#)

 [PDF](#)

 [DOWNLOAD PDF](#)

### A REVIEW: SYNTHESIS AND MEDICINAL IMPORTANCE OF 1,4-BENZOTHAZINE ANALOGUES

MONIKA MAHESHWARI, ANJU GOYAL

41-46

 [VIEW ABSTRACT](#)

 [PDF](#)

 [DOWNLOAD PDF](#)

### CRYPTOCOCCOSIS IN ADVANCE STATE OF AIDS AND ITS CHALLENGING THERAPEUTIC REGIMEN: IS IT REALLY CURABLE?

SWETASRI BHATTACHARYA, ANINDYA BANERJEE

51-53

 [VIEW ABSTRACT](#)

 [PDF](#)

 [DOWNLOAD PDF](#)

## PHARMACOLOGICAL POTENTIALITY AND MEDICINAL USES OF IPOMOEA AQUATICA FORSK: A REVIEW

CHITRAJIT MALAKAR, DR. ANUPAM DAS TALUKDAR, PINAK PANI NATH CHOUDHURY

60-63

 [VIEW ABSTRACT](#)  [PDF](#)  [DOWNLOAD PDF](#)

## EXPERIMENTAL MODELS FOR HEPATOTOXICITY

GURFATEH SINGH, NANCY DHADWAL, S.L. HARIKUMAR

70-74

 [VIEW ABSTRACT](#)  [PDF](#)  [DOWNLOAD PDF](#)

## COSMECEUTICALSÂ€: AN OPINION IN THE DIRECTION OF PHARMACEUTICALS

ANURADHA S N, VILASHENE A/P GANASAN, LALITHAMBIGAI A/P JOOBI, ARUNKUMAR S

64-69

 [VIEW ABSTRACT](#)  [PDF](#)  [DOWNLOAD PDF](#)

## UNIQUE ECRF Â€“ IMPORTANCE TO CLINICAL TRIALS AND HUMAN HEALTH

SUPREET K GILL, AJAY F CHRISTOPHER, SANJIV KUMAR, VIKAS GUPTA, PARVEEN BANSAL

81-87

 [VIEW ABSTRACT](#)  [PDF](#)  [DOWNLOAD PDF](#)

## DIAGNOSTIC METHODS FOR NON-ALCOHOLIC FATTY LIVER DISEASES ALTERNATIVE TO LIVER BIOPSY: A REVIEW

SURENDRA H BODAKHE, SANJAY KUMAR GUPTA

54-59

 [VIEW ABSTRACT](#)  [PDF](#)  [DOWNLOAD PDF](#)

## ANTIDERMATOPHYTIC ACTIVITY OF ANGIOSPERMIC PLANTS: A REVIEW

JAVED IQBAL, MISHRA RP, AASHIQ HUSSAIN ALLIE

75-80

 [VIEW ABSTRACT](#)  [PDF](#)  [DOWNLOAD PDF](#)

## SHORT COMMUNICATION(S)

### SCREENING OF COLLEGE STUDENTS FOR OBESITY

SOHEL MEMON, VINEELA NEKKANTI, RAVINANDAN AP, SRINIVASAN R, APOORVA DEV, SANJAY SHARMA

88-89

 [VIEW ABSTRACT](#)  [PDF](#)  [DOWNLOAD PDF](#)

## LETTER TO EDITOR

### PLANT PHARMACOGNOSY FOR DENGUE FEVER: BACK TO NATURE

HAMIDUN BUNAWAN, SYARUL NATAQAIN BAHARUM

1

 [VIEW ABSTRACT](#)

 [PDF](#)

 [DOWNLOAD PDF](#)

## ORIGINAL ARTICLE(S)

### IN VITRO CYTOTOXIC AND APOPTOTIC ACTIVITY OF POLYSACCHARIDE RICH MORINDA CITROFOLIA FRUIT ON MCF-7 CELLS

VENNILA SRINIVASAHAN, BRINDHA DURAIRAJ

190-193

 [VIEW ABSTRACT](#)

 [PDF](#)

 [DOWNLOAD PDF](#)

### EVALUATION OF DIURETIC ACTIVITY OF MUSSAENDA FRONDOSA

SREELAKSHMI R, SHAN P MOHAMMED, JYOTI HARINDRAN, SRIGANESAN P

117-118

 [VIEW ABSTRACT](#)

 [PDF](#)

 [DOWNLOAD PDF](#)

### SCREENING AND MOLECULAR DOCKING STUDIES OF CURCUMIN AND ITS DERIVATIVES AS INHIBITORS OF AMYLOID- $\beta$ PROTEIN - A KEY PROTEIN IN ALZHEIMER'S DISEASE

JAYASREE GANUGAPATI, RAVINDRA BABU, SURUCHI JAIKUMAR AHUJA, MADHUMITA MUKUNDAN, SESA SRRINIVAS VUTUKURU

98-101

 [VIEW ABSTRACT](#)

 [PDF](#)

 [DOWNLOAD PDF](#)

### ISOLATION AND CHARACTERIZATION OF SECONDARY METABOLITE FROM HABENARIA INTERMEDIA D.DON FOR EVALUATION OF HEPATOPROTECTIVE ACTIVITY AGAINST CARBON TETRACHLORIDE INDUCED LIVER DAMAGE IN ALBINO RATS

MAHESH ANAND GOUDAR, JAYADEVAPPA H, MAHADEVAN KM, SHASTRY RA4SHASTRY RA, HABBU PV, SAYESWARA HA

194-198

 [VIEW ABSTRACT](#)

 [PDF](#)

 [DOWNLOAD PDF](#)

### EVALUATION OF CARDIOPROTECTIVE ACTIVITY OF AQUEOUS EXTRACT OF GARCINIA INDICA LINN FRUIT RIND

KARUNAKAR HEGDE, DHARUV KAMLESH KUMAR PATEL, KEERTHI VARMA

107-112

 [VIEW ABSTRACT](#)

 [PDF](#)

 [DOWNLOAD PDF](#)



## THE COMBINATION THERAPY MODEL OF ANDROGRAPHIS PANICULATA EXTRACT AND CHLOROQUINE ON PLASMODIUM BERGHEI INFECTED MICE

ACHMAD FUAD HAFID

205-208

 [VIEW ABSTRACT](#)

 [PDF](#)

 [DOWNLOAD PDF](#)

## ENHANCEMENT OF ROSUVASTATIN CALCIUM BIOAVAILABILITY APPLYING NANOCRYSTAL TECHNOLOGY AND IN-VITRO, IN-VIVO EVALUATIONS.

KARTHICK PALANI, PETER CHRISTOPER GV, SATHESH KUMAR KESAVAN

88-92

 [VIEW ABSTRACT](#)

 [PDF](#)

 [DOWNLOAD PDF](#)

## SOLUBILITY, DISSOLUTION TEST AND ANTIMALARIAL ACTIVITY OF ARTESUNATE NICOTINAMIDE CO CRYSTAL PREPARED BY SOLVENT EVAPORATION AND SLURRY METHODS

DWI SETYAWAN, NARENDRA KUSUMA WARDHANA, RETNO SARI

164-166

 [VIEW ABSTRACT](#)

 [PDF](#)

 [DOWNLOAD PDF](#)

## FOURIER TRANSFORM INFRARED ANALYSIS OF ULVA LACTUCA AND GRACILARIA CORTICATA AND THEIR EFFECT ON ANTIBACTERIAL ACTIVITY

RADHIKA D, MOHAIDEEN A

209-212

 [VIEW ABSTRACT](#)

 [PDF](#)

 [DOWNLOAD PDF](#)

## TO DETERMINE THE RISK FACTORS ASSOCIATED WITH ECTOPIC PREGNANCY

RAJESH BASNET, NEELAM PRADHAN, LAXMAN BHARATI, NIRAJAN BHATTARAI, BUDDHA BAHADUR BASNET, BIDUR SHARMA

93-97

 [VIEW ABSTRACT](#)

 [PDF](#)

 [DOWNLOAD PDF](#)

## FLAVONOID FROM METHANOLIC EXTRACT OF LIMONIASTRUM FEEI (GIRARD) BATT (PLUMBAGINACEAE)

ZIANE L, LAZOUNI HA, MOUSSAOUI A, HAMIDI N, DJELLOULI M, BELABBES A

218-219

 [VIEW ABSTRACT](#)

 [PDF](#)

 [DOWNLOAD PDF](#)

## EVALUATION OF PHYTOCHEMICAL CONSTITUENTS, QUANTITATIVE ANALYSIS AND ANTIMICROBIAL EFFICACY OF POTENTIAL HERBS AGAINST SELECTED MICROBES

RAJESWARI A

232-237

 [VIEW ABSTRACT](#)

 [PDF](#)

 [DOWNLOAD PDF](#)

### REFERRED OTALGIA – A CASE SERIES

SUMITHA R, NISHA ALICE JOSEPH

343-345

 [VIEW ABSTRACT](#)

 [PDF](#)

 [DOWNLOAD PDF](#)

### DESIGN DEVELOPMENT AND EVALUATION OF BUCCAL TABLET CONTAINING NICORANDIL AS A MODEL DRUG

BISWAJIT BISWAL, HARDIK PARMAR, JYOTIRANJAN NAYAK

102-106

 [VIEW ABSTRACT](#)

 [PDF](#)

 [DOWNLOAD PDF](#)

### COMPARISON OF FOOD WASTE, PONGAMIA SEED COATS AND COMMERCIAL ACTIVATED CARBON AS EFFECTIVE ADSORBENTS IN DAIRY EFFLUENT TREATMENT

DAWN SS, NIRMALA N, RASHMI KUMARI

238-241

 [VIEW ABSTRACT](#)

 [PDF](#)

 [DOWNLOAD PDF](#)

### EVALUATION OF EFFECT OF AQUEOUS EXTRACT OF ZINGIBER OFFICINALE ROSCOE (GINGER) ON ACUTE AND CHRONIC INFLAMMATION IN ADULT ALBINO RATS

NAGARAJ B MALIPATIL, MANJUNATH S, SHRUTHI DP

113-116

 [VIEW ABSTRACT](#)

 [PDF](#)

 [DOWNLOAD PDF](#)

### NOVEL SPECTROPHOTOMETRIC METHODS FOR THE QUANTIFICATION OF DESVENLAFAXINE IN PURE AND PHARMACEUTICAL DOSAGE FORM

SREEJA U, GURUPADAYYA BM, CHANDAN RS

267-270

 [VIEW ABSTRACT](#)

 [PDF](#)

 [DOWNLOAD PDF](#)

### FORMULATION, IN-VITRO&IN-VIVO EVALUATION OF NANOEMULSION GEL FOR TRANSDERMAL DRUG DELIVERY OF NIMODIPINE

SHEELA A YADAV, SUSHILKUMAR S PODDAR

119-124

 [VIEW ABSTRACT](#)

 [PDF](#)

 [DOWNLOAD PDF](#)

### A PROSPECTIVE STUDY ON CLINICAL EVALUATION, TREATMENT PATTERN AND ADVERSE EFFECTS OF ANTICANCER DRUGS IN VARIOUS GYNAECOLOGICAL CANCER PATIENTS

VARSHA SANIGARAM, SNEHARIKA LINGAMPALLY, AMULYA BOYANA, SANGRAM VURUMADLA

125-131

 [VIEW ABSTRACT](#)

 [PDF](#)

 [DOWNLOAD PDF](#)

### PHARMACOGENOMIC ANALYSIS OF SNPS OF ACE GENE IN STROKE

MAHESWARI L PATIL, SEEMA J PATEL

308-310

 [VIEW ABSTRACT](#)

 [PDF](#)

 [DOWNLOAD PDF](#)

## CYTOTOXIC ACTIVITY OF ANREDERA CORDIFOLIA LEAF EXTRACT ON HELA CERVICAL CANCER CELLS THROUGH P53-INDEPENDENT PATHWAY

SRI HARTATI YULIANI, CLARA DEWI ANGGRAENI, WINDA SEKARJATI, ANDUNG PANJALU, ENADE PERDANA ISTYASTONO, AGUSTINA SETIAWATI

328-331

 [VIEW ABSTRACT](#)

 [PDF](#)

 [DOWNLOAD PDF](#)

## DESIGN, DEVELOPMENT AND EVALUATION OF FLUCONAZOLE TOPICAL GEL

SUDIPTA DAS, ARNAB SAMANTA, ANANYA BOSE

132-135

 [VIEW ABSTRACT](#)

 [PDF](#)

 [DOWNLOAD PDF](#)

## PALATAL RUGOSCOPY AS A METHOD OF SEX DETERMINATION IN FORENSIC SCIENCE

PRATHUSHA SUBRAMANIAN, NITHYA JAGANNATHAN

136-138

 [VIEW ABSTRACT](#)

 [PDF](#)

 [DOWNLOAD PDF](#)

## ANTI-INFLAMMATORY EFFECT OF LIPID EXTRACT OF SEA PEN (VIRGULARIA GUSTAVIANA) IN MICE

SHARAREH SHARIFI, SHILA SAFAEIAN

332-334

 [VIEW ABSTRACT](#)

 [PDF](#)

 [DOWNLOAD PDF](#)

## INVITRO ANTIOXIDANT ACTIVITIES OF VARIOUS LEAVES EXTRACTS FROM FIVE VARIETIES OF RAMBUTAN (NEPHELIUM LAPPACEUM) AND ITS CORRELATION WITH TOTAL FLAVONOID, PHENOLIC, CAROTENOID CONTENT

IRDA FIDRIANNY, ASIH SUKOWATI, SUKRASNO SUKRASNO

139-143

 [VIEW ABSTRACT](#)

 [PDF](#)

 [DOWNLOAD PDF](#)

## EVALUATION OF ANTIMICROBIAL EFFICIENCY AND Î’LPHA-GLUCOSIDASE INHIBITION OF RUBUS ELLIPTICUS SMITH. LEAF EXTRACTS AND ITS PHYTOCHEMICAL ANALYSIS

LATHA R, TRAYEE SARKAR, SAGAYA JANSI R, AGASTIAN P

422-426

 [VIEW ABSTRACT](#)

 [PDF](#)

 [DOWNLOAD PDF](#)

## ISOLATION, SCREENING AND CHARACTERIZATION OF POTENT MARINE STREPTOMYCES SP. PM 105 AGAINST ANTIBIOTIC RESISTANT PATHOGENS

THIRUMALAIRAJ J, SHANMUGASUNDARAM T, SIVASANKARI K, NATARAJASEENIVASAN K, BALAGURUNATHAN R  
439-443

 **VIEW ABSTRACT**

 **PDF**

 **DOWNLOAD PDF**

**DRUG UTILIZATION PATTERN OF ANTIDIABETIC DRUGS AMONG DIABETIC OUTPATIENTS IN A TERTIARY CARE HOSPITAL**

SOUMYA MARY ALEX, SREELEKSHMI BS, SMITHA S, JIJI KN, ARUN S MENON, UMA DEVI P  
144-146

 **VIEW ABSTRACT**

 **PDF**

 **DOWNLOAD PDF**

**ANALYTICAL METHOD DEVELOPMENT & VALIDATION OF ETRAVIRINE IN ITS BULK DOSAGE FORM BY USING RP-HPLC METHOD AS PER ICH GUIDELINES**

SOMSUBHRA GHOSH, SAILAJA A, RAVIKUMAR BVV  
147-150

 **VIEW ABSTRACT**

 **PDF**

 **DOWNLOAD PDF**

**THE PRESENCE OF A LITTERMATE DURING MEASUREMENT OF BLOOD PRESSURE REDUCES THE ACCLIMATIZATION TIME IN CONSCIOUS NAÛVE RATS.**

BRINNELL CASZO, ZANARIAH AWANG, JUSTIN GNANOU, HARBINDARJEET SINGH  
151-153

 **VIEW ABSTRACT**

 **PDF**

 **DOWNLOAD PDF**

**ANTIMOTOLITY EFFECT OF ORGANIC EXTRACTS OF ANTHEMIS MAURITIANA MAIRE & SENNEN FLOWERS ON THE RODENT ISOLATED JEJUNUM**

AHMED KARIM, HASSAN ZROURI, SOULIMAN AMRANI, MOHAMMED BNOUHAM, ABDERRAHIM ZIYYAT, MOHAMMED AZIZ  
154-158

 **VIEW ABSTRACT**

 **PDF**

 **DOWNLOAD PDF**

**DESIGN AND EVALUATION OF TORSEMIDE CONTROLLED RELEASE MATRIX TABLETS**

ASWANI MACHARLA, SELLAPPAN VELMURUGAN, VEERABHADRA RAO P  
159-163

 **VIEW ABSTRACT**

 **PDF**

 **DOWNLOAD PDF**

**A COMPARATIVE STUDY OF SAFETY AND EFFICACY OF 30% FORMIC ACID WITH 85% FORMIC ACID IN THE TREATMENT OF PALMOPLANTAR WARTS.**

DEEPTI C DSOUZA, NEEMA M ALI  
167-170

 **VIEW ABSTRACT**

 **PDF**

 **DOWNLOAD PDF**

**ANTIBACTERIAL ACTIVITY, FREE RADICAL SCAVENGING POTENTIAL, PHYTOCHEMICAL INVESTIGATION AND IN-VIVO TOXICITY STUDIES OF MEDICINAL PLANT EMBELIA BASAAL (R. & S.) A.**

DC.

KOMAL D BARBADE, AJIT G DATAR

171-177

 [VIEW ABSTRACT](#)

 [PDF](#)

 [DOWNLOAD PDF](#)

### RP-HPLC METHOD DEVELOPMENT AND VALIDATION FOR THE SIMULTANEOUS ESTIMATION OF ATORVASTATIN AND EZETIMIBE IN PHARMACEUTICAL DOSAGE FORM

SAROJ KUMAR RAUL, RATNA BHASKAR ARAVELLI, DURGASI JHANSI

178-181

 [VIEW ABSTRACT](#)

 [PDF](#)

 [DOWNLOAD PDF](#)

### ACUTE ORAL TOXICITY OF SINAPIS ALBA IN SWISS ALBINO MICE

DIPTI KASPATE, TINA SALDANHA, SWATI NARKHEDE, BHAGYARSHREE KARMARKAR, KARAN SHAH

182-184

 [VIEW ABSTRACT](#)

 [PDF](#)

 [DOWNLOAD PDF](#)

### SAFETY EVALUATION OF PETROLEUM ETHER, ACETONE, AND HYDROALCOHOLIC EXTRACTS OF HOLOPTELEA INTEGRIFOLIA BY ORAL ADMINISTRATION IN WISTAR RATS

KUMAR D, PATIL PA, HARSHA V HEGDE, ROY S, KHOLKUTE SD

185-189

 [VIEW ABSTRACT](#)

 [PDF](#)

 [DOWNLOAD PDF](#)

### VALIDATED HIGH PERFORMANCE LIQUID CHROMATOGRAPHY (HPLC) METHOD FOR ANALYSIS OF METHAMPHETAMINE IN HUMAN URINE USING LIQUID-LIQUID EXTRACTION

ABU BAKAR RUZILAWATI, HALIJAH MIRAN

199-201

 [VIEW ABSTRACT](#)

 [PDF](#)

 [DOWNLOAD PDF](#)

### QUANTITATIVE ANALYSIS OF TOTAL PHENOLS AND FLAVONOIDS IN IN VIVO AND IN VITRO SAMPLES OF OROXYLUM INDICUM (L.) VENT.

ESHA RAMI, ILLA PATEL

202-204

 [VIEW ABSTRACT](#)

 [PDF](#)

 [DOWNLOAD PDF](#)

### ANTIFUNGAL ACTIVITY OF BACILLUS SPP. ISOLATED FROM CALOTROPIS PROCERA AIT. RHIZOSPHERE AGAINST CANDIDA ALBICANS

MOUNYR BALOUIRI, SAMIRA BOUHDID, EL HOUSSAINE HARKI, MOULAY SADIKI, WESSAL OUEDRHIRI

213-217

 [VIEW ABSTRACT](#)

 [PDF](#)

 [DOWNLOAD PDF](#)

### THE STUDY OF POTENTIALITY OF PICRORHIZA KURROA ROOT PROTEINS TO INHIBIT FREE RADICALS AND Î'-AMYLASE ENZYME

SANJAY S, SYEDA HAJIRA BANU, CHETHANKUMAR M

220-225

 **VIEW ABSTRACT**

 **PDF**

 **DOWNLOAD PDF**

**A SODIUM HYALURONATE OPHTHALMIC SOLUTION FOR REDUCING DRY EYE AND ENHANCING CORNEAL WOUND HEALING AFTER PHOTOREFRACTIVE KERATECTOMY (PRK)**

NGAMJIT KASETSUWAN, USANEE REINPRAYOON

226-231

 **VIEW ABSTRACT**

 **PDF**

 **DOWNLOAD PDF**

**STUDY OF VITAMIN D LEVELS IN EPILEPTIC CHILDREN IN AGE GROUP OF 2-16 YEARS**

NIVEDITA PATIL, SHANKAR RAI

242-243

 **VIEW ABSTRACT**

 **PDF**

 **DOWNLOAD PDF**

**GAS CHROMATOGRAPHY - MASS SPECTROMETRY ANALYSIS OF BIOACTIVE CONSTITUENTS FROM THE MARINE STREPTOMYCES**

USHA NANDHINI S, SANGARESHWARI S, KUMARI LATA

244-246

 **VIEW ABSTRACT**

 **PDF**

 **DOWNLOAD PDF**

**METFORMIN AND SULFONYLUREAS EFFECT ON THE BLOOD LEVEL OF PROSTATE SPECIFIC ANTIGEN**

YOUSIF ELRAIH AHMED, ISMAT HASSAN ALI, MOHAMMED ELIMAM AHAMED

247-250

 **VIEW ABSTRACT**

 **PDF**

 **DOWNLOAD PDF**

**HEPATOPROTECTIVE ACTIVITY OF TRICHOSANTHES CUCURMENA L.**

VAIJAYANTHIMALA PALANISAMY, SURESHKUMAR SHANMUGAM, SANGAMESWARAN BALAKRISHNAN

251-253

 **VIEW ABSTRACT**

 **PDF**

 **DOWNLOAD PDF**

**ASSESSMENT OF DIABETES KNOWLEDGE USING DIABETES KNOWLEDGE QUESTIONNAIRE AMONG PEOPLE WITH TYPE 2 DIABETES MELLITUS**

KANCHANA DUSSA, PARIMALAKRISHNAN S, RAKESH SAHAY

254-256

 **VIEW ABSTRACT**

 **PDF**

 **DOWNLOAD PDF**

**ANTIPROLIFERATIVE AND APOPTOTIC EFFECTS OF FICUS PSEUDOPALMA BLANCO (MORACEAE) AGAINST HEPATOCARCINOMA (HEPG2)**

LIBRADO A SANTIAGO, ANNA BEATRIZ R MAYOR

257-261

 [VIEW ABSTRACT](#)

 [PDF](#)

 [DOWNLOAD PDF](#)

## INVESTIGATION ON THE CYTOTOXIC NATURE OF LEAF AND STEM BARK EXTRACTS OF PROSOPIS CINERARIA

STELLAA ROBERTSON, N NARAYANAN, V RAVICHANDRAN

262-266

 [VIEW ABSTRACT](#)

 [PDF](#)

 [DOWNLOAD PDF](#)

## FACILITATORS AND BARRIERS FOR BEDSIDE TEACHING IN THE TEACHING HOSPITALS OF COASTAL SOUTH INDIA

RAMESH HOLLA, MEDINI SHRISHA, BHASKARAN UNNIKRISHNAN, NISHTHA SHARMA, SAI JANANI, REKHA THAPAR, PRASANNA MITHRA, NITHIN KUMAR, VAMAN KULKARNI, DARSHAN BB, AVINASH KUMAR, KARTHIK REDDY, DIVYA PRAKASH

271-273

 [VIEW ABSTRACT](#)

 [PDF](#)

 [DOWNLOAD PDF](#)

## FACTORS CONTRIBUTING TO NON-ADHERENCE TO MEDICATION AMONG TYPE 2 DIABETES MELLITUS IN PATIENTS ATTENDING TERTIARY CARE HOSPITAL IN SOUTH INDIA

DIVYA S, PRATIBHA NADIG

274-276

 [VIEW ABSTRACT](#)

 [PDF](#)

 [DOWNLOAD PDF](#)

## DESIGN, DEVELOPMENT AND CHARACTERIZATION OF CLOPIDOGREL BISULFATE TRANSDERMAL DRUG DELIVERY SYSTEM

DWARAKANADHA REDDY P, SWARNALATHA D, SIDDA RAMANJULU B, KARTHIK SAI KUMAR P, SARDAR USSAIN M

277-280

 [VIEW ABSTRACT](#)

 [PDF](#)

 [DOWNLOAD PDF](#)

## DRUG UTILIZATION PATTERN AMONG GERIATRIC PATIENTS ADMITTED IN MEDICAL INTENSIVE CARE UNIT IN A TERTIARY CARE TEACHING HOSPITAL

BALAJI V, SATHISHA AITHAL, GEETHA S, SWETHA ES

281-283

 [VIEW ABSTRACT](#)

 [PDF](#)

 [DOWNLOAD PDF](#)

## RISK FACTORS FOR NON-COMMUNICABLE DISEASES AMONG RURAL ADOLESCENTS: A SCHOOL-BASED CROSS-SECTIONAL STUDY

MARIA FRANCES BUKELO, DEEPTHI KIRAN, B. RAMAKRISHNA GOUD, MARIO JOSEPH BUKELO, PRETESH ROHAN KIRAN, VAMAN KULKARNI, NITHIN KUMAR, TANUJ KANCHAN, BHASKARAN UNNIKRISHNAN

284-287

 [VIEW ABSTRACT](#)

 [PDF](#)

 [DOWNLOAD PDF](#)

## SCREENING OF STAPHYLOCOCCUS AUREUS AND COAGULASE NEGATIVE STAPHYLOCOCCUS (CONS) FROM URINE SAMPLES.

METRI BASAVARAJ C, JYOTHI P

288-290

 [VIEW ABSTRACT](#)

 [PDF](#)

 [DOWNLOAD PDF](#)

## EFFICACY OF GOSERELIN FOR POST-OPERATIVE TREATMENT IN CHINESE PATIENTS WITH MODERATE TO SEVERE ENDOMETRIOSIS: AN OBSERVATIONAL, MULTICENTRE, OPEN-LABEL, NON-INTERVENTIONAL STUDY

JINGHE LANG, YINGFANG ZHOU, JINHUA LENG, JIANHUA ZHENG, ZHENG GUAN, XIAOLING FANG, JUN LIN, AI ZHENG, DUANDUAN LA, SHULAN ZHANG, LIGUO MA, MEIQING XIE, WEN DI, HENG CUI, BIN LING, XIAOYAN XIN

291-295

 [VIEW ABSTRACT](#)

 [PDF](#)

 [DOWNLOAD PDF](#)

## INHIBITION OF DIFFERENT STAGES OF BIOFILM OF PSEUDOMONAS AERUGINOSA PA01 BY ISOLATED BACTERIOPHAGE P2

SADHANA SINGH SAGAR, RAJESH KUMAR, SHILPA KAISTHA

296-299

 [VIEW ABSTRACT](#)

 [PDF](#)

 [DOWNLOAD PDF](#)

## ASSOCIATION OF EMOTIONAL INTELLIGENCE WITH ACADEMIC PERFORMANCE AMONG MEDICAL STUDENTS IN SOUTH INDIA

BHASKARAN UNNIKRISHNAN, DARSHAN BB, VAMAN KULKARNI, REKHA THAPAR, PRASANNA MITHRA, NITHIN KUMAR, RAMESH HOLLA, AVINASH KUMAR, RITHIKA SRIRAM, NAMITHA NAIR, JUANNA, SANJANA RAI, HUWWA NAJIZA

300-302

 [VIEW ABSTRACT](#)

 [PDF](#)

 [DOWNLOAD PDF](#)

## ACTIVITY OF INDIAN TOPICAL SKIN PHARMACEUTICALS AGAINST SOME FUNGAL PATHOGENS

JAVED IQBAL

303-304

 [VIEW ABSTRACT](#)

 [PDF](#)

 [DOWNLOAD PDF](#)

## AWARENESS AND PRACTICE REGARDING CERVICAL CANCER PREVENTION AMONG FEMALE COLLEGE STUDENTS OF MANGALORE CITY, INDIA

VAMAN KULKARNI, DARSHAN BB, ABHISHEK TANDON, BHASKARAN UNNIKRISHNAN, SRIRANJANI IYER, AMODINI KUKREJA, AMINA MAQBOOL, PALLAV BHANDARI, JITENDER YADAV, REKHA THAPAR, PRASANNA MITHRA P, NITHIN KUMAR, RAMESH HOLLA, AVINASH KUMAR

305-307

 [VIEW ABSTRACT](#)

 [PDF](#)

 [DOWNLOAD PDF](#)

## PROSOPIS CINERARIA LEAF EXTRACT PROTECT H2O2 INDUCED OXIDATIVE STRESS-INDUCED CELL DEATH IN SACCHAROMYCES CEREVISIAE



DHARANI BANGARUSWAMY, SIVAPRABHA JAMBUNATHAN, PALGHAT RAGHUNATHAN PADMA, SUMATHI SUNDARAVADIVELU

311-315

 [VIEW ABSTRACT](#)

 [PDF](#)

 [DOWNLOAD PDF](#)

## EVALUATION OF ANTI-ANXIETY ACTIVITY OF SILICA GEL ENTRAPPED TRADITIONAL MEDICINE

LOPAMUDRA BHATTACHARYYA

316-319

 [VIEW ABSTRACT](#)

 [PDF](#)

 [DOWNLOAD PDF](#)

## IN VITRO GLUCOSE BINDING ACTIVITY OF TERMINALIA BELLIRICA

MARY SHOBA DAS C, GAYATHRI DEVI S

320-323

 [VIEW ABSTRACT](#)

 [PDF](#)

 [DOWNLOAD PDF](#)

## EFFECTS OF ANTI ANXIETY DRUG MIDAZOLAM AS PRETREATMENT THERAPY FOR ANXIETY OF ZEBRA FISHES INDUCED BY THE EXPOSURE OF UNFAMILIAR ENVIRONMENT OF AQUATIC WHITE/BLACK MAZE

SURENDRA VADA, DIVAKAR GOLI, ANIRBANDEEP BOSE, UDAY RAJ SHARMA

324-327

 [VIEW ABSTRACT](#)

 [PDF](#)

 [DOWNLOAD PDF](#)

## MONITORING AND ANALYSIS OF ADVERSE DRUG REACTIONS IN A PRIVATE TERTIARY CARE TEACHING HOSPITAL

KIRAN ROY, DIVYA S, PRATIBHA NADIG, . BHANUPRAKASH

335-337

 [VIEW ABSTRACT](#)

 [PDF](#)

 [DOWNLOAD PDF](#)

## GC-MS DETERMINATION OF BIOACTIVE COMPONENTS OF THREE TRAITS OF VILVAM (BAEL)

ARIHARAN VN, KALIRAJAN K, NAGENDRA PRASAD P

338-342

 [VIEW ABSTRACT](#)

 [PDF](#)

 [DOWNLOAD PDF](#)

## INVESTIGATION OF EPIDEMIOLOGY AND ETIOLOGY OF LIVER DISEASES AND CHARACTERIZATION OF ITS ASSOCIATION WITH VARIOUS FACTORS

NAMRATA A DESAI, KISHAN P KOTAK, SNEHAL S PATEL

346-349

 [VIEW ABSTRACT](#)

 [PDF](#)

 [DOWNLOAD PDF](#)

## IN SILICO DOCKING APPROACH FOR ANTIATHEROSCLEROTIC ACTIVITY OF PHYTOCONSTITUENTS OF CORCHORUS AESTUANS AND ADMET PREDICTION

DHANALAKSHMI R, MANAVALAN R

350-353

 [VIEW ABSTRACT](#)

 [PDF](#)

 [DOWNLOAD PDF](#)

### A NOVEL STABILITY INDICATING RP-HPLC METHOD FOR THE DETERMINATION OF KETOROLAC TROMETHAMINE IN PHARMACEUTICAL FORMULATIONS

BANDALA KOTESWARA RAO, GOLKONDA RAMU, ILLURU JYOTHSNA KUMARI, CHINTALA RAMBABU

354-359

 [VIEW ABSTRACT](#)

 [PDF](#)

 [DOWNLOAD PDF](#)

### FREE RADICAL SCAVENGING ACTIVITY OF VARIOUS EXTRACTS OF WHOLE PLANT OF CALYPTERIS FLORIBUNDA (LAM.): AN IN-VITRO EVALUATION

BHUVANESWARI SANTHARAM, GANESH P, SORANAM R, PACKIA LEKSHMI

360-363

 [VIEW ABSTRACT](#)

 [PDF](#)

 [DOWNLOAD PDF](#)

 [VIEW ABSTRACT](#)

 [PDF](#)

 [DOWNLOAD PDF](#)

### HEPATOPROTECTIVE ACTIVITY OF HYDRO-ALCOHOLIC EXTRACT OF WHOLE PLANT OF SOLANUM DULCAMARA L. AND NEPHROLEPIS CORDIFOLIA (L) C. PRESL AGAINST PARACETAMOL INDUCE HEPATOTOXICITY IN ALBINO RATS

RAJASHEKHAR U, VRUSHABENDRA SWAMY B M, JAYAVEERA K N

364-370

 [VIEW ABSTRACT](#)

 [PDF](#)

 [DOWNLOAD PDF](#)

### ANTIMICROBIAL ACTIVITY OF LACTOBACILLUS FERMENTUM, A VOLVO VAGINAL ISOLATE

SUMI DAS PURKHAYASTHA, M. K. BHATTACHARYA, H. K. PRASAD, H. UPADHYAYA, K. PAL, G. D. SHARMA

371-372

 [VIEW ABSTRACT](#)

 [PDF](#)

 [DOWNLOAD PDF](#)

### EFFECT OF PLANT GROWTH REGULATORS ON GROWTH AND ESSENTIAL OIL CONTENT IN PALMAROSA (CYMBOPOGON MARTINII)

AHAMAD FAIZ KHAN, FARINA MUJEEB, A.H. A. FAROOQI, ALVINA FAROOQUI

373-376

 [VIEW ABSTRACT](#)

 [PDF](#)

 [DOWNLOAD PDF](#)

### IN VITRO MASS PROPAGATION AND SYNTHETIC SEED PRODUCTION COMBINED WITH PHYTOCHEMICAL AND ANTIOXIDANT ANALYSIS OF BACOPA CHAMAEDRYOIDES: AN ETHNO-MEDICINALLY IMPORTANT PLANT

SK MOQUAMMEL HAQUE, SUBRATA KUNDU, ANUPAM DAS, BISWAJIT GHOSH

377-383

 [VIEW ABSTRACT](#)

 [PDF](#)

 [DOWNLOAD PDF](#)

## **DISTRIBUTION, ISOLATION AND CHARACTERIZATION OF LYTIC BACTERIOPHAGES AGAINST MULTI-DRUG RESISTANT AND EXTENDED-SPECTRUM OF Î²-LACTAMASE PRODUCING PATHOGENS FROM HOSPITAL EFFLUENTS**

DURASAMY NIVAS, NACHIMUTHU RAMESH, VAITHILINGAM KRISHNAKUMAR, PANDIYAN RAJESH, EBENEZER KING SOLOMON, VELU RAJESH KANNAN

384-389

 **VIEW ABSTRACT**

 **PDF**

 **DOWNLOAD PDF**

## **A STUDY ON PATIENTS' AWARENESS, RECOGNITION MANAGEMENT AND PREVALENCE OF HYPOGLYCEMIC EPISODES IN TYPE 2 DIABETES MELLITUS IN A TERTIARY CARE HOSPITAL**

SOUJANYA AKKINENI, ANCY MARY MATHEWS, GADEPALLI APUROOPA, NEHA SRIDHAR N, PRUDENCE A RODRIGUES

390-394

 **VIEW ABSTRACT**

 **PDF**

 **DOWNLOAD PDF**

## **PHARMACOVIGILANCE STUDY IN GERIATRIC POPULATION**

KIRAN NAGARAJU, MANASA S, MANJUNATH R

395-399

 **VIEW ABSTRACT**

 **PDF**

 **DOWNLOAD PDF**

## **ACUTE AND SUB-ACUTE DERMAL TOXICITY STUDIES OF MORINDA CITRIFOLIA L. FRUIT EXTRACT IN SPRAGUE DAWLEY RATS**

ALI KHAIRULLAH ZAH, HAZILAWATI HAMZAH, HUTHEYFA S, MOHD ROSLY SHAARI SHAARI, SHANMUGAVELU SITHAMBARAM, HEMN HASAN OTHMAN

400-408

 **VIEW ABSTRACT**

 **PDF**

 **DOWNLOAD PDF**

## **PREVALENCE OF MULTI DRUG RESISTANT STRAINS ON TOUCH SCREEN OF AUTOMATED TELLER MACHINE**

RAMESH N, AKSHITA PRAKASH PILLAI, NANDINI RAJANNAMBIAR, PRASANTH M, SHANTHINI T, GOTHANDAM KM, KARTHIKEYAN S

409-411

 **VIEW ABSTRACT**

 **PDF**

 **DOWNLOAD PDF**

## **EVALUATION OF ANXIOLYTIC ACTIVITY OF AERIAL PARTS OF SARCOSTIGMA KLEINII WIGHT. & ARN.**

NAINA SARA SABU

412-416

 **VIEW ABSTRACT**

 **PDF**

 **DOWNLOAD PDF**

## **IN-VITRO ANTIOXIDANT ACTIVITY AND FREE RADICAL SCAVENGING POTENTIAL OF ROOTS OF RED SAGE**

SAILESH NARAYAN

417-421

[VIEW ABSTRACT](#)[PDF](#)[DOWNLOAD PDF](#)

### SCREENING OF EXTRACELLULAR LIPASE RELEASING MICROORGANISMS ISOLATED FROM SUNFLOWER VEGETABLE OIL CONTAMINATED SOIL FOR BIO-DIESEL PRODUCTION

NARASIMHAN V, VALENTIN BHIMBA B

427-430

[VIEW ABSTRACT](#)[PDF](#)[DOWNLOAD PDF](#)

### SCREENING OF SOME INDIAN HOUSEHOLD SPICES FOR COMPARATIVE STUDIES OF ANTIOXIDANT AND ANTIRADICAL ACTIVITIES BY USING IN-VITRO MODELS

ROHAN SHARADANAND PHATAK, ASHA KRISHNAJI, ANUP SUBHASH

431-438

[VIEW ABSTRACT](#)[PDF](#)[DOWNLOAD PDF](#)

### CARDIOPROTECTIVE EFFECTS OF ETHANOLIC LEAF EXTRACT OF IPOMOEA BATATAS ON DOXORUBICIN INDUCED CARDIOTOXICITY IN RATS

BALAKRISHNA SOMASHEKAR, SHIVA SHANKER RAI, SHIVALINGE GOWDA KP

444-450

[VIEW ABSTRACT](#)[PDF](#)[DOWNLOAD PDF](#)

### PHYTOCHEMICAL SCREENING AND ANALGESIC, ANTI-BACTERIAL AND CYTOTOXIC ACTIVITY EVALUATION OF ETHANOL EXTRACT OF PITHCELLOBIUM DULCE ( ROXB.) BENTH LEAF

MOHAMMED HARUN UR RASHID, SUJIT BISWAS, MOHAMMED ABDULLAH-AL-MAMUN, AMDADUL HUQUE, JAMILUR RAHMAN BHUIYAN

451-457

[VIEW ABSTRACT](#)[PDF](#)[DOWNLOAD PDF](#)

### POTENTIAL SOURCE OF FRESH AND PHOTOACTIVATED GOMUTRA FOR STUDY OF ANTIOXIDANT AND ANTIPATHOGENIC ACTIVITIES AGAINST VARIOUS PATHOGENS

LAKSHMI PRABA.S, GNANASARASWATHI. M, RAJADURAI JESUDOSS.R.P, RAMYA. N, NANDHINI DEVI. S

459-462

[VIEW ABSTRACT](#)[PDF](#)[DOWNLOAD PDF](#)

### MOLECULAR DOCKING STUDIES ON EGF “ 5 FLUOROURACIL

KANAGATHARA.N, K.KAVITHA

463-465

[VIEW ABSTRACT](#)[PDF](#)[DOWNLOAD PDF](#)

### DEVELOPMENT OF AQUEOUS POLYMERIC DISPERSION (APD) OF EUDRAGIT E PO- PERFORMANCE CHARACTERIZATION FOR AQUEOUS BASED TASTE MASKING COATING SYSTEM

MEHTA NAVEEN

466-470



Online ISSN: 2455-3891

Print ISSN: 0974-2441

ICV 2021: 100.00



Embase®

It's Embase, Not Expanded Embase, [Learn in 1 Min](#)

Peer Review



Plagiarism Check



Embase

Open Journal Systems

KEYWORDS

Silver nanoparticles

Antioxidants  
Obesity  
Hypertension  
Docking  
Validation  
Antimicrobial  
Flavonoids  
Cytotoxicity  
Diabetes  
Antioxidant  
Anticancer  
Diabetes mellitus  
Phytochemicals  
Antibacterial  
Antifungal  
Lipid profile  
Knowledge

Our Journals || Open Access Policy || Publication & Peer Review Policy || Publication Ethics

The publication is licensed under a [Creative Commons License](#) (CC BY). [View Legal Code](#)

Copyright © 2021 All Rights Reserved, [Innovare Academic Sciences](#) | Powered By [CyberDairy](#)

## CYTOTOXIC ACTIVITY OF *ANREDERA CORDIFOLIA* LEAF EXTRACT ON HELA CERVICAL CANCER CELLS THROUGH p53-INDEPENDENT PATHWAY

SRI HARTATI YULIANI<sup>1</sup>, CLARA DEWI ANGGRAENI<sup>2</sup>, WINDA SEKARJATI<sup>2</sup>, ANDUNG PANJALU<sup>2</sup>,  
ENADE PERDANA ISTYASTONO<sup>2</sup>, AGUSTINA SETIAWATI<sup>2\*</sup>

<sup>1</sup>Division of Pharmaceutics and Pharmaceutical Technology, Department of Pharmaceutical Sciences, Faculty of Pharmacy, Sanata Dharma University, Yogyakarta 55281, Indonesia. <sup>2</sup>Division of Drug Design and Discovery, Department of Pharmaceutical Sciences, Faculty of Pharmacy, Sanata Dharma University, Yogyakarta 55281, Indonesia. Email: nina@usd.ac.id

Received: 28 January 2015, Revised and Accepted: 07 February 2015

### ABSTRACT

**Objective:** This study investigated cytotoxic activity and apoptosis induction of *Anredera cordifolia* leaf extract on cervical cancer cells.

**Methods:** *A. cordifolia* leaf extract was prepared by maceration using 70% ethanol. This study used HeLa cells, a model of stress inducing-p53 cervical cancer cells. Cytotoxic study on HeLa cells was designed by 3-[4,5-dimethylthiazol-2-yl]-2,5 diphenyltetrazolium bromide (MTT) test, further apoptotic induction assay was determined by annexin V-FITC method. Molecular mechanism of the extract on HeLa was assayed by p53 immunocytochemistry. The MTT data were analyzed using linear regression to get IC<sub>50</sub> then apoptosis was conducted by ModFit LT and immunocytochemistry data were qualitatively analyzed.

**Results:** *A. cordifolia* leaf extract showed cytotoxic activity and promoted apoptosis in HeLa cells with IC<sub>50</sub> value 75 µg/mL. The extract did not increase level expression of p53 in cells.

**Conclusion:** Cytotoxic activity of *A. cordifolia* leaf extract on HeLa cells was through a p53-independent pathway.

**Keywords:** *Anredera cordifolia*, Apoptosis, Cervical cancer, p53.

### INTRODUCTION

Recently, world cancer statistics showed that the incidence of breast and cervical cancer are globally on the rise [1]. Cervical cancer was the second highest diagnosed and the third leading cause of cancer death in females in ASEAN countries. It accounted for 11% of total new cancer cases and 9% the total cancer deaths among female in 2008 respectively [2]. Since cervical cancer also the most leading cause of female death in Indonesia [3], research focus on cervical cancer is an interesting topic.

Cervical cancer is transmitted by sexual intercourse that leads to human papillomavirus (HPV) infection. Oncogenic DNA is found in 95% of invasive HPV caused cervical cancers [4]. Previous studies showed that the E6 oncogenic protein from HPV form a complex with p53, a tumor suppressor gene and, as a result, targets it for rapid proteasome degradation [5,6]. Restoration of p53 function in cervical cancer is proposed to promote a selective therapeutic effect [6]. Moreover, reactivation of p53 is one of the key points in selective anticancer screening against this type of cancer.

Discovering selective anticancer agent against cervical cancer from plants is very challenging. Many compounds previously extracted from plant (vinblastine, vincristine, taxol) have excellent activity against several cancer cells. Molecular targeting approaches were applied to get selective activity against cervical cancer. *Anredera cordifolia* is a promising source of anticancer agent since its leaf contains good antioxidant compound; 8-glucopyranosil 1-4',5,7 trihydroxyflavone with an IC<sub>50</sub> of 68.07 µg/mL [7]. The antioxidant activity of *A. cordifolia* is potential to inhibit cervical cancer cells since oxidative stress is one of inducing cervix carcinogenesis. However, antioxidant and cytotoxic activity of an extract is not always has a positive correlation in cervical cancer [8]. Another study performed that *A. cordifolia* leaf had good activity against colon cancer cells HT-29 and breast cancer cells MDA-MB231 [9]. Meanwhile, cytotoxic activity of *A. cordifolia* on cervical cancer cells remained unclear.

This study investigated cytotoxic activity and apoptosis induction by *A. cordifolia* leaf ethanol extract (ALE) on cervical cancer cells. Furthermore, the contribution of p53 reactivation in the molecular pathway of apoptosis was deeply observed through p53-expression levels in HeLa cells. This research was performed using HeLa cells, an *in vitro* model of cervical cancer that could express p53 under genetic stress condition.

### MATERIALS AND METHODS

#### Materials

*A. cordifolia* leaf was cultivated and harvested from Wirobrajan, Yogyakarta. Dried *A. cordifolia* leaf was extracted using 70% ethanol (Merck) in the Phytochemistry Laboratory of Sanata Dharma University then the solvent was evaporated using a rotary evaporator and a dry extract was obtained by freeze drying. A HeLa cervical cancer cell line was derived in the Parasitology Laboratory, of the Faculty of Medicine, Universitas Gadjah Mada, Yogyakarta, Indonesia. It was cultured in Dulbecco's Modified Eagle Media (DMEM) (Gibco) containing fetal bovine serum 10% (v/v) (Gibco) and penicillin-streptomycin 1% (v/v) (Gibco). Cytotoxic assay used 3-[4,5-dimethylthiazol-2-yl]-2,5 diphenyltetrazolium bromide (MTT) (Sigma) while the apoptosis kit used was Annexin V from Roche. Immunocytochemistry used p53 primary antibody purchased from Novus Bio NB 200-103 while the universal secondary antibody was derived from Starr Trek Universal HRP Detection System No.901-STUHRP700-090314. All culture plates used in this study were Iwaki and all tips were supplied by Biologix.

#### Methods

##### MTT cytotoxic assay

HeLa cells were seeded until confluent, then  $5 \times 10^3$  cells plated into a 96-well microplate and incubated at 37°C and under 5% CO<sub>2</sub> for 24 hrs. The medium was removed and rinsed by phosphate-buffered saline (PBS) 10%. ALE and cisplatin were dissolved in dimethyl sulfoxide as stock.



The various concentrations of ALE in the medium were poured into 96-well plate at 100  $\mu$ L each and incubated for 24 hrs. Each concentration was assayed in triplicates (n=3). The medium culture was removed and rinsed by PBS 10%, then 100  $\mu$ L medium containing 5 mg/mL MTT was added into each well and incubated for 4 hrs. Further, the medium was removed and 100  $\mu$ L SDS was added to each well to dissolve Formazan crystals. The 96-well microplate was incubated for 24 hrs in a dark room, avoid contact from light. Formazan crystals were measured by ELISA reader at a wavelength of 595 nm.

#### Apoptosis assay

HeLa was seeded  $5 \times 10^5$ /100  $\mu$ L into coverslips in a 6-well plate, then acclimated at 37°C and under 5% CO<sub>2</sub> for 24 hrs. Then, the medium was removed, and the culture was rinsed twice by PBS. The IC<sub>50</sub> concentration of ALE in DMEM was added into the well plate and incubated for 24 hrs. At the end of incubation time, cells were detached by 2000 rpm centrifugation, and then it was washed twice with cold PBS. The cells were suspended in 500  $\mu$ L of Annexin V buffer, and Annexin V and propidium iodide were added for 10 minutes at 37°C. Finally, the cells were subjected to FACS flow cytometry. Bivariant analysis of FITC-fluorescence (FL-1) and PI-fluorescence (FL-3) gave information on the designed cells population where RI quadrant showed viable cells, RII showed early apoptotic cells, RIII showed late apoptosis cells and RIV showed necrotic cells.

#### Immunocyto staining of p53

HeLa cells in DMEM were seeded  $10^5$ /100  $\mu$ L on a 6-well plate and incubated under 5% CO<sub>2</sub> for 24 hrs. Cells were treated with ALE at IC<sub>50</sub> concentration and incubated for 24 hrs. After incubation, the cells were collected and washed in PBS. They were resuspended in DMEM and placed in object glass. Later, they were fixed for 5 minutes and incubated in H<sub>2</sub>O<sub>2</sub> for 10-15 minutes and then washed again using PBS. Monoclonal antibodies of p53 were added to the cells and incubated at least for an hour and washed three times using PBS. Secondary antibodies of biotinylated goat anti-polyvalent were dropped to the cells and incubated in room temperature for 10 minutes and washed four times in PBS. DAB as chromogen was dropped into the cells and incubated for 3-8 minutes, then washed using distilled water. Finally, hematoxylin solution was added and incubated for 3-4 minutes. These slides were dried and observed under a light microscope. Expression of p53 was indicated by brown cell color.

#### Analysis

The cytotoxic data of ALE were plotted and analyzed by excel then IC<sub>50</sub> was linear regression using Excel MS Office 2010. Immunocyto staining data of p53 were visual qualitatively analyzed by observing p53 expressing cells that showed brown color.

### RESULTS AND DISCUSSION

Cytotoxic activity of ALE against cervical cancer has not yet been evaluated. In this study, cisplatin was used as positive control since it has been widely recommended to women with cervical cancer, especially combined with radiotherapy [10,11]. The drug strongly cross-links DNA, form intra- and inter-strand adducts that poorly repaired [12]. Even though cisplatin is an effective anticancer drug, it can cause severe side effect to many tissues namely that of peripheral nerves, renal tubules, the gastrointestinal tract, and bone marrow [13].

The MTT method demonstrated that ALE is a potential anticancer agent against cervical cancer cells with IC<sub>50</sub> 75  $\mu$ g/mL ( $R^2=0.9759$ ) as shown in Fig. 1. Due to compounds complexity in ALE, cytotoxic activity of ALE was weaker than that of cisplatin, as pure compound with IC<sub>50</sub> 40  $\mu$ M or equal to 12  $\mu$ g/mL ( $R^2=0.9908$ ) (Fig. 2). But, both of ALE and cisplatin reduced HeLa cells viability in a dose-dependent manner and also manipulated the morphology of HeLa cells (Fig. 3). Cytotoxic activity of both of ALE and cisplatin could be related with a molecular mechanism induced apoptosis.

Apoptosis assay was determined using Annexin V that is able to bind phosphatidylserine residue in outer plasma membrane as the

consequences of the apoptosis process. Annexin V specifically bound to this phospholipid that translocate in the surface membrane in the early stage of apoptosis stage [14]. Figs. 4 and 5 show ALE-induced apoptosis (9.44%) compared to untreated HeLa cells (2.31%) and cisplatin (6.23%). ALE triggered apoptosis better than cisplatin against HeLa cells, but the involvement of the molecular mechanism of apoptosis was still questionable. Jordan and Fonseca reported that

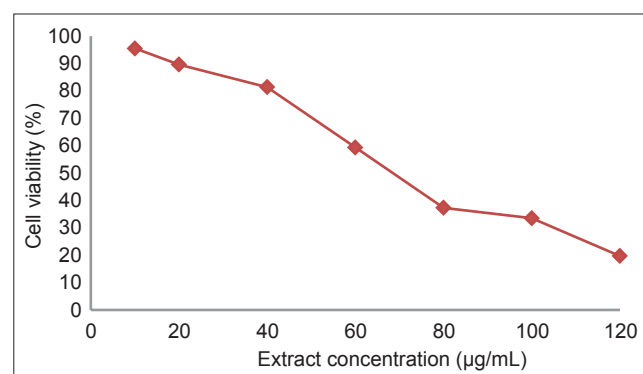


Fig. 1: Effect of *Anredera cordifolia* leaf ethanol extract on HeLa viability after 24 hrs incubation

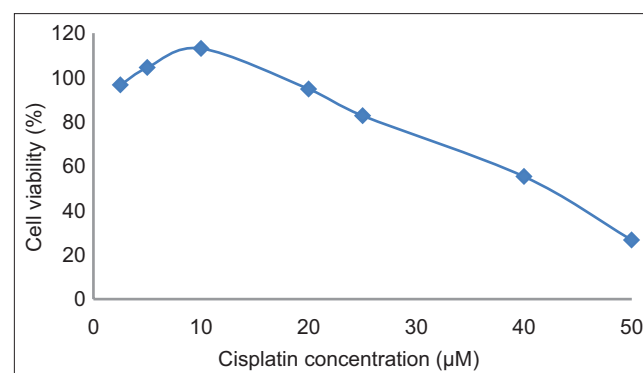


Fig. 2: Effect of cisplatin on HeLa viability after 24 hour incubation.

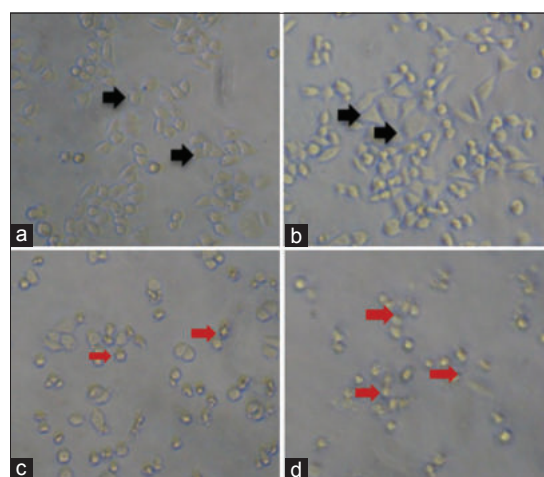


Fig. 3: Effect of *Anredera cordifolia* leaf ethanol extract (ALE) and cisplatin on HeLa cells morphology after 24 hrs incubation (a) Untreated cells (b) 40  $\mu$ g/mL, (c) 80  $\mu$ g/mL ALE treated cells, (d) 40  $\mu$ M cisplatin treated cells  $\blacktriangleright$  Living cells  $\blacktriangleright$  Death cells



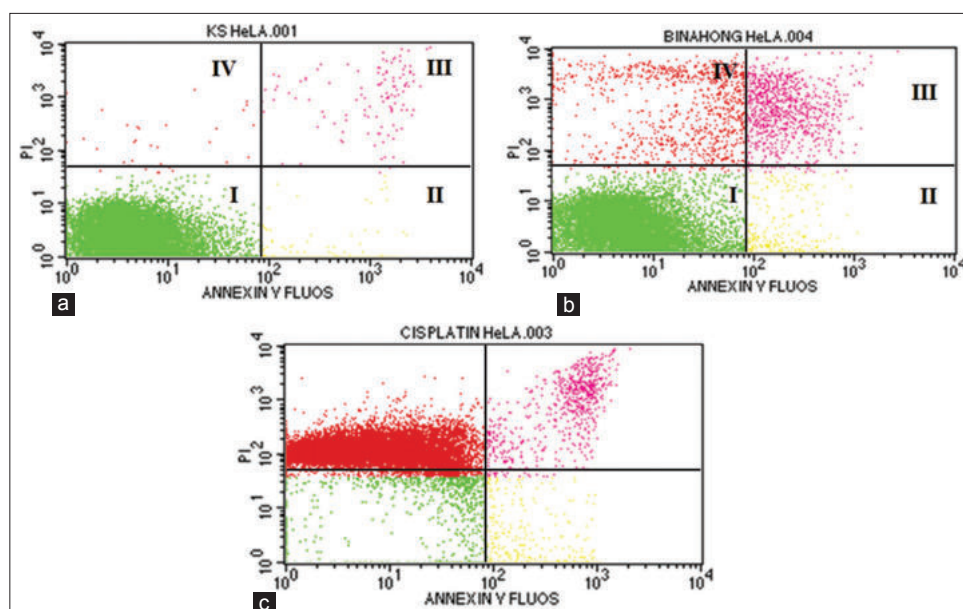


Fig. 4: Apoptotic cells observed using the annexin V/PI method. (a) Untreated cells, (b) 75 µg/mL *Anredera cordifolia* leaf ethanol extract-treated cells, (C) 40 µM cisplatin-treated cells. RI: Living cells, RII: Early apoptotic cells, RIII: Late apoptotic cells, RIV: Necrotic cells

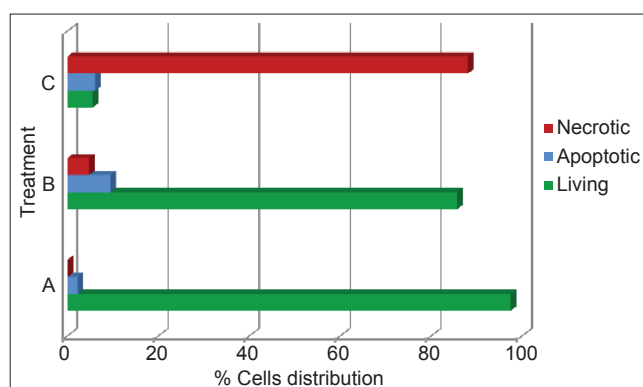


Fig. 5: Cell distribution in apoptosis assay using the annexin V/PI method, (A) Untreated cells, (B) 75 mg/mL *Anredera cordifolia* leaf ethanol extract-treated cells, (C) 40 µM cisplatin-treated cells

p53 and p73-related p53 protein were responsible in the apoptosis process of cisplatin in cervical cancer treatment [12]. Thus, p53 protein is interesting tumor suppressor gene to observe in relation to ALE cytotoxicity and apoptosis pathway.

Cervical cancer cells infected by an oncogenic virus are able to degrade tumor suppressor genes, like p53 by ubiquitination [5,6]. Since the restoration of p53 function promotes a selective therapeutic effect [6], this study focused on p53 role in apoptosis induction pathway of ALE against HeLa cells. ALE-treatment did not increase protein p53 expression in these cells (Fig. 6) compared to untreated cells. On the other hand, cisplatin treatment showed a slight increase in p53 expression. Cytotoxic activity of ALE was not related with p53 restoration in HeLa cells. The molecular mechanism of ALE anticancer activity was p53-independent pathway. Further, study on other proteins involved in the molecular mechanism of anticancer activity must be conducted.

## CONCLUSION

This research concludes that *A. cordifolia* leaf extract is promising anticancer agent against HeLa cervical cancer cells with an  $IC_{50}$  value of 75 µg/mL. It definitely triggered apoptosis on HeLa cells through

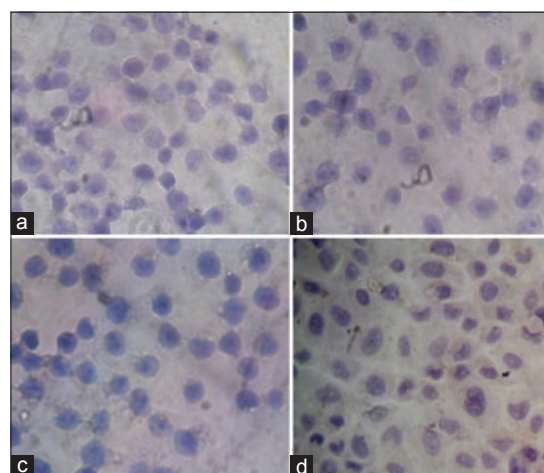


Fig. 6: Effect of *Anredera cordifolia* leaf ethanol extract (ALE) on p53 expression of HeLa cells after 24 hrs incubation (a) Untreated cells with antibody, (b) Untreated cells without antibody, (c) 75 µg/mL ALE, (d) 40 µM cisplatin-treated cells

p-53 independent pathway. Other regulating proteins involved in this molecular mechanism must be investigated.

## ACKNOWLEDGMENT

This work was financially supported by Institute for Research and Public Affairs, Sanata Dharma University (Internal Research Grant No 081/Pen Dosen Muda/LPPM USD/VI/2014).

## REFERENCES

1. World Health Organization. International Agency for Research on Anticancer: Global: Latest World Statistics. Press Release. December 12, 2013.
2. Kimman M, Norman R, Jan S, Kingston D, Woodward M. The burden of cancer in member countries of the Association of Southeast Asian Nations (ASEAN). *Asian Pac J Cancer Prev* 2012;13(2):411-20.
3. Idamardi. Breast Cancer. Jakarta: Indonesian Cancer Foundation; 2007.
4. Ibeanu OA. Molecular pathogenesis of cervical cancer. *Cancer Biol Ther* 2011;11(3):295-306.

5. Thomas M, Pim D, Banks L. The role of the E6-p53 interaction in the molecular pathogenesis of HPV. *Oncogene* 1999;18(53):7690-700.
6. Hietanen S, Lain S, Krausz E, Blattner C, Lane DP. Activation of p53 in cervical carcinoma cells by small molecules. *Proc Natl Acad Sci U S A* 2000;97(15):8501-6.
7. Djamil R, Wahyudi PS, Wahono S, Hanafi M. Antioxidant activity of flavonoid *Anredera cordifolia* (Ten) steenis leaves. *Int Res J Pharm* 2012;3(9):241-3.
8. Sathis M, Niraimathi V, Noorulla KM, Palanimuthu A. *In vitro* antioxidant and cytotoxic activity of isolated compounds in roots of *Clerodendrum phlomidis* Linn. *Asian J Pharm Clin Res* 2015;8(1):196-201.
9. Uddin SJ. Cytotoxic Screening of Bangladeshi Medicinal Plant and Structural Elucidation of Novel Anticancer Compound. PhD Thesis. Queensland : Griffith University; 2010.
10. Rose PG, Bundy BN, Watkins EB, Thigpen JT, Deppe G, Maiman MA, et al. Concurrent cisplatin-based radiotherapy and chemotherapy for locally advanced cervical cancer. *N Engl J Med* 1999;340(15):1144-53.
11. Hong JH. Concurrent chemotherapy for cervical cancer patients primarily treated with radiotherapy: Is it necessary for all? *Chang Gung Med J* 2006;29(6):550-4.
12. Jordan P, Carmo-Fonseca M. Molecular mechanisms involved in cisplatin cytotoxicity. *Cell Mol Life Sci* 2000;57(8-9):1229-35.
13. Bouliskas T. Molecular mechanisms of cisplatin and its liposomally encapsulated form, Lipoplatin™ Lipoplatin™ as a chemotherapy and antiangiogenesis drug. *Cancer Ther* 2007;5:349-76.
14. van Engeland M, Nieland LJ, Ramaekers FC, Schutte B, Reutelingsperger CP. Annexin V-affinity assay: A review on an apoptosis detection system based on phosphatidylserine exposure. *Cytometry* 1998;31(1):1-9.