Number of MoUs, collaborations/linkages during the A.Y. 2018-19

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PRINCIPAL
VIGNAN INSTITUTE OF PHARMACEUTICAL TECHNOLOGY
Beside: VSEZ, Duvvada, Visakhapatnam-46

Memorandum of Understanding

Vignan Institute of Pharmaceutical Technology (VIPT),
Beside VSEZ, Kapujaggarajupeta, Duvvada,Gajuwaka,
Visakhapatnam, Andhra Pradesh 530046

And

BHAN PHARMAINFO PVT. LTD
12-7-133/G/2, Anjaneya Nagar, Moosapet, Hyderabad, Telangana-500018

This Memorandum of Understanding (hereinafter called as the 'MoU') is entered into on this the 15th day of May 2019, by and between:

Vignan Insitute of Pharmaceutical Technology, Duvvada the First Party represented herein by its Principal / Director / Head of Institution **VIPT**

And

Bhan Pharmainfo Pvt. Ltd, 12-7-133/g/2, anjaneya nagar, moosapet, Hyderabad, Telangana-500018, The second party, and represented herein by its Dr.K. Bhanu Praad (Managing Director), 12-7-133/G/2, Anjaneya Nagar, Moosapet, Hyderabad, Telangana-500018

WHEREAS:

A) First Party is a Higher Educational Institution named VIPT

B) First Party & Second Party believe that collaboration and co-operation between themselves will promote more effective use of each of their resources, and provide each of them with enhanced opportunities.

C) The Parties intent to cooperate and focus their efforts on cooperation within area of Skill Based Training, Education, Placement, Industrial Visit, Expert Lecture.

NOW THEREFORE, IN CONSIDERATION OF THE MUTUAL PROMISES SET FORTH IN THIS MOU, THE PARTIES HERETO AGREE AS FOLLOWS:

VIGNAN INSTITUTE OF PHARMACEUTICAL TECHNOLOGY * VADLAPUDI, VSP-49 *

PRINCIPAL
VIGNAN INSTITUTE OF
PHARMACEUTICAL TECHNOLOGY
Beside: VSEZ, Duvvada, Visakhapatnam-49

CLAUSE 1: CO-OPERATION

1.1 Both Parties are united by common interests and objectives, and they shall establish co-operation.

1.2 First Party and Second Party co-operation will facilitate effective utilization of the intellectual capabilities.

1.3 The parties shall co-operate with each other and shall as promptly as is responsibly practical, relevant agreement.

CLAUSE 2: SCOPE OF THE MoU

2.1 Industrial Training & Visits

Industry and Institution interaction will provide an insight into the latest developments / requirements of the industries; the Second Party to permit the Faculty and Students of the First Party to visit its group companies and also involve in Industrial Training Programs for the First Party. This will provide confidence & smooth transition for students work. Also the Second party may register on the AICTE/PCI Internship Portal for the benefit of students.

2.2 Guest Lectures

Second Party to extend the necessary support to deliver guest lecturers to the students of the First Party on the technology trends and in house requirements.

2.3 Placement of trained students

Second party will actively engage to help the delivery of the training and placement of the students of the first party on the technology trends and in house requirements.

2.4 There is no financial commitment on the part of the **Vignan Institute of Pharmaceutical Technology** the first party to take up any program

PRINCIPAL
VIGNAN INSTITUTE OF
PHARMACEUTICAL TECHNOLOGY
Beside: VSEZ, Duvvada, Visakhapatnam-49

VIGNAN INSTITUTE OF PHARMACEUTICAL TECHNOLOGY
VADLAPUDI, VSP-49

2.5 mention in MoU. If there is any financial consideration, it will be dealt separately.

2.6 Both Parties to obtain all internal approvals, consents, permissions, and licenses of whatsoever nature required.

CLAUSE 3: VALIDITY

3.1 This Agreement will be valid a period of 7 Years from the above mentioned date it is expressly terminated by either Party on mutually agreed terms.

CLAUSE 4: RELATIONSHIP BETWEEN THE PARTIES

4.1 It is expressly agreed that First Party and Second Party are acting under this MOU as independent contractors, and the relationship established under this MOU shall not be construed as a partnership.

First Party

Signature-1 Y. Srinivasa Rao

Name: DR. Y. SRINIVASA RAO

Date 15.05.2019

Second Party

For BHAN PHARMAINFO PVT. LTD.

Signature-1

Name: Dr. K. Bhanu prasad.

Date: 15.05.2019

12-7-133/G/2, Sri Siva Sai Enclave, Anjaneya Nagar, Behind Kukatpally Municipal Office,
Moosapet, Hyderabad - 500 018,Andhra Pradesh, India Tel : 040 - 4003 5597, 98663 99882
email : bhanpharmainfo@gmail.com website : www.bhanpharma.com

Y. Srinivasa Rao

PRINCIPAL
VIGNAN INSTITUTE OF
PHARMACEUTICAL TECHNOLOGY
Beside: VSEZ, Duvvada, Visakhapatnam-49

ACTIMUS BIO

Memorandum of Understanding (MOU)
Between

ACTIMUS BIOSCIENCES Private Limited

and

VIGNAN INSTITUTE OF PHARMACEUTICAL TECHNOLOGY

This Agreement made by this 6th day of May, 2019, between Actimus Biosciences Private Limited located at Siripuram, Visakhapatnam and Vignan Institute of Pharmaceutical Technology, Duvvada, Visakhapatnam.

Objective of the MOU

The objective of this Memorandum of Understanding (MOU) is:

- To promote the interaction between **ACTIMUS BIO** and **VIPT** which is mutually beneficial in the area of research and student training

Proposed Mode of Collaboration

- Sponsoring student projects, Internship and Industrial visits
  Sponsoring R& D projects, this may be carried out wholly or partly at **VIPT** or **ACTIMUS BIO**

Forms of Research and Development Programs

- In their own existing facilities. The performance of research individually by each party or concurrently with both parties in mixed groups at their own facilities.

Agreements for Research Collaboration

- The nature, scope and schedule of the Research collaboration.
- The form of research collaboration.
- The sponsoring of the research fund. .

Signed In Duplicate

- This MOU is executed in duplicate with each copy being an official version of the Agreement
- By signing below, the parties acting by their duly authorized officers have caused this memorandum of understanding to be executed effective as of the day and year first above written. The agreement is valid for a period of two years.

Ramnath Reddy

Mr. A. Ramnath Reddy
Chairman and Managing Director
Actimus Biosciences Pvt Ltd
Varun Towers, 4th Floor,
Siripuram
Visakhapatnam-530003, AP

Y. Srinivasa Rao
06/05/19

Dr. Y. Srinivasa Rao
Principal
Vignan Institute of
Pharmaceutical Technology
Beside VSEZ, Duvvada,
Visakhapatnam-530049, AP

Y. Srinivasa Rao

PRINCIPAL
VIGNAN INSTITUTE OF
PHARMACEUTICAL TECHNOLOGY
Beside VSEZ, Duvvada, Visakhapatnam-49

Memorandum of Understanding (MOU)
Between

LEE PHARMA LIMITED
and
VIGNAN INSTITUTE OF PHARMACEUTICAL TECHNOLOGY

This Agreement made by this 3rd day of May 2019, between Lee Pharma Pharma Limited, Duvvada, Visakhapatnam and Vignan Institute of Pharmaceutical Technology, Duvvada, Visakhapatnam.

Objective of the MOU

The objective of this Memorandum of Understanding (MOU) is:

- To promote the interaction between **Lee Pharma** and **VIPT** which is mutually beneficial in the area of research and student training

Proposed Mode of Collaboration

- Sponsoring student projects, Internship and Industrial visits
  Sponsoring R& D projects, this may be carried out wholly or partly at **VIPT** or **Lee Pharma**

Forms of Research and Development Programs

- In their own existing facilities. The performance of research individually by each party or concurrently with both parties in mixed groups at their own facilities.

Agreements for Research Collaboration

- The nature, scope and schedule of the Research collaboration.
- The form of research collaboration.
- The sponsoring of the research fund.

Signed In Duplicate

- This MOU is executed in duplicate with each copy being an official version of the Agreement
- By signing below, the parties acting by their duly authorized officers have caused this memorandum of understanding to be executed effective as of the day and year first above written. The agreement is valid for a period of two years.

T. Praveen Reddy

Mr.T.Praveen Reddy
Director-Operations
Lee Pharma Limited
Plot No: V, Phase II,
VSEZ, Duvvada,
Visakhapatnam, Andhra Pradesh
530049

Y. Srinivasa Rao 03/05/19

Dr.Y.Srinivasa Rao
Principal
Vignan Institute of
Pharmaceutical Technology
Beside VSEZ, Duvvada,
Visakhapatnam, Andhra Pradesh
530049

Y. Srinivasa Rao
PRINCIPAL
VIGNAN INSTITUTE OF PHARMACEUTICAL TECHNOLOGY
Beside VSEZ, Duvvada, Visakhapatnam-49

JCI Gajuwaka Gems

Memorandum of Understanding (MOU)
Between
JCI Gajuwaka Gems
and
VIGNAN INSTITUTE OF PHARMACEUTICAL TECHNOLOGY

This Agreement made by this 25th February 2019, between, **JCI Gajuwaka Gems (International NGO)** Gajuwaka, Visakhapatnam and **Vignan Institute of Pharmaceutical Technology (VIPT)**, Duvvada, Visakhapatnam..

Objective of the MOU

The objective of this Memorandum of Understanding (MOU) is:

- To provide development opportunities that empowers young people to create positive change.

Proposed Mode of Collaboration

- Training activities will be conducted to the students
- A platform for service based activities is provided for the interested students
- Students will be given platform to exhibit their ideas and mould them as entrepreneurs
- Students can be made a part of Extension Activities
- Student Members will be supported from the Institute
- Students will be trained and encouraged in various skills related to personality development, Extra- Curricular activities, Career Development, etc.

Areas of Opportunities

1. Training 2. Management 3. Group Discussion 4. Business 5. Programmes

Agreements for Collaboration

- Students have to enrol as members of **JCI Gajuwaka Gems by paying annual membership fee** to the National Head Quarters
- Students will be provided **training and other afore mentioned services** from JCI Gajuwaka Gems

Signed in Duplicate

- This MOU is executed in duplicate with each copy being an official version of the Agreement
- By signing below, the parties acting by their duly authorized officers have caused this memorandum of understanding to be executed effective as of the day and year first above written.
- The agreement is valid for a period of two years.

JFM Dr K C A Santhosh Kumari
President - JCI Gajuwaka Gems

Y. Srinivasa Rao
25/02/19
Dr. Y. Srinivasa Rao
Principal-VIPT

Y. Srinivasa Rao
PRINCIPAL
VIGNAN INSTITUTE OF PHARMACEUTICAL TECHNOLOGY
Beside: VSEZ, Duvvada, Visakhapatnam-49

SANTHI BIOTECH

Block B , Sy no 56/ 11 to 14 , Chelavuru-535005,Vizianagaram Andhra Pradesh

Memorandum of Understanding (MOU)
Between

SANTHI BIOTECH

and

VIGNAN INSTITUTE OF PHARMACEUTICAL TECHNOLOGY

This Agreement made by this 19th day of Feb, 2019, between Santhi Biotech, Vizianagaram and Vignan Institute of Pharmaceutical Technology, Duvvada, Visakhapatnam.

Objective of the MOU

The objective of this Memorandum of Understanding (MOU) is:

- To promote the interaction between **Santhi Biotech** and **VIPT** which is mutually beneficial in the area of research and student training

Proposed Mode of Collaboration

- Sponsoring student projects, Internship and Industrial visits
  Sponsoring R& D projects, this may be carried out wholly or partly at **VIPT** or **Santhi Biotech**

Forms of Research and Development Programs

- In their own existing facilities. The performance of research individually by each party or concurrently with both parties in mixed groups at their own facilities.

Agreements for Research Collaboration

- The nature, scope and schedule of the Research collaboration.
- The form of research collaboration.
- The sponsoring of the research fund.

Signed In Duplicate

- This MOU is executed in duplicate with each copy being an official version of the Agreement
- By signing below, the parties acting by their duly authorized officers have caused this memorandum of understanding to be executed effective as of the day and year first above written. The agreement is valid for a period of two years.

G Santhi

Mrs.G.Santhi
Director
Santhi Biotech
Block B, Sy No 56/11 to 14
Cheluvuru
Vizianagaram-535005, AP

SANTHI BIOTECH VIZIANAGARAM, A.P.

Y. Srinivasa Rao 19/02/19

Dr. Y. Srinivasa Rao
Principal
Vignan Institute of
Pharmaceutical Technology
Beside VSEZ, Duvvada,
Visakhapatnam-530049, AP

Y. Srinivasa Rao

PRINCIPAL
VIGNAN INSTITUTE OF
PHARMACEUTICAL TECHNOLOGY
Beside: VSEZ, Duvvada, Visakhapatnam-49

VIGNAN INSTITUTE OF PHARMACEUTICAL TECHNOLOGY * VADLAPUDI, VSP-49 *

Memorandum of Understanding (MOU)
Between

ZAINT HEALTH CARE PRIVATE LIMITED

and

VIGNAN INSTITUTE OF PHARMACEUTICAL TECHNOLOGY

This Agreement made by this 12th day of February, 2019, between Zaint Health Care Private Limited located in Hyderabad and Vignan Institute of Pharmaceutical Technology, Duvvada, Visakhapatnam.

Objective of the MOU

The objective of this Memorandum of Understanding (MOU) is:

- To promote the interaction between **ZAINT Health Care Private Limited** and **VIPT** which is mutually beneficial in the area of research and student training

Proposed Mode of Collaboration

- Sponsoring student projects, Internship and Industrial visits
  Sponsoring R& D projects, this may be carried out wholly or partly at **VIPT** or **ZAINT Health Care Private Limited**

Forms of Research and Development Programs

- In their own existing facilities. The performance of research individually by each party or concurrently with both parties in mixed groups at their own facilities.

Agreements for Research Collaboration

- The nature, scope and schedule of the Research collaboration.
- The form of research collaboration.
- The sponsoring of the research fund.

Signed In Duplicate

- This MOU is executed in duplicate with each copy being an official version of the Agreement
- By signing below, the parties acting by their duly authorized officers have caused this memorandum of understanding to be executed effective as of the day and year first above written. The agreement is valid for a period of one year.

S. M.

Mr. Malyadri Sominenı
Director
Zaint Health Care Private Limited,
Sy No: 228/E/B, Kucharam Village,
Medak District,
Hyderabad-502336, TG

Zaint Health Care Pvt. Ltd. Kucharam

Y. Srinivasa Rao 12/02/19

Dr. Y. Srinivasa Rao
Principal
Vignan Institute of Pharmaceutical Technology
Beside VSEZ, Duvvada,
Visakhapatnam-530049, AP

Y. Srinivasa Rao

PRINCIPAL
VIGNAN INSTITUTE OF PHARMACEUTICAL TECHNOLOGY
Beside: VSEZ, Duvvada, Visakhapatnam-49

HOMI BHABHA CANCER HOSPITAL & RESEARCH CENTRE
A CENTRE FOR TREATMENT, RESEARCH & EDUCATION IN CANCER
A Unit of Tata Cancer Hospital, Mumbai
(A Grants-in-Aid Institution, Department of Atomic Energy, Government of India)

Prof. D. Raghunadharao, MD, DM
Director

Memorandum of Understanding (MOU)
Between

HOMI BHABHA CANCER HOSPITAL AND RESEARCH CENTRE
and
VIGNAN INSTITUTE OF PHARMACEUTICAL TECHNOLOGY

This Agreement made by this 14th September 2018, between, **Homi Bhabha Cancer Hospital and Research Centre (HBCH&RC)**, Aganampudi, Visakhapatnam and **Vignan Institute of Pharmaceutical Technology (VIPT)**, Duvvada, Visakhapatnam.

Objective of the MOU

The objective of this Memorandum of Understanding (MOU) is:

- To promote the interaction between **HBCH&RC** and **VIPT** which is mutually beneficial in the area of research and student training

Proposed Mode of Collaboration

- Sponsoring student projects, Internship and Industrial visits
- Sponsoring R& D projects, this may be carried out wholly or partly at **VIPT** or **HBCH&RC**

Forms of Research and Development Programs

- In their own existing facilities. The performance of research individually by each party or concurrently with both parties in mixed groups at their own facilities.

Agreements for Research Collaboration

- The nature, scope and schedule of the Research collaboration.
- The form of research collaboration.
- The sponsoring of the research fund.

Signed In Duplicate

- This MOU is executed in duplicate with each copy being an official version of the Agreement
- By signing below, the parties acting by their duly authorized officers have caused this memorandum of understanding to be executed effective as of the day and year first above written.
- The agreement is valid for a period of two years.

Prof. D.Raghunadharao
Director
HOMI BHABHA CANCER HOSPITAL
& RESEARCH CENTRE
Aganampudi,
Visakhapatnam,-530053
Andhra Pradesh

Y. Srinivasa Rao
14/09/18

Dr.Y.Srinivasa Rao
Principal
VIGNAN INSTITUTE OF
PHARMACEUTICAL TECHNOLOGY
Beside VSEZ, Duvvada,
Visakhapatnam,-530049
Andhra Pradesh

Y. Srinivasa Rao

PRINCIPAL
VIGNAN INSTITUTE OF
PHARMACEUTICAL TECHNOLOGY
Beside VSEZ, Duvvada, Visakhapatnam-49

(INSTITUTE – INDUSTRY INTERACTION)
MEMORANDUM OF UNDERSTANDING BETWEEN
VIGNAN INSTITUTE OF PHARMACEUTICAL TECHNOLOGY
AND
NATSOL LABORATORIES PRIVATE LIMITED
FOR COLLOBORATION OF ACADEMIC INTERACTION

In accordance with the Mutual Desire to promote cooperation between Vignan institute of Pharmaceutical Technology and Natsol laboratories Private Limited. Visakhapatnam. both the Institute and Industry enter into this formal statement of collaboration in the form of Memorandum of Understanding (MOU) for the purpose of Academic interaction.

Both the institutions have found it mutually beneficial to explore cooperative activities for the following purposes:

1. Collaboration in Research activities between Industry and Institute

2. Exchange of visits between Natsol Laboratories Private Limited. Visakhapatnam Students/Professionals/Faculty Members of the Institute to their counter part and place.

3. Organization of Joint Seminars/Training Programs/Meetings.

4. Extra Mutual Research Facility to the Scientists and Technical people working in the Natsol Laboratories Private Limited. Visakhapatnam.

It is understood that the details of joint activities /conditions for utilization of results achieved, arrangements for specific visits, exchange and all other form of cooperation will be handled on mutually agreeable terms for each specific case.

G.V. Subbaraju, Ph.D., FACN
Managing Director
Natsol Laboratories Private Limited
II Floor, Ramky Commercial Hub, J.N. Pharma City
Parwada, Visakhapatnam-531019

Date : Sep. 7, 2018

Dr. Y. Srinivasa Rao
Principal
Vignan Institute of
Pharmaceutical Technology
Beside VSEZ, Duvvada
Visakhapatnam-530046

Date :

PRINCIPAL
VIGNAN INSTITUTE OF
PHARMACEUTICAL TECHNOLOGY
Beside: VSEZ, Duvvada, Visakhapatnam-49

COSTARICA PHARMACEUTICALS
One stop for quality
Plot No:171/C, Western Hills, Addagutta Society, Near Vijetha Degree College, Opp.JNTU,
Kukatpally,Hyderabad TG 500072 www.costaricapharma.com info@costaricapharma.com

Memorandum of Understanding (MOU)
Between

COSTARICA PHARMACEUTICALS
and
VIGNAN INSTITUTE OF PHARMACEUTICAL TECHNOLOGY

This Agreement made by this 1st day of September, 2018, between Costarica Pharmaceuticals located in Hyderabad and Vignan Institute of Pharmaceutical Technology, Duvvada, Visakhapatnam.

Objective of the MOU

The objective of this Memorandum of Understanding (MOU) is:

- To promote the interaction between **COSTARICA PHARMACEUTICALS** and **VIPT** which is mutually beneficial in the area of research and student training

Proposed Mode of Collaboration

- Sponsoring student projects, Internship and Industrial visits
  Sponsoring R& D projects, this may be carried out wholly or partly at **VIPT** or **COSTARICA**

Forms of Research and Development Programs

- In their own existing facilities. The performance of research individually by each party or concurrently with both parties in mixed groups at their own facilities.

Agreements for Research Collaboration

- The nature, scope and schedule of the Research collaboration.
- The form of research collaboration.
- The sponsoring of the research fund.

Signed In Duplicate

- This MOU is executed in duplicate with each copy being an official version of the Agreement
- By signing below, the parties acting by their duly authorized officers have caused this memorandum of understanding to be executed effective as of the day and year first above written. The agreement is valid for a period of two years.

A. Venkata Ramesh

Mr. A. Venkata Ramesh
Proprietor
Costarica Pharmaceuticals,
Plot No: 171/C, Opp. JNTU,
Kukatpally
Hyderabad-500072, Telangana

Y. Srinivasa Rao
01/09/18

Dr. Y. Srinivasa Rao
Principal
Vignan Institute of
Pharmaceutical Technology
Beside VSEZ, Duvvada,
Visakhapatnam-530049, AP

Y. Srinivasa Rao
PRINCIPAL
VIGNAN INSTITUTE OF
PHARMACEUTICAL TECHNOLOGY
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Research Article

SCREENING OF IN VITRO ANTIOXIDANT ACTIVITY OF SELECTED FRUIT PEELS: A COMPARATIVE STUDY

Gana Manjusha K. [1]*, Dr. Ganga Rao B. [2]

[1] Vignan Institute of Pharmaceutical Technology, Andhra Pradesh, INDIA.
[2] University College of Pharmaceutical Sciences, Andhra University, Andhra Pradesh, INDIA.

Received on: 10-10-2018; Revised and Accepted on: 25-10-2018

ABSTRACT

The present was planned to evaluate the in vitro antioxidant activity of selected peel powers such as Annona sqaumosa, Actinidia deliciosa, Cucumis melo and Mallus pumila using different in vitro assays including the scavenging activities of hydroxyl radical, hydrogen peroxide, Nitric oxide and DPPH radical scavenging activities. The antioxidant activity of peels was compared with standard antioxidant rutin. The comparative study resulted that the Mallus pumila showed better antioxidant activity against the hydroxyl radical, hydrogen peroxide, Nitric oxide and DPPH radicals. The antioxidant activity of selected peels is due to its rich source of anthocyanins, carotenoids, tannins, flavanoids and phenols of fruit peels.

KEYWORDS: *Fruit peels, Antioxidants and Rutin.*

INTRODUCTION

Herbs are the source of treatment options of various ailments uncured by the existed therapies for the sake of mankind. Thousands of plant species are available throughout the world with phytoconstituents, which are the reasons of medicinal property [1]. Synthetic and natural antioxidants are available. Now a day interest is going in the identification of new herbal antioxidants as substitutes to the synthetic antioxidants, in order to avoid the un towards effects. Among the natural ones, the fruits and vegetables occupied because of high levels of antioxidant or secondary metabolites. Epidemiological studies have indicated that frequent consumption of natural antioxidants is associated with a lower risk of oxidative stress, which is the major cause of many dysfunctions. In general terms, oxidative stress is caused by the excessive generation of free radicals.

Free radicals are capable to reacts more fast might be due its nature of containing one or more unpaired electrons acts by donating or extracting the other molecules of carbohydrates, proteins, lipids and nucleic acids etc [2] Hence, free radicals are termed as reactive oxygen species (ROS). ROS are various forms of activated oxygen, which include free radicals such as superoxide anion radicals (.O2-) and hydroxyl radicals (OH·), as well as non free radicals (H_2O_2) and singlet oxygen [3]. The oxidation process that occur under the influence of atmospheric oxygen or reactive oxygen species can be delayed or inhibited by compounds called "Antioxidants". Nutritonal supplements and pharmaceutical products containing antioxidant active principles can satisfy the need of exogenous antioxidants. Amongst the most important exogenous antioxidants, vitamin E, vitamin C, β-carotene, vitamin E, flavonoids, mineral Se are well Exogenous antioxidants can derive from natural sources (vitamins, flavonoids, anthocyanins, some mineral compounds), but can also be synthetic compounds, like butylhydroxy anisole, butylhydroxytoluene, gallates, etc [4].

***Corresponding author:**
Gana Manjusha K.
Vignan Institute of Pharmaceutical Technology, Andhra Pradesh, INDIA.
** E-Mail: manjusha.kondepudi@gmail.com*

DOI:

Among the selected plants parts, the fruit peels were also showed presence of phytoconstituents which might show the beneficial effects such as suger, protein, lipids, tannins, glycosides, vitamins and some trace elements. These peels are also contains notable amount of chlorophyll, carotene and anthocyanins. Hence, fruit peel has great potential for development due to its significant action over many health problems. Therefore it is to required extraction of its functional and medicinal components, in order to increase its potential values [5]. Research and development of fruit peel is still in the initial stage and need to develop new component from fruit as nutrition and in treatment major ailments. Hence the present study was planned to work on the peels of *Annona sqaumosa*, *Actinidia deliciosa*, *Cucumis melo* and *Mallus pumila*.

MATERIALS AND METHODS

Plant materials and preparation:

The ripened custard apple, kiwi, musk melon and apple were obtained from local market. The peels were manually separated and shade dried. The peels were grounded and passed through 40 mesh size. The moisture content of peel powder was found to be 12%. The powder was suspended in 2% gum acacia and used in the *in vitro* studies.

Hydroxyl radical scavenging activity:

Scavenging activity of hydroxyl radical was measured by the method of Halliwell et al., 1989.[6] Hydroxyl radicals were generated by a Fenton reaction (Fe3+-ascorbate-EDTA-H_2O_2 system), and the scavenging capacity of the extract and standard towards the hydroxyl radicals was measured by using deoxyribose degradation method. The reaction mixture contained 2-deoxy-2-ribose (2.8 mM), phosphate buffer (0.1 mM, pH 7.4), ferric chloride (20 µM), EDTA (ethylene diamine tetra acetic acid) (100 µM), hydrogen peroxide (500 µM), ascorbic acid (100 µM) and different concentrations of the test sample and the final volume is 1 ml. The reaction mixture was then incubated for 1 hour at 37 °C. After the incubation an aliquot of the reaction mixture (0.8 ml) was added to 2.8% TCA (trichloro acetic acid) solution (1.5 ml), followed by TBA (thiobarbituric acid) solution (1 ml of 1% in 50 mM sodium hydroxide) and sodium dodecyl sulphate (0.2ml). Then the mixture was heated for colour development. The mixture is then cooled and the absorbance was measured at 532nm against an appropriate blank solution. All experiments were performed in triplicates. The percentage of inhibition was expressing as

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RESEARCH ARTICLE

Assessment of Ototoxicity and Nephrotoxicity in patients receiving weekly Cisplatin Chemotherapy: A Prospective Observational Study

Vinodkumar Mugada[1]*, Jyothipriya Hanumanthu[2], Juhi Shagufa[2], Sosamma Iype[2], Sowmya Yerlapati[2]

[1]Department of Pharmacy Practice, Vignan Institute of Pharmaceutical Technology, Duvvada, AP, India
[2]Department of Pharmacy Practice, Aditya Pharmacy College, Surampalem, AP, India
*Corresponding Author E-mail: **vinod59mugada@gmail.com**

ABSTRACT:

The aim of the study was to assess the ototoxicity and nephrotoxicity in cancer patients receiving weekly cisplatin therapy. This prospective cross-sectional study was carried out in chemotherapy ward, department of radiotherapy, for the duration of six months. This was designed to implement a mixed methods approach. Patient's baseline Serum Creatinine and Blood Urea Nitrogen values and hearing assessment were noted down from the laboratory data. The patient was followed for three successive chemotherapy schedules. Association between cisplatin and nephrotoxicity was calculated using the Friedman Test. Association between cisplatin and ototoxicity was calculated using Fishers Exact test. Correlation between baseline renal function assessing parameters and other successive chemotherapies was done using Spearman's Rho test. The level of significance was considered at $p<0.05$. The mean dose of weekly cisplatin in patients evaluated for nephrotoxicity was 55.74 mg/ sq.m. Statistically, a significant association was found between nephrotoxicity (serum creatinine, $p=0.013$; blood urea nitrogen, $p=0.037$) and weekly cisplatin therapy at different times of chemotherapy i.e. at baseline, after chemotherapy 1, chemotherapy 2 and chemotherapy 3. Statistically, significant association was found between the correlation of serum Creatinine with baseline and different times of chemotherapy (Baseline and CT1, $p=0.0001$; Baseline and CT2, $p=0.000001$; Baseline and CT3, $p<0.000001$). The mean dose of cisplatin in patients evaluated for ototoxicity was 55mg/sq.m. There was no statistically significant association between weekly cisplatin dose and ototoxicity (right ear, $p=0.302$; left ear, $p=0.387$; both ears, $p=0.325$) in our study. The ototoxicity of cisplatin has to be assessed in a large number of patients.

KEYWORDS: Cisplatin, nephrotoxicity, ototoxicity, chemotherapy, cancer

INTRODUCTION:

One of the principal aims of anticancer drug development is to improve efficacy and reduce toxicity through greater tumor specificity[1]. The use of platinum drugs has contributed to increases in the long-term survival of cancer. Unfortunately, platinum agents have adverse effects including ototoxicity and associated permanent hearing loss[2]. The effect of hearing loss in young children is significant and can influence speech and language development, educational achievement, and social-emotional development[3].

Platinum ototoxicity is typically manifested as bilateral high-frequency sensorineural hearing loss. With continued administration and increasing cumulative dose, the hearing loss tends to increase in severity and progressively spreads to affect hearing at lower frequencies[4]. Ototoxicity probably is caused by damage to the organ of Corti by cisplatin, including the destruction of auditory sensory cells, and is manifested as hearing loss and/or tinnitus in the high-frequency range (beyond 4 kHz)[5]. Cisplatin accumulates in the kidneys, and the nephrotoxic effect of cisplatin is proportional to the amount of drug accumulated[6, 7].

The aim of the present study was to assess the nephrotoxicity and ototoxicity of weekly cisplatin therapy in cancer patients.

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RESEARCH ARTICLE

Synthesis, Screening and Docking Analysis of Novel Benzimidazolium and Benzotriazolium Compounds as Potent Anti Tubercular Agents

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ARTICLE HISTORY

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Abstract: ***Introduction*:** Tuberculosis is an infectious bacterial disease that mainly affects the lungs. Globally, there are about 10.5 million new cases and about 1.5 million deaths reported each year as per science daily research news in 2017.

***Objective*:** One of the biggest problems of Tuberculosis is the lack of effective treatments. Bedaquiline (2013) and Delaminid (2014) are the only two agents approved for TB after Rifampicin. This clearly shows the need for new lead molecules to fight against TB.

***Methodology*:** A series of benzimidazolium and benzotriazolium derivatives were synthesized and the structures were confirmed by their IR, ^{1}H NMR,^{13}C NMR and mass spectral data. They were tested for *in vitro* antitubercular activity by MABA Assay, MTT Assay and axenic culture assay. To determine selective TB activity, they were also tested for antimicrobial activity and cytotoxicity. Docking simulations and drug-inhibitor combination studies were conducted to know the probable mechanism of action.

***Results*:** Among the synthesized compounds B10, B11, B13, B14, B22, B23, B24, B25, B26 and B27 showed excellent anti TB activity with an MIC 3.12-0.8 μg/mL. Among these, compound 1,3-bis(4-chlorobenzyl)-1H-benzo[d]imidazol-3-ium chloride (B11) has shown selective anti TB activity against *Mycobacterium tuberculosis* H37Rv (0.8μg/mL) in MABA assay. This compound hasn't shown any antimicrobial (at 100μg/mL) and cytotoxicity (at 10μM). Docking studies and drug-inhibitor combination studies indicated that the compounds might act *via* enzymes involved in the cell division process.

***Conclusion*:** In conclusion, we synthesized molecules with potent and selective anti TB activity.

Keywords: Benzimidazolium, benzotriazolium, synthesis, molecular docking, anti-mycobacterial, mtFtsZ.

1. INTRODUCTION

TB is one of the oldest communicable diseases. Despite of the efforts made by the scientific community, its spread remained consistent in many parts of the world. The treatment of TB is limited to a cocktail of drugs which target cell-wall and RNA biosynthesis [1]. The ongoing proliferation of antibiotic resistance among important bacterial pathogens presents a formidable challenge to human health and necessitates the development of new antibiotics with novel mode of action.

Currently, Filamentous temperature-sensitive protein Z (FtsZ) emerged as an attractive target for the discovery of novel antibiotics. Prokaryotic cell division is a dynamic process that requires a concentration-dependent, temporal and spatial septation of the cell membrane and cell wall [2-4]. FtsZ is a homologue of tubulin and the most abundant bacterial cell-division protein involved in septation. In the presence of cytoplasmic protein and essential GTPase, FtsZ polymerizes bi directionally at the centre of the cell on the inner membrane to form a highly dynamic helical structure known as the 'Z-ring' [5-9]. This Z-ring structure is essential in initiating invagination of the cytoplasmic membrane and guiding the biosynthesis of septal peptidoglycan, which eventually leads to the formation of two daughter cells. It was hypothesized that the inhibition of the proper FtsZ assembly would cause an absence of septum formation, leading to bacterial cell division arrest. The bacterial cell continues to elongate, resulting in a filamentation, which ultimately leads to cell death [10, 11].

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2211-3533/19 $58.00+.00

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RESEARCH ARTICLE

Synthesis, Screening and Docking Analysis of Hispolon Pyrazoles and Isoxazoles as Potential Antitubercular Agents

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Abstract: ***Background:*** Hispolons are natural products known to possess cytoprotective, antioxidant and anti-cancer activities. We have found recently anti TB activity in these compounds. Efforts were made to optimize the structure with bioisosteric replacement of 1,3-diketo functional group with the corresponding pyrazole and isoxazole moieties.

Objective: The goal of this paper is designing new hispolon isoxazole and pyrazole and the evaluation of their biological activities.

Methods: The designed compounds were prepared using classical organic synthesis methods. The anti-TB activity was evaluated using the MABA method.

Results: A total of 44 compounds were synthesized (**1a- 1v and 2a-2v**) and screened for anti TB activity and antibacterial activity. The compounds **1b** and **1n** showed the highest potency with MIC 1.6μg/mL against *M. tuberculosis* H37Rv.

Conclusion: Bioisosteric replacement of 1,3-diketo functional group in hispolons with pyrazole or isoxazole rings have resulted in potent anti TB molecules. Docking simulations of these compounds on mtFabH enzyme resulted in a clear understanding of bioactivity profiles of these compounds. Docking scores are in good agreement with the anti TB activity obtained for these compounds. Computational studies and *in vitro* screening results indicate mtFabH as the probable target of these compounds.

Keywords: Isoxazole, Pyrazole, Antitubercular, Antibacterial, mtbFabH, Ketoacyl synthase inhibition.

1. INTRODUCTION

Mycobacterium tuberculosis (Mtb), the causative organism for tuberculosis, is well recognized for its distinct, unusually thick lipid rich cell wall essential for its virulence and resistance to several of the known antibiotics and persistence. Complex chemistry of the cell wall is also responsible for Mtb's ability to hide and hibernate inside human macrophages without getting consumed [1]. The Outermost layer of mycobacterial cell wall consists of mycolic acids (70 to 90-carbon-containing, branched fatty acids) which are esterified to arabinogalactan, a polymer composed primarily of D-galactofuranosyl and D-arabinofuranosyl residues. The peptidoglycan is the innermost of the three cell wall core macromolecules. Biosynthesis and maintenance of this complex chemical matrix require robust biosynthetic machinery including several unique enzymes. For most of these enzymes, homologs are absent in other microbes and mammalian system. Hence mycobacterial cell wall biosynthesis offers attractive protein targets for the development of selective anti TB agents. Very important members of 1st line anti TB drugs such as isoniazid [2] and ethambutol [3] inhibit cell wall synthesis.

Mycolic acids are biosynthesized by a series of enzymes called FAS-II system consisting of β -ketoacyl synthase (KAS), β -ketoacyl reductase (KR),β-hydroxyacyldehydrase (DE), and enoyl reductase (ER) which takes 14-26 carbon precursors produced by the FAS-I multifunctional polypeptidic enzyme system [4, 5]. Other essential enzymes involved in the functionalization of mycolic acids are dehydratase and methyl transferases [6, 7]. All these enzymes were found to be essential for Mtb and hence identified as possible drug targets. Among these, InhA and FabH have attracted a lot of attention as indicated by the opulence of scientific reports available [8-10]. We have recently identified potential anti

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Sequent

Date: 12th June 2019

TO WHOM SO EVER MAY CONCERN

This is to certify that Ms. Rangala Mohini student of Vignan Institute of Pharmaceutical Technology, Duvvada, Visakhapatnam District, Andhra Pradesh has successfully completed internship from 12th May 2019 to 11th June 2019 at SeQuent Research Limited. During this period of her internship she has covered the departments of Quality Control and Quality Assurance. In the course of her internship with us she was found punctual, hardworking and inquisitive.

We wish her all the best for future endeavors and success in life.

For SeQuent Research Limited.,

(Mrs. Valarie Pinto)
Manager – HR

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30.06.2019

TO WHOM SO EVER IT MAY CONCERN

This is to certify that **Ms. R. Anusha**, a III/IV-year student B. Pharmacy of VIGNAN INSTITUTE OF PHARMACEUTICAL TECHNOLOGY, DUVVADA, VISAKHAPATNAM, had undergone industrial training at our factory at J.N. Pharma city, Parawada, Visakhapatnam, during the period from **30.05.2019 to 29.06.2019**

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This is to certify that **Ms. T.Divya** , bearing Reg.No.16AC1R0074a student of **Vignan Institute of Pharmaceutical Technology** , Visakhapatnam, underwent a project work in our Quality Control department starting from 30th May 2019to29th June 2019 under the guidance of Mr.P.Srinivasa rao, AGM-Quality control.

In this due course of time her conduct was found to be satisfactory

We wish her all the best in all her future endeavors

Yors faithfully

for PharmaZell (Vizag) Private Ltd.,

S Appa Rao,
Sr. Manager – HR & Administration

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30.06.2019

CERTIFICATE

This is to certify that **Ms.K. Monisha**, B. Pharmacy, from Vignan Institute of Pharmaceutical technology, Duvvada, Visakhapatnam (Dist), affiliated to JNTU, Kakinada, and Andhrapradesh.Underwent industrial training from 30thMay 2019 to 29thJune 2019. She got trained in "**organic synthesis, downstream process, Analysis of semi synthetic penicillin's by chemical and instrumental techniques, (HPLC and GC)**. She had made a thorough study of different steps involved in effluent treatment and disposal procedure. During the period she had shown great enthusiasm in learning and her work and efforts are appreciated.

We wish her all the best in the future.

For Aurobindo Pharma Ltd.

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With Best Regards,

Spectrum Pharma Research Solutions
Flat No 301, Nandini Residency,
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Date: 28.06.2019

To,

The Principal

Vignan Institute of Pharmaceutical technology

Beside VSEZ, Kapujaggarajupeta,

Duvvada, Visakhapatnam-530049, A.P

Dear Sir,

We like to inform you that Ms. B.Sindhu Priya, B. Pharmacy student from your college has undergone industrial training in our manufacturing unit from 28th May 2019 to 27th June 2019.

During the training much exposure has been imparted to her in manufacturing of API's and analysis of various products. She has shown keen interest in learning and her observation level is excellent.

We wish her all the success in the future.

For Divis pharmaceuticals Pvt.Ltd.

Authorised Signatory.

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Andhra Pradesh, India.
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13th June, 2019

To Whomsoever It May Concern

This is to certify Ms. A Anvitha, pursuing B PHARM in Vignan Institute of Pharmaceutical Technology has undergone industrial training from 12th May 2019 to 13th June 2019, in Pfizer Healthcare India Pvt Ltd., a Pfizer company, Visakhapatnam.

During the above period, we found her sincere and hardworking.

We wish her all the best for her future endeavors.

for Pfizer Healthcare India Pvt Ltd.

Rajesh Rambha
Manager – Human Resources.

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