VAAGDEVIDEGREE & PG COLLEGE

DIST: HANUMAKONDA,TELANGANASTATE–50600

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INNOVATION ECOSYSTEM OUTPUTS AND INITIATIVES

Academic Year 2022-2023

INDEX

Project Proposals Submitted by Faculty Members to DST-SERB, New Delihi for the Financial Support

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Synthesis of Polycyclic fused heterocyclics through Novel Annulation reactions and it's Evaluation of its anticancer activity

File Number : SUR/2022/000566

Submitted By : Dr. SRINIVAS AVULA
[SERB Qualified Unique Identification Document: SQUID-1978-SR-1378]

Submission Date : 16-Sep-2022

Principal
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PROPOSAL DETAILS

(SUR/2022/000566)

Dr. SRINIVAS AVULA
asvas1978@gmail.com
ASISTANT PROFESSOR (CHEMISTRY)
Vaagdevi Degree and PG College
Karimnagar-warangal rd, rajaji nagar, ramnagar, Hanumakonda, Telangana-506001
[College (Private)]

Technical Details :

Scheme : State University Research Excellence (SERB SURE)
Research Area : Organic Chemistry (Chemical Sciences)
Duration : 36 Months
Contact No : +919949437219
Date of Birth : 30-Aug-1978
Nationality : INDIAN
Total Cost (INR) : 22,84,201

Project Summary :

The synthesis of cyclic compounds through intramolecular annulation reactions for the construction of diversely functionalized heterocycles from simple starting materials as an alternative to traditional methods and has attracted considerable interest in recent years. The atom and pot economy, mild reaction conditions and excellent stereoselectivity are the major benefits associated with these reactions. In particular, the indole skeleton is one of the most significant heterocyclic system present in numerous natural products and bioactive molecules. Among the naturally occurring indole alkaloids, 3,4-fused indoles (those in which the 3-position of the indole is bridged to the 4-position) have been considered attractive synthetic targets because of their biological activities and synthetic challenges.

Objectives :

- Synthesis of polycyclic benzoisoindoles.
- Synthesis of 3,4-fused indole skeleton from substituted pyrroles
- Synthesis of indolactam V and its analogues
- Evaluation of biological activities of the synthesized molecules

Keywords :
Polycyclic aromatic compounds,Novel Annulation reactions, Benzo isoindoles, Fused Indoles, Indolactum V

Expected Output and Outcome of the proposal :
I. Synthesis of 30-40 novel polycyclic fused-heterocycles will be accomplished II. Development of two novel strategies III. 1 - 2 research publications IV. New knowledge generation for PI career

Suitability of the proposed work in major national initiatives of the Government:
Make in India

Collaboration Details for last 5 Years :

Planned Collaboration for the proposed work with any foreign scientist/ institution ? No

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SCIENCE AND ENGINEERING RESEARCH BOARD

STATE UNIVERSITY RESEARCH EXCELLENCE (SURE)

Other Technical Details

1. Origin of the Proposal:

Title: Synthesis of Polycyclic fused heterocyclics through Novel Annulation reactions and it's Evaluation of its anticancer activity

The synthesis of cyclic compounds through intramolecular annulation reactions for the construction of diversely functionalized heterocycles from simple starting materials as an alternative to traditional methods and has attracted considerable interest in recent years. The atom and pot economy, mild reaction conditions and excellent stereoselectivity are the major benefits associated with these reactions. In particular, the indole skeleton is one of the most significant heterocyclic system present in numerous natural products and bioactive molecules. Among the naturally occurring indole alkaloids, 3,4-fused indoles (those in which the 3-position of the indole is bridged to the 4-position) have been considered attractive synthetic targets because of their biological activities and synthetic challenges.

2. Review of status of Research and Development in the subject

2.1 International status

1. Shugao et al (*J. Org. Chem.* 2012, 77, 22, 10409–10415) Reported the synthesis of Polycyclic Isoindoline Derivatives via Tandem Pd-Catalyzed Coupling Propargyl–Allenyl Isomerization, [4 + 2] Cycloaddition and Aromatization Reaction.
2. Bornadiego et al (*J. Org. Chem.* 2019, 84, 11, 7426–7433)reported an easy Multicomponent synthesis of polycyclic isoindoles from cyclic 1,3-dicarbonyls, aldehydes, isocyanides, and male imides. The key step consists of the one-pot Diels–Alder trapping of a reactive 2-aminofuran intermediate, formed by a sequence of a Knovenagel condensation and a [4+1] cycloaddition.
3. Yimin Hu Prof (*Angew Chem Int Ed Engl .2009;48(30):5448-51*) reported one step synthesis of Benzocyclo[penta- to octa-]isoindole Core from inactivated diene containing cyclo alkenyl moiety ,aryl halides in the presence of ledacetate.
4. Mohamed Othman (*Journal of Heterocyclic Chemistry (1999), 36(3), 735-738*) reported the synthesis of isoindolo[2,1-b]pyrrolo[l,2-d][2,4]benzodiazocine andisoindolo[l,2-d] pyrrolo[l,2-a][1,5]benzodiazocine are described starting from 2-(2-meth oxy carb onyl) benzylphthalimide and ethyl α-bromohomophthalate respectively.

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5. Melanie Denißen (*Beilstein J. Org. Chem.* **2017,** *13,* 2340–2351) reported one pot synthesis of blue-luminescent 4-aryl-1*H*-benzo[*f*]isoindole-1,3(2*H*)-diones by T3P® activation of 3-arylpropiolic acids.
6. Wang Shu-Liang (*Chemistry letters*, 2011,40, No.8834-836) An Efficient Three-component Tandem Reaction Leading to Pentacyclic Isoindole-fused Benzo[*b*,*e*][1,4]diazepines in Water
7. Joshua S. Alford (*J. Am. Chem. Soc.* 2013, 135, 32, 11712–11715) reported a highly effected synthesis of 2,3-fused pyrroles from cyclic ketones has been achieved. The transformation includes a rhodium-catalyzed reaction of 4-alkenyl-1-sulfonyl-1,2,3-triazoles featuring an unusual 4π electrocyclization. The methodology was further extended to the synthesis of indoles using a one-pot reaction starting from 1-ethynylcyclohexenes.
8. Lorenzo Caruana (***Chem. Commun.***, 2014,**50**, 445-447) reported the synthesis of Indoles bearing Michael acceptors at the 4-position were engaged in organocatalytic enantioselective cascade reactions with enals. Careful optimisation of the reaction parameters overcame the inherent low reactivity of these substrates, rendering 3,4-ring fused indoles in good yields, excellent enantioselectivities and as single diastereoisomers.
9. Fedor I. Zubkov (***RSC Adv.***, 2012,**2**, 4103-4109) reported the Aromatization of IMDAF adducts in aqueous alkaline media.
10. Cang Cheng (*Org. Lett.* 2020, 22, 13, 4985–4989) reported the synthesis of 3,4-fused tricyclic indoles through cascade carbopalladation and C-H bond amination. Development and total synthesis of Rucaparib.
11. Yu Nakagava (*Bio sci.Bio tech. Bio chem, 1997, 61(8) ,1415-1417*) reported synthesis and biological activities of Indolactone- V, the lactone analogue of the tumor promoter – Indolactam – V.
12. Zhen green Xu (*Org.Bio.Mol. Chem, 2011,9, 2512*) reported the total synthesis of Indolactam V
13. ToshiharuNoji (*Tetrahedron, 71,23, 2015, 3833- 3837*) reported A concise total synthesis of Indolactam V from tryptophanol and Indole

2.2 National Status:

Literature survey indicates none of the reports are available by the Indian researchers on my proposed work.

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2.3 Importance of the proposed project in the context of current status

Drug discovery programme is a continuously ongoing programme towards the human health care wherein, the requirement of novel chemical entities is essential through the development of new chemical transformations. Synthesis of poycyclic-fused heterocycles is planned to achieve via novel. Annulation reaction such as intra-molecular Diels-Alder reactions, enyne-assisted annulations to construct the diversely substituted new molecular entities, which might serve as an important scaffolds in drug-discovery research programme.

2.4 If the project is location specific, basis for selection of location be highlighted:

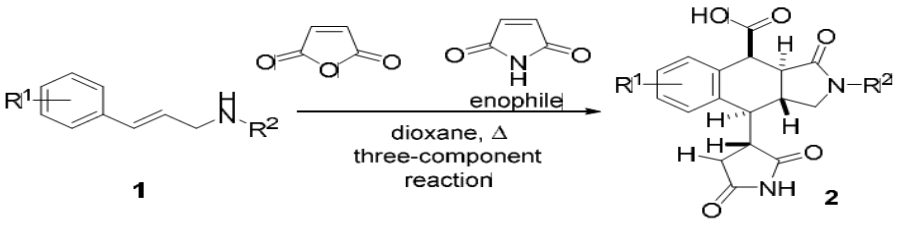
Not Applicable

3. Work Plan:

3.1 Methodology

3.1.1.Development of novel methods, optimization of reaction conditions towards the synthesis of polycyclic benzoisoindoles.

The benzoisoindole core plays an important role in a large number of natural products exhibiting a wide range of antibacterial and antiviral activities. Therefore, the efficient synthesis of these molecules is of particular interest. We propose to develop a novel three-component strategy starting from cinnamyl derivatives involving IMDA reaction (**Scheme 1**). The reaction proceeds through acylation, IMDA followed by ene-reaction. The scope of reaction can be extended to various enophiles to prepare several analogues of benzoisoindoles



Scheme 1: Proposed synthesis of polycyclic benzoisoindoles

3.1.2 Method optimization towards the synthesis of 3,4-fused indole skeleton from substituted pyrroles and application to the synthesis of library of compounds

Herein, a novel approach for the construction of 3,4-fused indole alkaloids either from benzene derivatives by using new catalytic systems or from pyrroles as novel building blocks will be developed. The developed strategy will be applied to synthesize the novel 3,4-fused indole based molecules. Our aim is to develop an approach which would not only expedite the synthesis of 3,4-fused indole alkaloids but also enable the flexible construction of a library of their analogues for additional medicinal chemistry studies (**Scheme 2**).

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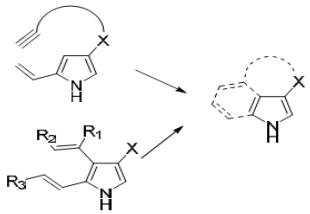
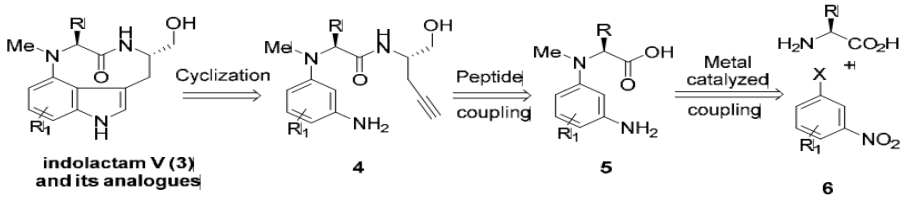


Scheme 2: Synthesis of 3,4-fused indole skeleton – proposed strategy

3.1.3 Development of strategy for the synthesis of indolactam V and its analogues.
To the best of our knowledge, the synthesis of indolactam V (**3**) by transition-metal-catalyzed intramolecular annulation of alkyne via a C-H bond activation has never been reported (indolactam cyclic ring and indole moiety formed in single step). The retrosynthetic analysis for indolactam V (**3**) and its analogues is shown in the Scheme 3. We envisioned that indolactam V macrocycles could be accessed through intramolecular annulation via a C-H bond activation of alkyne precursors **4**. The alkyne precursors **4** can be synthesized from **5** by the peptide coupling approach. The amino acid moiety in **5** might be introduced through a metal-catalyzed carbon-nitrogen bond-forming reaction with aryl halide **6**and amine nucleophiles. Critically, use of a metal-catalyzed coupling method that is amenable to introduction of other hydrophobic amino acids permits further diversification of the indolactam scaffold.



Scheme 3: Synthesis of 3,4-fused indole skeleton – proposed strategy

The characterization by ^{1}HNMR, ^{13}CNMR, LC-MS, HRMS and HPLC purity will be taken for all compounds.

3.1.4 Biological evaluation of all the synthesized compounds will be achieved at CSIR-IICT with the help of biology department for various therapeutics.

3.2 Time Schedule of activities giving milestones through BAR diagram

Work Phase	YEAR 1				YEAR 2				YEAR 3			
	0-3	3-6	6-9	9-12	0-3	3-6	6-9	9-12	0-3	3-6	6-9	9-12
Literature Survey & update												
Development of novel methods, optimization of reaction conditions towards the synthesis of polycyclic benzoisoindoles												

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Method optimization towards the synthesis of 3,4-fused indole skeleton from substituted pyrroles and application to the synthesis of library of compounds												
Development of strategy for the synthesis of indolactam V and its analogues												
Biological evaluation of all the synthesized compounds will be achieved at CSIR-IICT with the help of biology department for various therapeutics												
Documentation/ Conference/ Journal publications												

3.3 Suggested Plan of action for utilization of research outcome expected from the project.

I. Synthesis of 30-40 novel polycyclic fused-heterocycles will be accomplished
II. Development of two novel strategies
III. 1 - 2 research publications
IV. New knowledge generation for PI career

3.4 Environmental impact assessment and risk analysis.

During this project we planned to develop some novel methodologies for the synthesis of title compounds which can improve the yield of the products and minimise the environmental pollution.

4. Expertise:

4.1 Expertise available with the investigators in executing the project:

Dr Avula Srinivas has done his Ph.D on Design and synthesis of novel heterocyclics at Kakatiya University in 2010. His research at CSIR –IICT, Hyderabad as a Research Associate from 2011-2014 was on First and Total synthesis of Hantupeptine A-C, where he was developed a novel synthetic route for the synthesis of Hantupeptins. He was completed one major research Project as a Principal investigator Sponsored by CSIR – HRDG, New Delihi with entitled Design, Synthesis and Biological Evaluation of Triazole Glycosides and Macrolides. Based on Ph.D and IICT experience he has successfully developed short synthetic routes different methodologies for polycyclic Aromatic compounds and Glycosides and evaluated its Anti cancer, Nematicidal, Anti microbial activities with the help of biology Departments of CSIR- IICT,HYD.

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Publication of Dr Avula Srinivas

1. Synthesis and biological assessment of some fused Pyran derivatives, Avula Srinivas, Sriramoju Shamili, Siddoju Kavitha, Ishrath farheen, *Journal of Heterocyclic chemistry, 2022,in press*.
2. Synthesis of new Heterocycles via Methylene bis(2-(2methoxyphenyl)thiazolidin-4-one)as potential anticancer agents, Avula Srinivas, SontiReddy Rajitha, *Org. Commun. 15:2 (2022) 96-107.*
3. Microwave assisted synthesis of Hybrid Heterocyclics. **Avula Srinivas,** *Indian J. Chem.* **2021**, *60B*, 2021.
4. Synthesis and Anticancer activity of Triazole linked macrocycles and Heterocyclic's. **Avula Srinivas,** Enugala Kalyan Rao, *Acta Chim.Slov*.2021, 68, 2,404-413.
5. Synthesis and Biological evaluation of novel pyrane glycosides, Avula Srinivas, Malladi Sunitha, Sriramoju Shamili, *Acta Chim.Slov*.2020, 67,4, 1061-1071.
6. Microwave assisted synthesis and anticancer activity of Triazolyl Thiazolidinone derivatives of Pyrane**. Avula Srinivas,** Malladi Sunitha, Pulluri Karthik & K. Vasumathi Reddy *Acta Chim.slov*, **2019**, 66,700-710.
7. **Book chapter**: Synthesis and Biological Evaluation of Novel Phosphonyl Thiazolo pyrazoles, **Avula Srinivas,** Heterocycles synthesis and biological activities. DOI: http://dx.doi.org/10.5772/intechopen.86977,**2019**.
8. Microwave assisted synthesis of Novel Spiro Phosphonyl Thiazolo Pyrazole Glycosides as Potential Nematicidal Agents, **Avula Srinivas**, Malladi Sunitha, Pulluri Karthik, S.Rajitha& K. Vasumathi Reddy *Journal of Heterocyclic chemistry, 2019, 56,* 1291-1295.
9. Microwave Assisted Synthesis of hybrid Heterocyclics as biological potent molecules, **Avula Srinivas**, Malladi Sunitha, Pulluri Karthik, G.Rajesh Kumar & K. Vasumathi Reddy, *Journal of Heterocyclic chemistry, 2018, 55,* 1564-1573.
10. Synthesis and Biological Evaluation of Mannose Thiazolidinones, Avula Srinivas, Md. Aleempasha, V Sudhakar Reddy, S Srinivas, *Research & Reviews: A Journal of Drug Formulation, Development and Production,5,2,*38-46.
11. Synthesis, Nematicidal and Antifungal properties of Hybrid heterocyclics ,**Avula Srinivas,** Malladi Sunitha, Pulluri Karthik, & K. Vasumathi Reddy , *Acta Chim.Slov*.2017, 64, 1030-1041.

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12. Microwave assisted synthesis of Hybrid Heterocyclics as Potential Nematicidal agents, **A.Srinivas**, M.Sunitha, P.Karthik, G.Nikhitha, K.Raju, B.Ravinder, S.Anusha, T. Rajasri, D. Swapna, D. Swaroopa, *Acta .chim. Slov*, **2017**, 64, 319.
13. Synthesis and in *vitro* study of Hybrid Heterocyclics as potential Nematicidal agents, **A.Srinivas**, M.Sunitha, P.Karthik, G.Nikhitha, K.Raju, B.Ravinder, S.Anusha, T. Rajasri, D. Swapna, D. Swaroopa, K.Srinivas and K.Vasumathi Reddy, *Journal of Heterocyclic chemistry*, 2017,54, 3250-3257.
14. Stereo selective synthesis of Hantupeptins A,B, and C common fragment, **A.Srinivas**, M.Sunitha, C.Govind Rao, *Indian J. Chem*. **2016**, *55B*, 1239.
15. Synthesis and biological evaluation of Triazole linked Thiazolidenone Glycosides, **Srinivas, A**.; Santhosh, M.; Sunitha, M.; Karthik, P.; Srinivas, K.; Vasumathi Reddy, K.; *Acta .Chim . Slov*, **2016**, 63, 827.
16. Stereo selective synthesis of Southern fragment of Hantupeptine, **A. Srinivas**, Sunitha, M. Govind rao, C. *Acta Chem.Slov*, **2016**, *63*,344.
17. Stereo selective synthesis of C1-C24 Fragment of Antanapeptin A. **Avula Srinivas**, Malladi Sunitha, Gaddam Rajesh. *Organic communications*.9:1, 2016, 1-8.
18. Synthesis and Antimicrobial Activity of Bis-[4-methoxy-3-(6-aryl-*7H*-[1,2,4]triazolo[3,4-b][1,3,4]-thiadiazin-3-yl)phenyl]methanes and Bis-[(triazolo[3,4-b]thiadiazipin-3-yl)phenyl]Methanes. **Avula Srinivas**. *Acta Chim.Slov*.2016, 63,173-179.
19. Synthesis of 1, 2, 3- Triazole glycosides as anti cancer agents. **Avula Srinivas**, Malladi Sunitha. *Indian J. Chem*. **2016**, *55B*, 231- 239.
20. Synthesis of Piparonyl Triazole as anti microbial agents. **Avula Srinivas**, Malladi Sunitha. *Indian J. Chem*. **2016**, *55B*, 102- 109.
21. Synthesis and *in vitro* study of methylene-bis-tetrahydro [1,3]thiazolo[4,5-*c*]isoxazoles as potential nematicidal agents. **Avula Srinivas**, Adki Nagaraj, Cherkupally Sanjeeva Reddy, *Eur. J. Med. Chem*. **2010**, *45*, 2353-2358.
22. Synthesis, Nematicidal and Antimicrobial Properties of Bis-[4-methoxy-3-[3-(4-fluorophenyl)-6-(4-methylphenyl)-2(aryl)-tetrahydro-2*H*-pyrazolo[3,4-*d*]thiazol-5-yl] phenyl] Methanes. **A. Srinivas** Ch. Sanjeeva Reddy, A. Nagaraj, *Chem. Pharm. Bull.* **2009**, *57*, 685-693.
23. Synthesis and *in vitro* study of a new class of methylene-bis-4,6-diarylbenzo[*d*] isoxazoles as potential antifungal agents. Ch. Sanjeeva Reddy, **A. Srinivas**& A. Nagaraj *J. Heterocycl. Chem.* **2009**, *46*, 497-502.

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24. Synthesis and biological evaluation of novel methylene-bis-thiazolidinone derivatives as potential nematicidal agents. Ch. Sanjeeva Reddy, **A. Srinivas** & A. Nagaraj *J. Heterocycl. Chem.* **2008**, *45*, 999-1003.
25. Synthesis of some novel methylene-bis-pyrimidinyl-spiro-4-thiazolidinones as biologically potent agents. Ch. Sanjeeva Reddy, **A. Srinivas** & A. Nagaraj *J. Heterocycl. Chem.* **2008**, *45*, 1121-1125.
26. Synthesis and biological study of novel methylene-bis-benzofuranyl-[1,5]-benzothiazepines. Ch. Sanjeeva Reddy, G. Purnachandra Reddy, A. Nagaraj , A. **Srinivas** *Org. Commun*. **2008**, *1*, 84-94.
27. Design and Synthesis of Novel Methylene-bis-fused pyrazoles as Cyclooxygenase-2 Selective Inhibitors and Antimicrobial Agents. Ch. Sanjeeva Reddy , **A. Srinivas**, M. Sunitha, A. Nagaraj, *J. Heterocycl. Chem*. **2010**, *47*, 1303-130.
28. $ZrCl_4$ Catalyzed efficient one-pot synthesis of novel methylene-bis--amino/ methylene-bis--acetamido ketones Ch Sanjeeva Reddy, A Nagaraj **A Srinivas** & G Purnachandra Reddy, *Indian J. Chem*. **2010**, *49B*, 617-622.
29. $ZrOCl_28H_2O$ catalyzed Bayer condensation: A facile and efficient synthesis of triarylmethanes under solvent-free conditions. Ch. Sanjeeva Reddy, A. Nagaraj, **A. Srinivas** & G. Purnachandra Reddy *Indian J. Chem*. **2009**, *48B*, 248-254.
30. Synthesis and nematicidal activity of 2-(1*H*-benzo[*d*]imidazol-2-ylmethyl)-4-aryl-1-thia-4-azaspiro [4.5]decan-3-one. Ch. Sanjeeva Reddy, **A. Srinivas**, A. Nagaraj, *Indian J. Chem*. **2008**, *47B,* 787-791.
31. Synthesis and in *vitro* antitumor activity of *Crassalactone B* Isomer and its Analogues. *Acta Chim.Slov*.2022, *In Review*.

4.2 Summary of roles/responsibilities for all Investigators:

S. No.	Name of the Investigators	Roles/Responsibilities
1.	**Dr Avula Srinivas**	**Principal Investigator-Synthesis, Charactarisation & Biological evaluation of polycyclic Aromatic compounds with the help of biology department.**

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4.3 Key publications published by the Investigators pertaining to the theme of the proposal during the last 5 years

1.Synthesis and biological assessment of some fused Pyran derivatives, **Avula Srinivas**, Sriramoju Shamili, Siddoju Kavitha, Ishrath farheen, *Journal of Heterocyclic chemistry, 2022,in press*.

2. Synthesis of new Heterocycles via Methylene bis(2-(2methoxyphenyl)thiazolidin-4-one)as potential anticancer agents, **Avula Srinivas**, SontiReddy Rajitha, *Org. Commun. 15:2 (2022) 96-107.*
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11. Synthesis, Nematicidal and Antifungal properties of Hybrid heterocyclics ,**Avula Srinivas,** Malladi Sunitha, Pulluri Karthik, & K. Vasumathi Reddy , *Acta Chim.Slov*.2017, 64, 1030-1041.

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4.4 Bibliography

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2. Shan, D. Gao, Y, Jia, Y. Anghew. Chem. 2013, 52, 1.

3. (a) Zubkov, F. I.; Airiyan, I. K.; Ershova, J. D.; Timur R. Galeev, Zaytsev, V. P.; Nikitina, E. V.; Varlamov, A. V.; *RSC Advances*, **2012**, *2*, 4103–4109. (b) Borisova, K. K.; Nikitina, E. V. Novikov, R. A.; Khrustalev, V. N.; Dorovatovskii, P. V.; Zubavichus, Y. V.; Kuznetsov, M. L.; Zaytsev, V. P.; Varlamov, A. V.; Zubkov, F. I. *Chem. Commun*., **2018**, *54*, 2850-2853. (c) Borisova, K. K.; Kvyatkovskaya, E. A.; Nikitina, E. V.; Aysin, R. R.; Novikov, R. A.; Zubkov, F. I.; *J. Org. Chem*. **2018**, *83*, 4840–4850.

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5.1 Details of Projects submitted to various funding agencies:

S. No	Title	Cost in Lakh	Month of submission	Role as PI/Co-PI	Agency	Status
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5.2 Details of Projects under implementation

S. No	Title	Cost in Lakh	Duration	Role as PI/Co-PI	Agency
	--------	---------	--------	--------	-------

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5.3 Details of Projects completed during the last 5 years

S. No	Title	Cost in Lakh	Duration	Role as PI/Co-PI	Agency
1	Design , synthesis and biological evaluation of Glycosides and Macrolides	23 lakhs	3 Years	PI	CSIR,HRDG, EMR-II

6. List of facilities being extended by parent institution(s) for the project implementation.

6.1 Infrastructural Facilities

Sr. No.	Infrastructural Facility	Yes/No/ Not required Full or sharing basis
1.	Workshop Facility	YES
2.	Water & Electricity	YES
3.	Laboratory Space/ Furniture	YES
4.	Power Generator	YES
5.	AC Room or AC	YES
6.	Telecommunication including e-mail & fax	YES
7.	Transportation	YES
8.	Administrative/ Secretarial support	YES
9.	Information facilities like Internet/Library	YES
10.	Computational facilities	YES
11.	Animal/Glass House	YES
12.	Any other special facility being provided	YES

6.2 Equipment available with the Institute/ Group/ Department/Other Institutes for the project:

Equipment available with	Generic Name of Equipment	Model, Make & year of purchase	Remarks including accessories available and current usage of equipment
PI & his group	1. Rota evapotator	Aditya	Working
	2. Magnetic stirrers	Remi	Working
	3. Hot air Oven	Sisco	Working
	4. UV Chamber	Sisco	Working
	5. High vacuum pump	Aditya	Working

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	6. Hot plate	Sisco	Working
	7. Melting point apparatus	Sisco	Working
	8. Columns	Borosil	Working
	9. HPLC	Thermo fischer scientific	Working

7. Name and address of experts/ institution interested in the subject / outcome of the project.

1. Prof. Krishna P. Kaliappan, IIT Bombay,
Professor of Chemistry
Indian Institute of Technology Bombay
Powai, Mumbai 400 076, India

2. Dr. Srinivasarao Yaragorla
Assistant Professor
Gurbaksh Singh Building
W-16, 17; School of Chemistry
University of Hyderabad, 500046, India

3. **Dr. Ajay Kumar Srivatsava**
Scientist
Central Drug Research Institute,
BS-10/1, Sector 10, Jankipuram extension,
Sitapur Road, Lucknow 226031, India

4. **Dr. Ravindar Kontham**
Senior Scientist-CSIR/Asst Professor-AcSIR.
Division of Organic Chemistry
CSIR-National Chemical Laboratory
Dr. Homi Bhabha Road Pune-411008, India

5. **Dr. Gakul Baishya**
Sr. Scientist, Asst. Prof. AcSIR.
Natural Products Chemistry Division,
CSIR-NEIST, Jorhat-785006, India

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8. Previous Projects Details (If Any)

S. No	Project Title	PI Name	CO-PI	Amount	Status	Date Of Start	Date Of Completion	Funding Agency
1	Design , synthesis and biological evaluation of Glycosides and Macrolides	Dr Avula Srinivas	----	23 lakhs	Completed	2016 Jan	2018 Dec	CSIR HRDG

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Budget Details

Institution wise Budget Breakup :

Budget Head	Vaagdevi Degree and PG College	Total
Research Personnel	13,39,200	**13,39,200**
Consumables	3,00,000	**3,00,000**
Travel	45,000	**45,000**
Equipment	1	**1**
Contingencies	6,00,000	**6,00,000**
Other cost	0	**0**
Overhead	0	**0**
Total	**22,84,201**	**22,84,201**

Institute Name : *Vaagdevi Degree and PG College*

Year Wise Budget Summary (Amount in INR) :

Budget Head	Year-1	Year-2	Year-3	Total
Research Personnel	4,46,400	4,46,400	4,46,400	**13,39,200**
Consumables	1,00,000	1,00,000	1,00,000	**3,00,000**
Travel	15,000	15,000	15,000	**45,000**
Equipments	1	0	0	**1**
Contingencies	2,00,000	2,00,000	2,00,000	**6,00,000**
Other cost	0	0	0	**0**
Overhead	0	0	0	**0**
Grand Total	**7,61,401**	**7,61,400**	**7,61,400**	**22,84,201**

Research Personnel Budget Detail (Amount in INR) :

Designation	Year-1	Year-2	Year-3	Total
Junior Research Fellow *Required a junior research fellow with stipend 31000/- per month*	4,46,400	4,46,400	4,46,400	**13,39,200**

Consumable Budget Detail (Amount in INR) :

Justification	Year-1	Year-2	Year-3	Total
chemicals - 200000 per year for three years 600000	1,00,000	1,00,000	1,00,000	**3,00,000**

Travel Budget Detail (Amount in INR) :

Justification (Inland Travel)	Year-1	Year-2	Year-3	Total
to attend seminars, conferences	15,000	15,000	15,000	**45,000**

Equipment Budget Detail (Amount in INR) :

Generic Name ,Model No. , (Make)/ Justification	Quantity	Spare time	Estimated Cost
NA (NA) *NA*	1	0 %	**1**

Contingency Budget Detail (Amount in INR) :

Justification	Year-1	Year-2	Year-3	Total
Contingency - 200000 per year	2,00,000	2,00,000	2,00,000	**6,00,000**

Overhead Budget Detail (Amount in INR) :

Justification	Year-1	Year-2	Year-3	Total
NA	0	0	0	**0**

Other Budget Detail (Amount in INR) :

Description/Justification	Year-1	Year-2	Year-3	Total
NA NA	0	0	0	**0**

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STUDENTS PAPER PRESENTATIONS IN CONFERENCES

RIHLSR-2023
National Seminar on
Recent Innovations in Health & Life Science Research
February 24-25, 2023 | Warangal, Telangana

Oral Presentation-42

ISOLATION AND CHARACTERIZATION OF HUMAN HEPATIC STEM CELL

C. Padmavati[1], A. Aleem Khan[2]

[1] Vaagdevi Degree & PG College. [2] Center for Liver Research and Diagnostics, Owaisi hospital and research center, Kanchanbagh

Stem cells found in multi-cellular organisms have ability to renew themselves through mitotic cell division and differentiate into a diverse range of specialized cell types in the body during early life and growth. The liver is an organ with tremendous regenerative capacity. Hepatic stem cells possess multi-lineage differentiation potential and self-renewing capability. These cells can differentiate in vitro as well as in vivo into some epithelia capable of reconstituting tissues within the liver, pancreas, and intestine following appropriate transplantation. The liver, normally proliferatively quiescent, invokes a rapid regenerative response to restore liver mass. It has to cope with various infectious pathogens, in particular hepatotropic viruses. The liver has adapted to the inflow of ingested toxins by the evolutionary development of unique regenerative properties. Under normal circumstances the liver shows a low rate of hepatocyte renewal but in the event of liver injury, for example, acute liver damage or drug intoxications, hepatocytes display a remarkable capacity to divide and to restore the liver parenchyma. Because of their enormous capability to regenerate the liver, which is unique among differentiated cells in human organs, hepatocytes function as stem cells. Isolation of liver cells were taken up from aborted fetus at the Center for Liver Research and Diagnostics, Owaisi hospital and research center, Kanchanbagh, Hyderabad. Isolation of stem cells was done by maghetic separation using antibody coated magnetic beads attached to solid matrix by Magnetic Activated Cell Sorter technology (MACS). Stem cells activity test was done by MTT assay which can be used for measuring cellular proliferation. Enriched stem cells were checked for liver specific markers using Anti CD34 marker. The cell surface receptors are the stem cell markers. CD34 cells can be sorted by using Fluorescent Activated Cell Sorter (FACS) or Magnetic Activated Cell Sorter (MACS). Enumeration and Gene expression analysis was done by using RT-PCR (reverse transcriptase PCR) and Flow cytometry. Specific Anti-antibody analysis was identified by immunocytochemistry

Keywords: Hepatic Stem Cells, Regeneration, Magnetic Activated Cell Sorter, MTT Assay, RT-PCR.

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Poster Presentation-18

IMPACT OF GANGRENE ON HEALTH CONDITION

P. Rachana, G. Jhancy, Dr. C. Padmavati

Vaagdevi Degree & PG College, Hanamkonda

When the pancreas produces inadequate insulin, diabetes develops. Uncontrolled blood sugar levels can harm nerves, result in regional death, and cause body tissues to break down. Diabetes patients can hurt a foot or toe, which can lead to wet gangrene, which needs to be treated right away since it develops quickly and can be fatal. Type 1 and type 2 diabetic complications include dry gangrene. It results in numbness, leg pain, or the emergence of tiny skin bubbles. In extreme circumstances, it can necessitate amputation or even result in death.

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Poster Presentation-19

EFFECT OF INCREASED FLUORIDE CONTENT ON POPULATION

T. Shravya, M. Prathish, Dr. C. Padmavati

Vaagdevi Degree & PG College, Hanamkonda

Fluorosis develops as a result of chronic exposure to high fluoride levels in drinking water. It results in skeletal, non-skeletal, and dental fluorosis. Certain regions of Rajasthan, southern Punjab, Gujarat, Karnataka, Tamil Nadu, Madhya Pradesh, and southern Haryana have high fluoride concentrations. Skeletal fluorosis can cause pain and injury to bones and joints in addition to microscopic white streaks in the tooth enamel. Fracture risk may increase as a result of the bones losing their flexibility due to hardening. Joint mobility may be hampered if the bones enlarge and bone tissue builds up. Excessive fluoride can occasionally cause hyperparathyroidism. As a result, bones may become more brittle and less calcium-rich. Lower IQ test results have been linked to higher fluoride levels. Acne, arteriosclerosis, high blood pressure, myocardial damage, decreased fertility, early puberty in girls, thyroid dysfunction, and osteoarthritis are further health issues. Due to an improvement in groundwater levels as a result of Mission Kakatiya, the amount of fluoride in the groundwater in fluoride-affected parts in Nalgonda district has decreased by at least 50%. By providing safe drinking water to every home in communities where fluoride contamination was a problem through Mission Bhagiratha, the State government had already been successful in halting the spread of new instances of fluorosis in the district. Cherlagudem reservoir was filled with water after work on the Shivannagudem reservoir was finished.

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Poster Presentation-20

FACTORS CAUSING CARDIOMYOPATHY

B. Shaini, V. Saritha, Dr. C. Padmavati

Vaagdevi Degree & PG College, Hanamkonda

Heart failure can result from cardiomyopathy, a condition that affects the heart's ability to pump blood to the body's other organs. Dilated, hypertrophic, and restricted cardiomyopathies are the three primary subtypes of cardiomyopathy. Breathlessness, swelling of the extremities, abdominal bloating, coughing, rapid heartbeats, chest discomfort, dizziness, and fainting are among the symptoms. MYH7, MYBPC3, TNNT2, and TNNI3 are the four most often involved genes. Risk is increased by sudden cardiac arrest, chronic high blood pressure, heart infections, obesity, binge drinking, using illegal substances, some chemotherapy medicines, and conditions like diabetes and thyroid illness. Serious complications from cardiomyopathy might include heart failure, blood clots, heart valve issues, cardiac arrest, and unexpected death.

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Research Papers Published in UGC Enlisted Journals

https://www.vaagdevicolleges.com/vaagdevi/adminpanel/uploads/naccuploads/3321-research-publications_file_1703755092.pdf

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WORKSHOPS CONDUCTED ON STARTUP IDEAS

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HANAMKONDA, KISHANPURA-
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(Affiliated to Kakatiya University, Warangal,
Telangana)

2022 – 23
Work shop on Preparation of Holi colors

Type of the Activity: **Work shop**
Date of Event: 20 Nov, 2022
Name of organizing Cell: **EPR and IPR Cell Vaagdevi Degree and PG College**
Names & Designations of Resource Persons: **Dr .A.Srinivas Reddy**, Assistant Professor in Chemistry, Vaagdevi Degree & PG College , Hanamkonda.
Outcomes / Benefits: The Programme is aimed to create awareness about Preparation of Holi Colors from Natural sources.
No.of Participants:159

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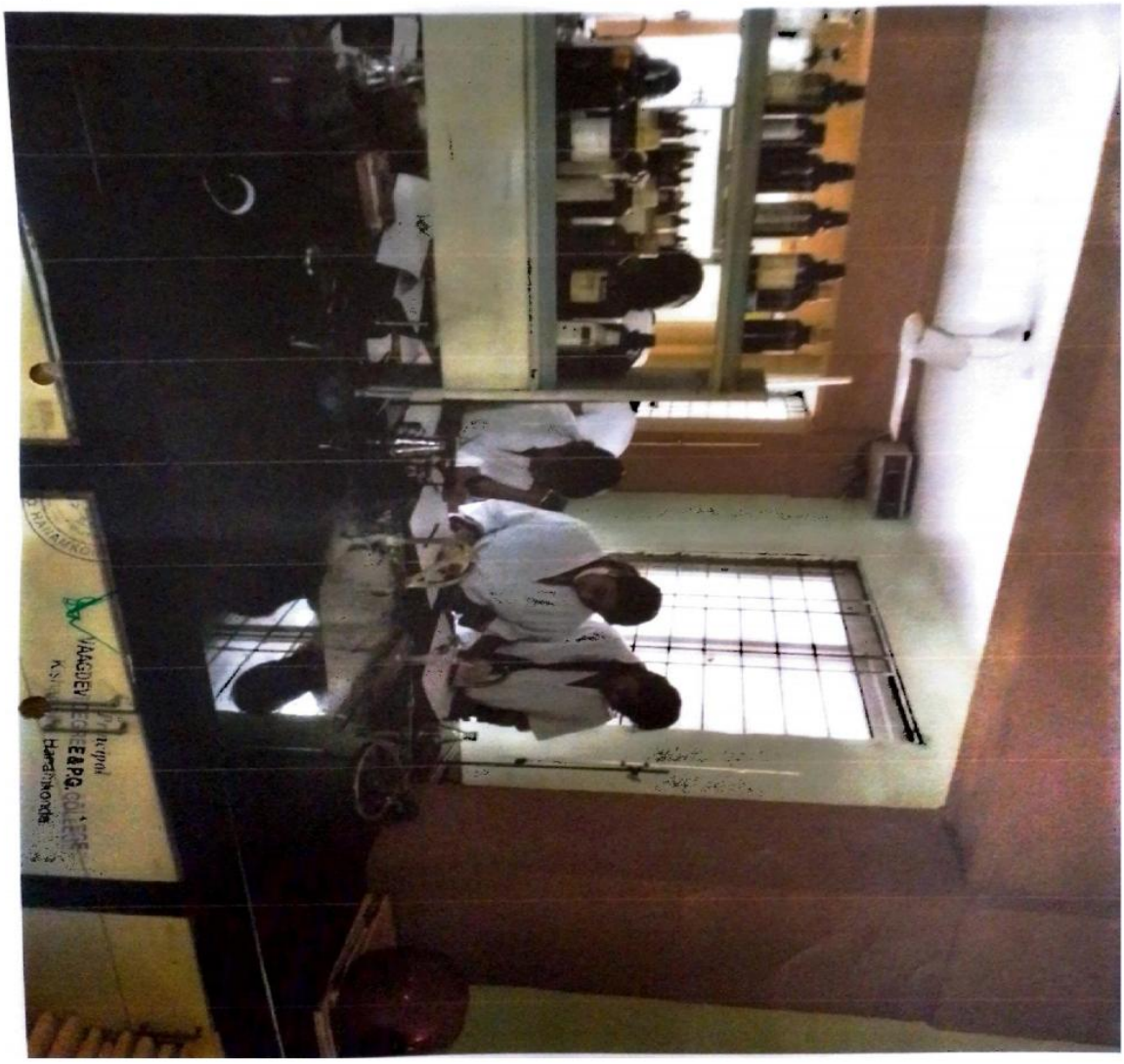

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2022- 23

Work shop on Preparation of Pickles, JAM,Chikkies& ORANGE SQUASH.

Type of the Activity: Work shop on Preparation of Pickles

Date of Event: Oct 21, 2022

Name of organizing Cell: R&D,IPR Cell **& EPR Club, Vaagdevi Degree & PG College, Hanamkonda**

Names & Designations of Resource Persons:

Session:1. Preparation of Pickles & JAM - Smt.B.Kiranmai & Miss.M.Supriya, Lec in Bio Technology, Vaagdevi Degree & PG College,.

Session: 2. Preparation of Chikkis & orange squash – Miss Supraja, Lec in Food Technology, Vaagdevi Degree & PG College. Hanamkonda.

Session: 3. Preparation of Wine – Miss Neeraja& Syed Ishrath Farheen, Lec in Micro biology, Vaagdevi Degree & PG College. Hanamkonda

Outcomes / Benefits: The Programme is aimed to develop awareness on start ups.

No. of Participants: 34

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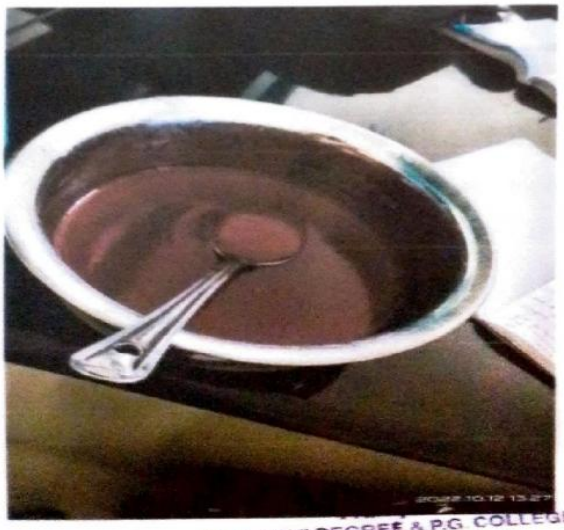
Kishanpura, Hanamkonda



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Students Project

2022-2023

Synthesis and in *vitro* antitumor activity of Crassalactone B Isomer and its Analogues

Department of Chemistry

Supervisor: Dr. A.Srinivas Reddy

Students Names:

1. K. Praveen, 2. V. Bhavani, 3. P. Shireesha, 4. U. Anil, 5.Gayathri

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Synthesis and in *vitro* antitumor activity of Crassalactone B Isomer and its Analogues

Avula Srinivas,* Kota Praveen,V.Bhavani,P.Shireesha, U.Anil,V.Gayathri, B.Indhu, B.Anjan kumar

Department of Chemistry, Vaagdevi Degree & PG College

Kishanpura, Warangal, Telangana, India 506001

E-mail: avula.sathwikreddy@gmail.com

Crassalactone B isomer and its Triazole analogues were synthesized from a known monosaccharide D-Glucose with a series of reactions and evaluated their anticancer activity against different cancer cell lines, all most all the compounds exhibited moderate to good activity. Compounds ***17a*** *and* ***17e*** *showed most potent activity against MCF- 7 cell line with IC* $_{50}$ *value of 1.62&1.70µM, whereas* ***17b, 17c, &17d*** *showed promising activity against MDA- MB-231 and HeLa cell lines.*

Key words:D-Glucose,Crassalactone B Isomer,Click reaction,Anticancer activity

Students Study Project

2022-2023

Microwave Assisted Synthesis of Mannose based Novel Spiro Phosphonyl thiazolo Pyrazole Glycosides

Supervisor: Dr. A.Srinivas Reddy

Department of Chemistry

Students Names:

S.No	H.T No	Class	Name
1	08622-3911	BSc FSZC	V.Gayathri
2	08622-3911	BSc FSMiC	B.Anam Kumar
3	08622-3251	BSc NDZC	CH.Jhanavi
4	22117-So-629	MSc,Che	P.Vaagdevi
5	22117-So-631	MSc,Che	G.Dinesh

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Microwave Assisted Synthesis of Mannose based Novel Spiro Phosphonyl thiazolo pyrazole Glycosides

Avula Srinivas Reddy ,V.Gayathri, B.Anjan kumar,CH.Jahnavi,P.Vaagdevi,G.Dinesh

[1]*Department of Chemistry, Vaagdevi Degree & PG* College
Kishanpura, Warangal, Telangana, India 506001
E-mail: avula.sathwikreddy@gmail.com

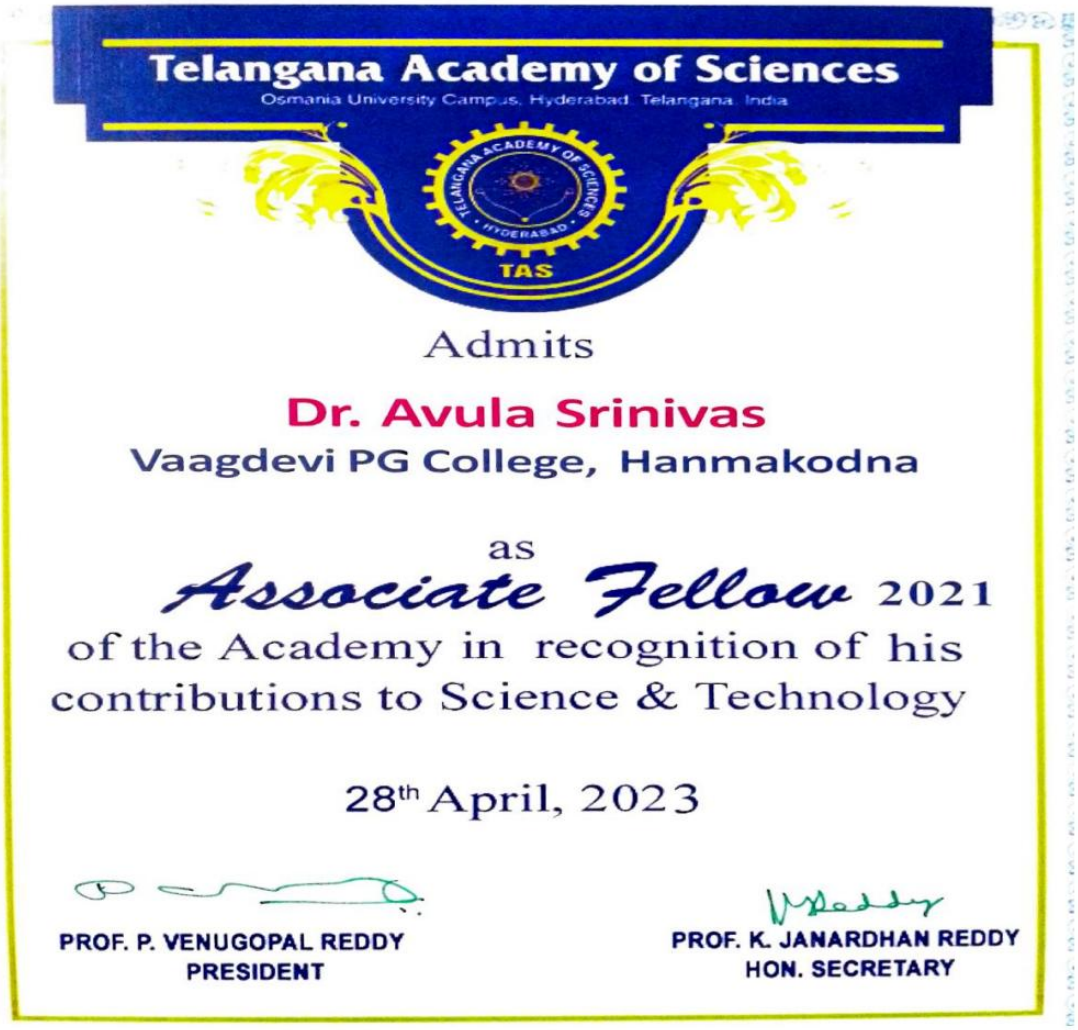
Abstract:*(Z)-2-((3aR,4S,6R,6aR)-6-((1-(4-chlorophenyl)-1H-1,2,3-triazol-4-yloxy)methyl)-2,2-dimethyltetrahydrofuro[3,4-d][1,3]dioxol-4-yl)-5-(4-fluorobenzylidene)-3-phenylthia zol idin-4-one* ***2a-g*** *were synthesized by the reaction of chalcone derivativesofdimethyl7-((3aS,4R,6aR)-6-((1-(4-chlorophenyl)-1H-1,2,3-triazol-4-yl)methoxy)-2,2-dimethyltetrahydrofuro [3,4-d][1,3]dioxol-4-yl)-4-(4-fluorophenyl)-9-oxo-8-phenyl-6-thia-1,2,8-triazaspiro[4.4]non-2-en-3-ylphosphonate****1*** *with Bestmen Ohira reagent. The chemical structures of newly synthesized compounds were elucidated by IR, NMR, MS and elemental analysis.*

Keywords— Phosponylpyrazoles, Bestmenohira reagent, click reaction, Knovenagel condensation, cyclisation.

Introduction

1,2,3-Triazoles are one of the most important classes of heterocyclic organic compounds, which are reported to present in a plethora of biological activities for diverse therapeutic areas[1]. The 1,2,3-triazole motif is associated with diverse pharmacological activities such as antibacterial, antifungal, hypoglycemic, antihypertensive and analgesic properties[2]. Polysubstituted five-membered aza heterocyclic's rank the most potent glycosidase inhibitors[3]. Further, this nucleus in combination with or in linking with various other classes of compounds such as amino acids, steroids, aromatic compounds, carbohydrates *etc* became prominent in having various pharmacological properties[4].1,2,3-Triazole modified carbohydrates have became easily available after the discovery of the Cu(I) catalyzed azide-alkynes 1,3-dipolar cycloaddition reaction[5] and quickly became a prominent class of non-natural sugars. The chemistry and biology of triazole modified sugars is dominated by Triazole glycosides [6]. Therefore, the synthesis and investigation of biological activity of 1, 2, 3-triazole glycosides is an important objective, which also received the considerable attention by the medicinal chemists. Thiazoles are familiar group of heterocyclic

AWARDS RECEIVED BY THE FACULTY MEMBERS WITH THE EFFORTS OF INNOVATION ECOSYSTEM



Telangana Academy of Sciences

Osmania University Campus, Hyderabad, Telangana, India

TAS

Admits

Dr. Avula Srinivas

Vaagdevi PG College, Hanmakodna

as

Associate Fellow 2021

of the Academy in recognition of his contributions to Science & Technology

28th April, 2023

PROF. P. VENUGOPAL REDDY
PRESIDENT

PROF. K. JANARDHAN REDDY
HON. SECRETARY

Dr Avula Srinivas Received Associate Fellow Award from Telangana Academy of Sciences in 2023

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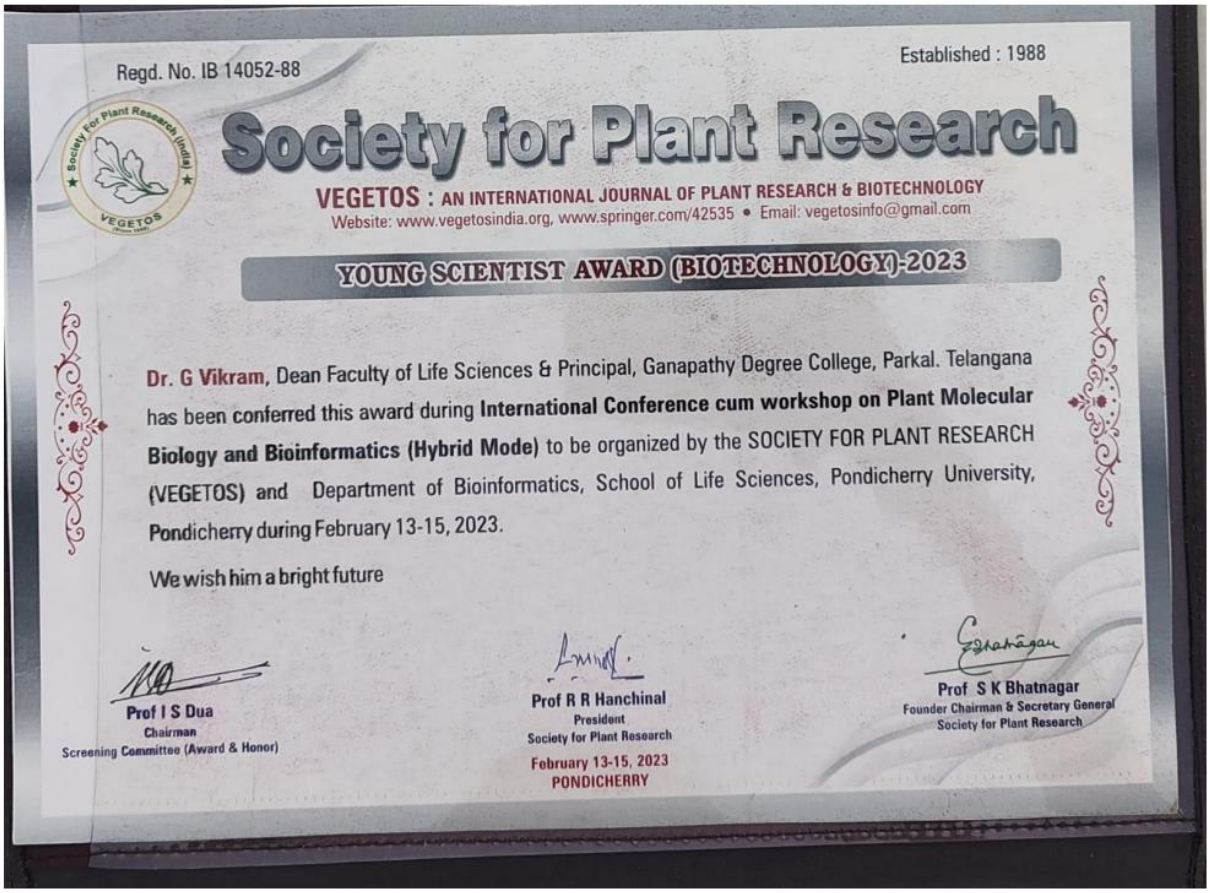

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YOUNG SCIENTIST AWARD (BIOTECHNOLOGY)-2023

Dr. G Vikram, Dean Faculty of Life Sciences & Principal, Ganapathy Degree College, Parkal. Telangana has been conferred this award during **International Conference cum workshop on Plant Molecular Biology and Bioinformatics (Hybrid Mode)** to be organized by the SOCIETY FOR PLANT RESEARCH (VEGETOS) and Department of Bioinformatics, School of Life Sciences, Pondicherry University, Pondicherry during February 13-15, 2023.

We wish him a bright future

Prof I S Dua
Chairman
Screening Committee (Award & Honor)

Prof R R Hanchinal
President
Society for Plant Research

February 13-15, 2023
PONDICHERRY

Prof S K Bhatnagar
Founder Chairman & Secretary General
Society for Plant Research

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RBBMR BEST PAPER AWARD CERTIFICATE

Presented to

Dr. SURESH CHANDRA CH.

for the paper entitled

Medical tourism in India - Analysis on growth potentials dur Covid-19 crisis.

in the National Conference on

"IMPACT OF COVID-19 ON BUSINESS AND INDUSTRY"

held on 30th Match,2022

Dr. D. Harikanth
Conference secretary

Prof. D. Chennappa
General Secretary, TCA

Prof. H. Venkateshwarlu
President, TCA

Dr CH Suresh Chandra Received Associate Fellow Award from Telangana Academy of Sciences in 2022

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has been assessed and found to be in accordance with the requirements of the quality standards

ISO 9001 : 2015

for the following scope of certification

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Further information about the scope of this certificate and applicability of ISO 9001 : 2015 requirements may be obtained by consulting the organization.

Surveillance Audit

Issued Certificate Date : 06:07:2020

Certificate Renewal Date : 05:07:2023

Due on 05.07.2021

Due on 05.07.2022

Authorised Signature

Certificate No : Q91864141662

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E-mail: hymcert09@gmail.com, Website: www.hymcertifications.com

Vaagdevi Degree & PG College received an ISO Certificate for 2022

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