Name : Dr.S.Saranya

Designation : Assistant Professor

Department : Biotechnology

Qualification :M.Sc.,M.Phil.,Ph.D.,

Experience :Teaching: 7 Years Industry: Nil Research: 3

Areaof Specialization(s) : Microbial biotechnology

Email (Official ID) :ssaranya@drngpasc.ac.in

AcademicQualifications

Degree	Branch	Institution/University Name	Year of Graduation
Ph.D.	Biotechnology	Madurai Kamaraj University, Madurai	2019
M. Phil.	Biotechnology	Dr.N.G.P. Arts and Science College ,Coimbatore	2010
M.Sc.	Biotechnology	St.Joseph's College,Trichy	2009
B.Sc.	Biotechnology	K.S.R College of Arts and Science College.	2007

AdditionalQualifications

Diploma / Vocational / Certification	Area of Specialization	Institution/University/Agency Name	Year
Diploma	Clinical Microbiology	Periyar University	2007

GrantsReceived

EventTitle	Agency	Amount	Date
Antimicrobial and wound healing properties of Natural herbs to construct adhesive herbal bandage	Dr.N.G.P Arts and Science College	5,000.00	05.10.2021

Projects Completed

Project Title	Agency	Amount	Duration
-	-	-	-
On-going Project Title	**Agency**	**Amount**	**Duration**

-	-	-	-

ResearchGuidance

Programme	No.of Scholars	
	Completed	Pursuing
Ph. D.	-	-
M. Phil.	-	-

ResearchPublications(Indexed)

International

Saranya Somasundaram, Samuel Raj Babu Arulmani, Govindarajan Ganesan. Screening and characterization of antagonistic Streptomyces sp. JS20 from marine sediment in Vaan Island.The Microbe,Volume 4,100106,ISSN 2950-1946, 2024. https://doi.org/10.1016/j.microb.2024.100106. (Indexed in Scopus)

S.Saranya, Satheeja santhi and RD. Jebakumar Solomon. Isolation, Screening, Statistical media optimization, Purification and Structural characterization of bioactive compound from marine derived *Streptomyces sp* JS-S6. *International Journal of Scientific and Research Publications* Vol. 7 Issue. pp. 270-282, 2017. (Indexed in UGC).

Somasundaram Saranya, Velayudhan Satheeja Santhi, Ashutosh Gupta, Solomon Robinson David Jebakumar. A novel marine bacterium*Isoptericola* sp. JS-C42 with the ability to saccharifying the plant biomasses for the aid in cellulosic ethanol production. *Biotechnology Reports.* Vol. 1. pp 8–14. 2014 (Indexed in Scopus).

Velayudhan Satheeja Santhi, Somasundaram Saranya, Ashok Kumar Bhagat, Ganesan Govindarajan, Solomon Robinson David Jebakumar. Seaweed (*Eucheuma cottonii*) associated microorganisms, a versatile enzyme source for the lignocellulosic biomass processing. *International Biodeterioration & Biodegradation*. Vol. 96, pp- 144-151. 2014 (Indexed in Scopus).

National

Saranya.S, Sowmini.N, Vinoth Kanna andNandhini Babu. Screening of bioactive compound from marine actinomycetes. *IJLPR.* Vol. 1, pp- 168-172. 2019 (Indexed in UGC).

RohiniT, Saranya S,Satheeja Santhi V,Sam Ebenezer R ,Shakila H. Optimization of AFEX Pretreated Agrowaste Media for Endoglucanase and Xylanase Production by *Stenotrophomonas maltophilia*. *International Journal Research in Applied Science &Engineering Technology*. Vol. 5. Pp.2361-2374. 2017. (Indexed in UGC).

Other Publications: International/ National Journals

-

Book Publications

Dr.S.Saranya. Vignesh Soundarajan. Rohini T.. Biofilm: A Bane to the Food Industry and Its Control Measures. Translational Research in Biomedical Sciences:Recent Progress and Future Prospects. Springer publications. 101-109.https://doi.org/10.1007/978-981-97-1777-4. 2024.

Consultancy

Nature of Consultancy	Client	Amount	Completion Status
-	-	-	-

Presentations in Conference

Presented a Paper on "Personalized Nutrition and Nutrigenomics" in National conference on Probiotics, Prebiotics, Postbiotics and Biofortification: The future of human health and Nutrition" organized by Department of Biotechnology, PSGR Krishnaamal College for Women, Coimbatore, supported by TNSCST, govt of Tamil Nadu on 12 & 13 Dec, 2024.

Presented a Paper on "Sustainable food production and environmental impact" in National conference on Probiotics, Prebiotics, Postbiotics and Biofortification: The future of human health and Nutrition" organized by Department of Biotechnology, PSGR Krishnaamal College for Women, Coimbatore, supported by TNSCST, govt of Tamil Nadu on 12 & 13 Dec, 2024.

Presented a Paper on "Bioactive Compounds from Marine Environment" in Three Days International conference on "Antibiotics and alternative Strategies for combating Antimicrobial resistance" organized by Department of Bioscience, Sri Krishna College of Arts and Science, Coimbatore, on 24, 25 & 26 July, 2024.

Presented a Paper on "Traditional Methods of Food preservation in the National seminar "Integration of Traditional Indian Knowledge System in to Modern Higher education: NEP Prospective" organized by IQAC, Dr.N.G.P. Arts and Science College, sponsored by ICSSR on 04 &n 05, July 2024.

Presented a Poster on "Bioactive compound from marine derived *Streptomyces* sp" in 8th International conference on "Recent Advances in Biosciences" held at KSG College of Arts and Science, Coimbatore, Tamil Nadu on 28, October,2022.

Presented a Poster on "Biofilm Inhibition by Bioactive compound from marine derived *Streptomyces* JS20" in INDO-SINGAPORE International conclave on Translational Research in Health care-

"Harnessing Next Gen AI enabled biotech innovations for sustainable healthcare" held at Satyabhama university, Chennai on 12th& 13th September 2022.

Molecular analysis and metabolomic Characterization of marine *Streptomyces* Sp JS-S6. 3rd National Conference on Challenges in Biochemical Engineering and Biotechnology for sustainable Environment (CBSE- 2014), Organized by Department of Chemical Engineering, Annamalai University, TamilNadu, April 2-3, 2014).

Statistical media optimization and metabolomic characterization of antibacterial compound from marine *Streptomyces* sp JS6.55th Annual Conference of Association of Microbiologist of India organized at Tamil Nadu Agricultural University, Coimbatore, India, November12-14, 2014.

Molecular analysis and Metabolomic characterization of Mangrove derived *Streptomyce.* Sp." BIOQUEST-13 organized by the Department of Biotechnology, Amrita University, Kerala, Aug 10- 14, 2013.

Quantum-Dots in cell imaging. National seminar-cum-workshop on Nanotechnology and Nanobiotechnology, Sathyabama University, Feb 14 -16,2008.

Participation in Conference

International

BIOQUEST-13,Department of Biotechnology,AmritaUniversity,Kerala,Aug10-14, 2013.

National

Participated in "Interdisciplinary approaches on Dynamics of Bioscience Research" organized by faculty of bioscience, Dr.N.G.P. Arts and Science College on 28, March, 2023.

Potentials of Translational Research in Reproductive Biology and Endocrinology for Health Care Management, Holy Cross College, Tiruchirappalli, Jan 23-25, 2008.

Participation in Seminars

Immunotherapeutics &Diagnostics, Madurai Kamaraj University,5thOctober,2015.

Stemcell Research-The Present and Future, Women's Christian College, Chennai-Sep4th&5th, 2008.

Structural Bioinformatics and its applications, Madurai Kamaraj University, September, 2011.

Participation in Workshop

Hands on Training & Workshop on "Flow Cytometry and Cell sorting", Organized by Center for Drug Discovery and Development, Sathybama Institute of Science and Technology, Chennai on 22, 23 october, 2024.

Hands on workshop "In silico prediction of Phytochemical activities. ADMETox and molecular Docking studies", Organized by Department of Biotechnology, Dr.N.G.P. Arts and Science College under DBT STAR College Status from 04 to 07 October, 2024.

Hands on Workshop on "Basics of Aquaculture and Zebrafish Model usage" organized by Department of Microbiology and Department of Biotechnology, Rathinam College of Arts and Science under DBT STAR College Scheme on 11.09.2024.

Two days' workshop on "Equipment handling (HPLC&NPTA) organized by the Science department (PG), PSGR Krishnammal College for Women, Coimbatore on 06.02.2024 & 07.02.2024.

Two-days' workshop on Public Financial Management System (PFMS) organized by Dr.N.G.P Arts and Science College & Dr.N.G.P IT held on 20.11. 2023 & 21.11.2023

One day hands on training & workshop on "Network Pharmacology for drug discovery organized by Department of Biochemistry, Kongunadu Arts and Science College, in association with Indian Science Congress Association, Coimbatore. Chapter on 21.12.2023.

Technology Transfer in Nano Science & Technology research to product awareness workshop, Madurai Kamaraj university, Madurai, June-2013.

Value Virtual labs on Biotechnology and Biomedical Engineering, Amrita School of Biotechnology, Aug 14, 2013.

Data analysis using SPSS, School of Mathematics, MaduraiKamarajUniversity, Madurai.Aug30, 2013.

One-day National workshop on Patent information. Patent cell. Bharathidasan University, Tiruchirappalli. April 29, 2009.

Participation in Orientation Programme /Short Term Courses

Practical approaches for Next generation sequencing technologies and data analysis towards healthcare, K.S.R.College of Technology,Dec21-26,2020.

Skillphones English Communication Programme,St.Joseph's College,Trichy,Feb13-March 28,2008.

Pharmaceutical Biotechnology, Bio-Sciences Techno Park, May 12- June 12, 2008.

Proficiency course in English, Central Institute of English and Foreign Languages, June27-July12, 2005.

Participation in Faculty Development Programme

Participated in AICTE Training And Learning (ATAL) Academy Online Elementary FDP on "Drug Engineering through Bioprospecting" fromAugust 12 -16 2021 at Dr.N.G.P.Arts and Science College, Coimbatore, India.

Participated in seven-day FDP on "Research methodologyand pedagogy for tertiary education" during June 15-21, 2021 organized by Internal quality assurance cell & center for faculty development, at Dr.N.G.P. Arts and Science College, Coimbatore, India.

Participated in AICTE sponsored one-week short term training programme on "Practical approaches for next generation sequencing technologies and data analysis towards health care" organized by Department of Biotechnology, K.S.R College of Technology on December 21-26,2020.

Conference/Seminar/Workshop Organized/

Agogtech-19, Organizing member, Sri Krishna Arts and Science College, Feb-2019.

Organizing member of international conference "Integrating Indian Knowledge Systems (IKS) with Cutting-Edge Biotechnology and Innovative Technologies" Department of Biotechnology, March 22, 2025.

Invited Speaker/Session Chair-Conference/Seminar/Workshop

Invited as Guest Speaker and delivered a presentation on the topic entitled "Fermentation Technology" in the association meeting of Biotechnology department at Dr. RV Arts and Science College, Karamadai, Coimbatore on 23.02.2024.

Member in BoS

Board of Biotechnology, Dr.N.G.P Arts and Science College,since2020.

Editorial/Review Board Member

Review member for the Journal "Biotechnology Journal International"

Reviewed Journals in Frontiers in Cellular and Infection Microbiology

Membership in Professional Bodies

Name of the Professional Body	Nature of membership	Duration
Indian Immunology Society	Member (LM/IIS/1080/05/24)	Life time member

Awards/ Honors

Awards/ Honors	Agency/ Institute	Year of Award
UGC-Project Fellow	UGC-MRP	2011

Recognition National/International

Nature of Recognition	Organization/Institution	Year
-	-	-

மதுரை காமராசர் பல்கலைக்கழகம்
Madurai Kamaraj University

UNIVERSITY WITH POTENTIAL FOR EXCELLENCE

அறிவியற் புலம் - உயிரி தொழில்நுட்பவியல்
FACULTY OF SCIENCE - BIOTECHNOLOGY

2019 ஆம் ஆண்டில் மதுரை காமராசர் பல்கலைக்கழகத்தில், ஆய்வு நிபுணர்
30-04-2019 நாளன்று முனைவர் பட்டம் பெற தகுதியுடையவர் என்று
சரண்யா எஸ்
அனைவருக்கு முனைவர் பட்டம் வழங்கப்படுகிறது என்று மதுரை காமராசர் பல்கலைக்கழக ஆட்சிப் பேரவை
அறிவித்துள்ளது.

மதுரை காமராசர் பல்கலைக்கழக இலச்சினையுடன் வழங்கப்பட்டது

The Senate of the MADURAI KAMARAJ UNIVERSITY in the year 2019 hereby makes known that SARANYA S has been conferred **DEGREE OF DOCTOR OF PHILOSOPHY** he/she having certified by duly appointed Examiners to be qualified to receive the same as on 30-04-2019.

Given under the seal of the University.

Register No : F8734

Subject Area : BIOTECHNOLOGY

Title of Thesis : BIOACTIVE COMPOUND FROM MARINE DERIVED STREPTOMYCES SPECIES JS 20 AND ITS APPLICATIONS

This Degree Certificate is awarded in Compliance of the UGC Regulations 2009

Date 28 September 2019

Controller of Examinations

Registrar

Vice-Chancellor

Reg.No: [illegible]

பாரதியார் பல்கலைக் கழகம்
Bharathiar University

அறிவியல் புலம்

FACULTY OF SCIENCE

பாரதியார் பல்கலைக் கழகத்தால் முறையாக அமைக்கப்பட்ட தேர்வாளர் குழு சரண்யா சே, டிசம்பர் 2010 ஆம் ஆண்டில் உயிர் நுட்பவியல் என்னும் பிரிவில் ஆய்வியல் நிறைஞர் என்னும் பட்டம் பெறத் தகுதியடைந்திருப்பதாகச் சான்றளித்ததை ஏற்று, அவருக்கு அந்தப் பட்டத்தைப் பல்கலைக் கழக இலச்சினையுடன் பாரதியார் பல்கலைக் கழக ஆட்சிக் குழு வழங்குகின்றது.

The Syndicate of the Bharathiar University hereby makes known that **SARANYA S** *has been admitted to the Degree of* **MASTER OF PHILOSOPHY** *in* **BIOTECHNOLOGY** *having been certified by duly appointed Examiners to be qualified to receive the same in* **DECEMBER 2010.**

Given under the Seal of the University.

கோயம்புத்தூர்
Coimbatore

Dated: 24th November 2011

ISSUED ON 14 SEP 2017

தேர்வாணையர்
Controller of Examinations

பதிவாளர் (பொ)
Registrar(i/c)

துணைவேந்தர்
Vice-Chancellor

Sl. No. 433624

Reg. No. 07PBT829 :Code No. 293A4 S.No. 480434

Centre Code :32

பாரதிதாசன் பல்கலைக்கழகம்
BHARATHIDASAN UNIVERSITY

(Established by the Government of Tamil Nadu in 1982; Recognized by UGC under 2f and 12B of UGC Act; Member, Association of Indian Universities and Association of Commonwealth Universities; Accredited by NAAC with 'A' Grade)

அறிவியல் புலம்
FACULTY OF SCIENCE

பாரதிதாசன் பல்கலைக்கழக ஆட்சிக் குழு ஏப்ரல் 2009 ஆம் ஆண்டு புனித சூசையப்பர் தன்னாட்சிக் கல்லூரி, திருச்சிராப்பள்ளி நடத்திய உயிர்நுட்பவியல் தேர்வில்

சோ. சரண்யா

என்பவர் முதல் வகுப்பில் தேர்ச்சி பெற்றார் என்று தக்க தேர்வாளர்கள் சான்றளித்தபடி அறிவியல் நிறைஞர் என்னும் பட்டத்தை அவருக்குப் பல்கலைக்கழக இலச்சினையுடன் வழங்குகிறது.

The Syndicate of the **BHARATHIDASAN UNIVERSITY** *hereby makes known that* **S. SARANYA** *has been admitted to the Degree of* **MASTER OF SCIENCE,** *having been certified by duly appointed Examiners to be qualified to receive the same in* **BIOTECHNOLOGY** *at the Examination held in* **APRIL 2009** *and placed in* **FIRST** *Class through the* ST. JOSEPH'S COLLEGE (Autonomous), TIRUCHIRAPPALLI *of the University.*

Given under the seal of the University.

திருச்சிராப்பள்ளி
Tiruchirappalli
நாள் :
Dated : 27th November 2009

பதிவாளர் Registrar

துணைவேந்தர் Vice-Chancellor

E 58516 ISSUED ON : 18 DEC 2009

Reg. No. 04ABD1088
Col Code 108

No. 2KG 003597

பெரியார் பல்கலைக்கழகம்
Periyar University

அறிவியல் புலம்
FACULTY OF SCIENCE

பெரியார் பல்கலைக்கழக ஆட்சிக்குழு 2007 ஆம் ஆண்டு ஏப்ரல் மாதம் நடந்த உயிரி தொழில்நுட்பவியல் தேர்வில்

S சரண்யா என்பவர்

முதல் வகுப்பில் தேர்ச்சி பெற்றார் என்று தக்க தேர்வாளர்கள் சான்றளித்தபடி அறிவியல் இளையர்

என்னும் பட்டத்தை அவருக்குப் பல்கலைக்கழக இலச்சினையுடன் வழங்குகிறது.

The Syndicate of the **Periyar University** *hereby makes known that*

SARANYA S *has been admitted to the* **DEGREE OF BACHELOR OF SCIENCE in BIOTECHNOLOGY** *he/she having been certified by duly appointed Examiners to be qualified to receive the same and was placed in the* **FIRST CLASS** *at the Examination held in* **APR-2007**

Given under the seal of this university

Dated 17-09-2007
சேலம் 636011, தமிழ்நாடு, இந்தியா.
Salem 636011, Tamil Nadu, India.

பதிவாளர்(பொ)
Registrar i/c

துணைவேந்தர்
Vice-Chancellor

Dr. N.G.P. ARTS AND SCIENCE COLLEGE (Autonomous)

Approved by Government of Tamil Nadu & Affiliated to Bharathiar University, Coimbatore

Re-accredited by NAAC with 'A' Grade | DST - FIST | DBT - Star College

Dr. N.G.P. - Kalapatti Road, Coimbatore - 641 048, Tamil Nadu, India. Phone: +91 - 422 - 2369100

Website: www.drngpasc.ac.in | Email: drngparts@kmch.ac.in

Prof. Dr. V. RAJENDRAN

M.Sc., M.Phil., B.Ed., M.Tech (Nanotech)., Ph.D., (D.Sc.)., FInstP. (London)

Professor and Principal

Ref.No: DrNGPASC/DEAN/R&D/SM/2020-21/022 05.10.2021

SANCTION ORDER

Dear Dr. S. Saranya,

We wish to inform you that your project grant under the seed-money scheme on "Antimicrobial and wound healing properties of natural herbs to construct adhesive herbal bandage" has been approved by the Management on the recommendations of the Project Review Committee. The Management has approved a grant-in-aid a sum of ₹.5,000 (Rupees five thousand only). You are requested to commence the study immediately. On the completion of the project, you are expected to submit the final report, statement of expenditure and utilization certificate.

With regards,

(Prof. Dr. V. Rajendran)
Professor & Principal

Copy to:

1) Research file (seed-money)
2) Accounts/ FC
3) Dean-R&D

To

Dr. S. Saranya
Assistant Professor
Department of Biotechnology
Dr.NGP ASC

Isolation, Screening, Statistical media optimization, Purification and Structural characterization of bioactive compound from marine derived Streptomyces sp JS-S6.

Saranya Somasundaram, V. Satheeja Santhi and Robinson David Jebakumar Solomon

Department of Molecular Microbiology, School of Biotechnology, Madurai Kamaraj University, Madurai - 625021, India

Abstract- Exploitation and overuse of antibiotics in the health sectors leads to the development of resistance mechanism in microbes against antibiotics. As a consequence, there is a vital need to develop effective lead compound from natural sources. Compounds derived from marine habitat have a remarkable nature of unique chemical structures and exhibit bioactivity, so it can be used in the treatment against antibiotic resistant clinical pathogens. The present study was mainly focused on isolation and screening of novel *Streptomyces* species against clinical pathogens from unexplored marine environment. In this study, thirty five actinomycetes isolates were identified. Among these, the isolate JS-S6 exhibits a strong antagonistic effect against the pathogens used. The 16S rRNA gene analysis of the isolate JS-S6 showed that it was similar to *Streptomyces viridobrunneus*^{T} LMG20317 and named as *Streptomyces* sp JS-S6. The Scanning Electron Microscopy (SEM) studies revealed that the spores were highly abundant, irregular in shape and distributed unequally. One Factor at a time (OFAT) medium optimization revealed that starch, ammonium sulphate and seven days of incubation period as efficient factor to emphasis the maximum biomass production and highest antibacterial activity. Placket Burman method and central composite design of response surface methodology in statistical media optimization disclosed the significant factors were starch, ammonium sulphate and Sodium chloride and their optimum concentration were 1%, 0.2% and 0.1 % respectively for maximum biomass production and antibacterial activity. Mass fermentation was carried out with optimized medium and purification of crude extract was done by silica column chromatography. The UV-Visible spectroscopy analysis showed that the compound has maximum absorption at 260.0 nm and FTIR analysis revealed the presence of methoxy functional group. The GC-MS analysis also strongly suggest that the bioactive metabolite was found to be Methyl N-hydroxybenzenecarboximidate (Oxime-Methoxy phenyl compound) when compared with mass spectra of Wiley and NIST95 database. The compound exhibited strong antibacterial activity against clinical pathogens without exhibiting cytotoxicity potential against H9C2 cell line. From this study it was clear that the bioactive compound from *Streptomyces* sp. JS-S6 have antibacterial activity against clinical pathogens. In future, it can be developed as potential lead molecule against pathogens that develop resistance against antibiotics.

Index Terms- Marine *Streptomyces*, media optimization, Spectroscopy studies.

I. Introduction

Combating drug resistant bacteria was found to be nightmare scenario for most of the clinicians. In order to overcome this issue, the lead bioactive molecule derived from natural source can be used as an effective drug candidate against the emerging drug resistance pathogens. Currently, most of the available drugs were originated from the microbial source (Singh *et al.*, 2014). Bioactive molecules from marine microbes with unique chemical entity have the ability to tackle the drug resistant bacteria and can be developed as broad spectrum antibiotics in future (Mangamuri *et al.*, 2016). In the marine microbial world, *Streptomyces* genus of actinomycetales order made headway as the lead bioactive molecule producer in the synthesis of commercially important pharmaceutical products (Manivasagan *et al.*, 2014). *Streptomyces* are filamentous gram positive bacteria with inimitable and complicated secondary metabolite pathways that synthesize antibiotics, antitumor agents, immunosuppressants and enzyme inhibitors (Khattab *et al.*, 2016). Most of the antibiotics that are currently in usage were obtained from the genus *Streptomyces*. In Microbial natural product, surplus amount of starting material for the drug candidate can be obtained from the fermentation process (Carter, 2011). In the present study, among 35 isolates, the isolate JS-S6 showed antagonistic effect against the clinical pathogens was selected. It was then subjected to media optimization, mass fermentation, purification and spectral studies of the purified compound. Cytotoxicity of the bioactive compound was verified with the H9C2 normal cell line .

II. Materials Methods

Isolation and screening for antagonistic isolate:

The sediment sample used in the study was collected at a depth of 2.0 m from the mangrove estuary of Arabian Sea, Kanyakumari district, located in southern part of India (8.0883° N, 77.5385° E). The sediment samples were transported to the laboratory in aseptic condition. Isolation was carried out using 1.0 g of marine sediment sample by standard serial dilution and plating method in Actinomycetes Isolation medium that constitutes of Soluble Starch 20 g, KNO_3 1 g, NaCl 0.5 g, K_2HPO4 0.5 g, $MgSO_4.7H_2O$ 0.5 g, $FeSO_4.7H_2O$ 20 µM, Agar 15 g in 1000 ml of brackish water from mangrove habitat (Santhi and Jebakumar , 2011). Nalidixic acid (50.0 µg mL^{-1}) and Ketoconozole (50.0 µg mL^{-1}) were added to inhibit the growth of

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A novel marine bacterium *Isoptericola* sp. JS-C42 with the ability to saccharifying the plant biomasses for the aid in cellulosic ethanol production

Velayudhan Satheeja Santhi, Ashutosh Gupta, Somasundaram Saranya, Solomon Robinson David Jebakumar*

Department of Molecular Microbiology, School of Biotechnology, Madurai Kamaraj University, Madurai 625 021, Tamil Nadu, India

ARTICLE INFO

Article history:
Available online 17 May 2014

Keywords:
Isoptericola
Saccharification
Cellulosic ethanol

ABSTRACT

The ever growing demands for food products such as starch and sugar produces; there is a need to find the sources for saccharification for cellulosic bioethanol production. This study provides the first evidence of the lignocellulolytic and saccharifying ability of a marine bacterium namely *Isoptericola* sp. JS-C42, a Gram positive actinobacterium with the cocci cells embedded on mycelia isolated from the Arabian Sea, India. It exhibited highest filter paper unit effect, endoglucanase, exoglucanase, cellobiohydrolase, β-glucosidase, xylanase and ligninase effect. The hydrolytic potential of the enzymes displayed the efficient saccharification capability of steam pretreated biomass. It was also found to degrade the paddy, sorghum, *Acacia mangium* and *Ficus religiosa* into simple reducing sugars by its efficient lignocellulose enzyme complex with limited consumption of sugars. Production of ethanol was also achieved with the *Saccharomyces cerevisiae*. Overall, it offers a great potential for the cellulosic ethanol production in an economically reliable and eco-friendly point-of-care.

1. Introduction

Cellulose is a structural framework of plant cell wall comprising of 35–50% weight basis of plant material [1] and one of the major constituents of renewable biomass. The major contribution for structural component in the cell wall is a cellulose complex comprising of linear polymer of β (1→4) glucose units. In plant cell walls, the cellulose contributes a microcrystalline structure and its component cellulose 1α, one of the stable isoform, which aids to 70% crystalline thus makes them hard material for saccharification [2]. The microcrystalline structure of cellulose is more difficult to hydrolyze economically into reducing sugars when compared to starch [3].

Generally cellulose hydrolytic enzymes are produced naturally by a wide range of microbial communities, including bacterial and fungal species. They are known to biosynthesize different types of cellulase enzymes, which have distinct metabolic actions on the breakdown of cellulose [4,5] and these enzymes play a key role in the large scale conversion of plant biomass into simple, reducing sugars and facilitate the possible opportunity in modern tools of biotechnological applications to meet the growing fuel demands [6]. Due to the high cost, ever growing demand and depletion of fossil fuel resources with global warming problems by the increased emission of greenhouse gases (GHG); the spread of cost-effective technologies for producing alternate renewable fuels such as ethanol from cellulosic biomass feedstocks have emerged both at research and industrial scale.

The second-generation biofuel, cellulosic ethanol is produced from non food based, renewable, fibrous lignocellulosic plant biomass. The lignocellulosic plant biomass is not used as a human food and is available as vast quantity at cheaper cost; hence there is no significant negative impact on the global food security [7]. Ethanol production from lignocellulosic materials involved a multistep process in which the size of the biomass should be reduced by pretreatment, enzymatic hydrolysis of cellulose and hemicellulose to simple sugars and finally conversion of released sugars into ethanol.

The crop stubbles left out in the field after harvesting (rice and sorghum) and tree residues were routinely burned around the globe which creates serious pollution and health issues [8]. However, all these crop residues represent a biofuel feedstock for ethanol production due to their cheaper cost, easy availability, easy processability, non-hazardous, non-abrasive, recyclable and environmental friendly nature. The aim of the present study is to

* Corresponding author. Tel.: +91 452 2459480.
E-mail address: jsolomon_mrna@yahoo.com (S.R.D. Jebakumar).

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Seaweed (*Eucheuma cottonii*) associated microorganisms, a versatile enzyme source for the lignocellulosic biomass processing

Velayudhan Satheeja Santhi, Ashok Kumar Bhagat, Somasundaram Saranya, Ganesan Govindarajan, Solomon Robinson David Jebakumar*

Department of Molecular Microbiology, School of Biotechnology, Madurai Kamaraj University, Madurai 625 021, Tamil Nadu, India

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ABSTRACT

Seaweeds are highly productive, macroscopic organisms inhabiting the marine environment which affords the shelter for a variety of microorganisms. However, the existence and functional significance of biofuel related enzyme producing bacterial groups are poorly understood. This study deals with the lignocellulosic biomass breakdown capability of the phylogenetically diverse microbial communities from the *Eucheuma cottonii* by their biofuel related enzymes. The lignocelluloses depolymerizing multi-enzyme complex, such as lignin peroxidase, xylanase and cellulases were present in all the 13 microbial isolates belonging to the genera Brachybacterium, Brevibacterium, Halomonas, Kokuria, Micrococcus, Nocardiopsis, Pseudomonas and Streptomyces. Their enzymatic saccharification level varied from 46 to 84% for the paddy straw and 48–83% for the biomasses of sorghum. The residual reducing sugar conversion rate was comparatively similar when ammonia pretreated and non-pretreated biomasses were subjected to enzymatic saccharification. Their efficient exo-, endo-acting cellulolytic and hemicellulolytic enzyme secretion in an active form is an emerging resource for the biofuel production by the potential of recycling the lignocellulosic biomasses.

Introduction

Lignocellulose is the most abundant renewable biomass produced by the plants which constitutes the complex structure imposed by the polymeric components such as cellulose, hemicellulose and lignin. All these polymeric components can be disintegrated by the enzymes with cellulolysis, lignolysis and hemicellulolysis effect and results in the release of fermentable sugars that can be further used as a source material for the biofuel i.e. cellulosic ethanol production. The biomass feedstocks for ethanol not only derived from harvested agricultural field crops, but also from waste residues of agricultural land crops and forest waste residues.

The microbial enzymes play an essential role in saccharification of plant biomass into fermentable sugars. However the cost of the commercial enzymes is a major barricade in determining the economy of cellulosic ethanol conversion process (Banerjee et al., 2010). Lignocellulolytic microorganisms are widespread in the environment which metabolizes a wide range of biomass substrates (Mosier et al., 2005). The cellulose can be converted into simple, reducing sugar by the saccharification methods based on physical-chemical or enzymatic process and enzymatic saccharification is the promising one when considering the economic and environmental issues. Present day research focused on finding the efficient lignocellulolytic enzyme systems with the main aim of sustainable bioconversion. While the most thoroughly studied cellulases were reported from fungal organisms like Trichoderma, Aspergillus and anaerobic bacteria like Clostridium (Galperin, 2008; Maki et al., 2009) relatively little is known about the cellulase enzyme producing aerobic bacteria distributed in the marine inhabitants or the environment. Discovering the lignocellulolytic enzymes in bacterial isolates from unexplored marine resources will facilitate the conversion of plant biomass into value added products like biofuels.

Seaweeds are highly persistent, productive and abundant eukaryotes that are widespread in the marine environment and also host a broad range of phylogenetically distinct microbial communities (Staufenberger et al., 2008). While many of their growth parameters making them a resource material in finding the alternate biofuel production (Candra et al., 2011), the specific microbial inhabitants with significance in biofuel conversion strategies and

* Corresponding author. Tel.: +91 452 2459480.
E-mail addresses: jsolomon_mrna@yahoo.com, get_rob2001@yahoo.com (S.R.D. Jebakumar).

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SP-22

SCREENING OF BIOACTIVE COMPOUNDS FROM MARINE ACTINOMYCETES

SARANYA SOMASUNDARAM[1]*, SOWMINI NAGARAJAN[2], VINOTH KANNA AYYACHAMY[3] AND NANDHINI BABU[4]

[1234] Department of Bioscience, Sri Krishna Arts and Science College, Coimbatore – 641 008, Tamil Nadu, India

Corresponding author: Email ssaranbio@gmail.com Mob. No.: 786792 4005

ABSTRACT

Antibiotic drug resistance was increasing among pathogens in recent years, so there is an emergency in need of new drugs to be developed. Bioactive compound from the natural sources can be used as a hit molecule in the development of the new drug candidate against the drug resistant pathogens. In this study, eight isolates was obtained from marine sediment that was collected from van island of Tuticorin district, Tamil Nadu, India. The isolate S8 showed inhibitory effect against *Staphyloccus aureus* ATCC 6538 in both well diffusion and disc diffusion methods. From the molecular analysis, the antagonist isolate S8 was found to be *Streptomyces* sp. which was confirmed using the morphological and cultural characteristic and it was named as *Streptomyces* sp S8. The maximum antibacterial activity was obtained when the media consists of starch (2% w/v), tryptone (1% w/v), 3%-4% NaCl concentration and at the neutral pH. Purification of bioactive components was carried out using the chromatography techniques. A maximum absorbance of the partially purified compound from isolate S8 was at 260-270 nm respectively. FTIR and GC MS analysis also confirmed the presence of the carboxyl and keto functional groups revealed the presence of compounds with antimicrobial and anti-oxidant property.

Keywords: ***Marine Environment, Streptomyces sp, Staphylococcus aureus, antibacterial activity***

INTRODUCTION

Multidrug resistance pathogens emerged due to continuous exposure of antibiotics in treatment against pathogens and further resistant was enhanced by self-medication, utilizing antibiotics for other purpose rather than health care system. New and effective lead compounds from natural resources have to be discovered hastily in order to compete against multidrug resistant pathogens. In general, two third of the earth surface was covered by marine environment. Marine environment has the resources for the discovery of numerous natural products with potential pharmaceutical properties and these marine natural products are derived from animals, plants and microorganisms (Aneiros and Garateix, 2004). The biomass of the marine sediments predominantly constitutes the microorganisms which are playing a key role in nutrient cycling, metabolism of pollutants and secondary metabolite production. Antibiotics from natural source, can be either bactericidal or bacteriostatic and most of them are derived from bacteria or fungi (Fenical and Jenson, 2006). *Streptomyces* are the filamentous, Gram-positive, spore forming bacteria that can synthesize different kind of biologically important therapeutic compounds. The members belonging to the *Streptomyces* from the unexploited marine sediment harbors the unexplored compound with unique chemical diversity for pharmaceutical lead compounds when compared to the terrestrial microbes. The antimicrobial natural products biosynthesized by the marine *Streptomyces* have immense applications in the human and veterinary medicine to treat infectious diseases caused by MDR pathogens.

MATERIALS AND METHODS

Isolation and screening of the antagonistic isolate

The marine sediment sample was collected from Van Island, Tuticorin district of Tamilnadu, India. The standard serial dilution method was done to isolate actimomycetes strains in the Actinomycetes isolation medium. The screening of the isolate with antibacterial activity was carried out using well diffusion and disc diffusion method against *Staphylocuss aureus* ATCC 6538 culture.

Optimization of AFEX pretreated agrowaste media for endoglucanase and xylanase production by *Stenotrophomonas maltophilia.*

Author(s) : Rohini, T. (/cabdirect/search/?q=au%3a%22Rohini%2c+T.%22) ; Santhi, V. S. (/cabdirect/search/?q=au%3a%22Santhi%2c+V.+S.%22) ; Saranya, S. (/cabdirect/search/?q=au%3a%22Saranya%2c+S.%22) ; Ebenezer, R. S. (/cabdirect/search/?q=au%3a%22Ebenezer%2c+R.+S.%22) ; Shakila, H. (/cabdirect/search/?q=au%3a%22Shakila%2c+H.%22) ; Shakila Harshavardhan (/cabdirect/search/?q=au%3a%22Shakila+Harshavardhan%22)

Author Affiliation : Department of Molecular Microbiology, School of Biotechnology, Madurai Kamaraj University, Madurai - 625 021, Tamil Nadu, India.

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Abstract : Translation of cellulosic biomaterials into simpler commercially beneficial products has gained attention during the past two decades. Endoglucanase and xylanase are such enzymes, which can convert complex lignocellulose into simple sugars, which can further be utilized for production of economically valuable products like ethanol. In this study, optimization of media components for the enhanced production of aforementioned enzymes was carried out by submerged fermentation (SMF) method, using Ammonia Fiber Explosion (AFEX) treated rice straw, a lignocellulosic waste from an agricultural field, as a substrate. Stenotrophomonas maltophilia, isolated from bio-gas waste slurry was used as production organism. The enzyme activities of endoglucanase and xylanase with unoptimized medium were 169.68 U/ml/min and 141.66 U/ml/min respectively. It was further optimized by statistical approaches like Placket-Burman design and Central Composite Design (CCD). Production was found to get significantly enhanced by Cellulose, K_2HPO_4, Yeast extract and peptone. The maximum activities predicted by the model value of 245.31 & 206.14 U/ml/min which was in good agreement with experimental values of 256.4 U/ml/min, 212 U/ml/min. However, lignin peroxidase activity decreased from 53.21 to 37.6 U/ml/min. The optimized production medium was finally determined to contain Cellulose (18.75 g/L), Di-Potassium Phosphate (3.75 g/L), yeast extract (2.5 g/L) and peptone (7.5 g/L).

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Coimbatore | Tamil Nadu | India

&

ipsr solutions limited

CERTIFICATE

This is to certify that

SaranyaSomasundaram

has participated in the

One Day Workshop on Outcome Based Education (OBE)

organisedby**Dr.N.G.PArtsandScienceCollege,Coimbatore** in

association with **ipsr solutions limited**

on**04 March 2023**

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Dr. Mendus Jacob
MD & CEO, ipsr solutions limited, India
Director - Valin UK, USA & Canada
Professor & Director, MCA
Marian College, Kuttikkanam, (Autonomous)

Prof. Dr. V. Rajendran
Principal
Dr. N.G.P. Arts and Science College (Autonomous)
Dr. N.G.P. Nagar, Kalapatti Road, Coimbatore, Tamil Nadu

Dr. N.G.P. ARTS AND SCIENCE COLLEGE

(An Autonomous Institution, Affiliated to Bharathiar University, Coimbatore)
Approved by Government of Tamil Nadu & Re-accredited by NAAC with 'A++' Grade (3rd Cycle-3.64 CGPA)
Dr.N.G.P. Nagar, Kalapatti Road, Coimbatore – 641048
Website : www.dragpasc.ac.in Email : info@drngpasc.ac.in Phone : +91 - 422 - 2369100

INSTITUTION'S INNOVATION COUNCIL (Ministry of Education Initiative)

&

Dr. N.G.P. INSTITUTE OF TECHNOLOGY

(An Autonomous Institution)
Approved by AICTE-New Delhi & Affiliated to Anna University, Chennai
Recognized by UGC, Accredited by NAAC with A+ Grade & NBA (BME,CSE,ECE,EEE & MECH)
Dr.N.G.P. Nagar, Kalapatti Road, Coimbatore – 641048

SUSTAINABLE DEVELOPMENT GOALS

G20 भारत 2023 INDIA

TWO DAY WORKSHOP ON
PUBLIC FINANCIAL MANAGEMENT SYSTEM (PFMS)

CERTIFICATE

This is to certify that Dr. /~~Mr.~~ /~~Ms~~ S. SARANYA, Assistant Professor, Department of Biotechnology, Dr. N.G.P. ASC has participated in the **Two Day Workshop on PUBLIC FINANCIAL MANAGEMENT SYSTEM (PFMS)** held on 20th & 21st November, 2023.

(Dr. P. ARUN & Dr. P. SAMPATH)	(Dr. S.S. SUDHA & Dr. K. RAMASH KUMAR)	(Dr. S.U. PRABHA)	(Prof. Dr. K. RAMAMURTHI)
Organizing Secretaries	Convenors	Principal– Dr. N.G.P. iTECH	Principal –Dr.N.G.P. ASC

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29th Rank among Colleges in NIRF 2023

G. N. Mills, Coimbatore - 641 029, Tamil Nadu, India

ONE DAY HANDS-ON TRAINING & WORKSHOP ON "NETWORK PHARMACOLOGY FOR DRUG DISCOVERY"

ORGANIZED BY THE DEPARTMENT OF BIOCHEMISTRY

SPONSORED BY INDIAN SCIENCE CONGRESS ASSOCIATION, COIMBATORE CHAPTER

CERTIFICATE OF PARTICIPATION

This is to certify that Dr/Mr/Mrs. Dr. S. SARANYA, ASSISTANT PROFESSOR, BIOTECHNOLOGY, Dr. N.G.P. ARTS AND SCIENCE COLLEGE, COIMBATORE. has actively participated in the One Day Hands-on Training & Workshop on "Network Pharmacology for Drug Discovery" organized by the Department of Biochemistry, Kongunadu Arts and Science College (Autonomous), Coimbatore, in association with INDIAN SCIENCE CONGRESS ASSOCIATION, Coimbatore Chapter on 21.12.2023.

Dr. M. SANTHOSHKUMAR	Dr. R. T. NARENDHIRAKANNAN	Dr. V. SELVI	Dr. M. LEKESHMANASWAMY
Coordinator	Coordinator	Convenor	Principal

PSGR
Krishnammal College for Women

DST FIST PG COLLEGES (LEVEL A)
NEW DELHI

CERTIFICATE OF PARTICIPATION

This is to certify that Dr. S. SARANYA, ASSISTANT PROFESSOR IN BIOTECHNOLOGY, Dr. NGP ARTS AND SCIENCE COLLEGE, COIMBATORE has participated in the two day workshop on "Equipment Handling (HPLC & NPTA)" on 6 & 7 February, 2024, organized by the Science Departments (PG), PSGR Krishnammal College for Women, Coimbatore.

N. M. Andal
DST FIST Co-ordinator

Principal

Dr. R.V. ARTS AND SCIENCE COLLEGE

(Approved by Government of Tamilnadu & Affiliated to Bharathiar University and Accredited by NAAC)

Mettupalayam Road, Karamadai, COIMBATORE - 641 104.

V. Ramakrishnan
Managing Trustee

R. Sundar
Secretary

Ref : RVASC/ATT - 16274 /2023-2024

Date : 23.02.2024

ATTENDANCE CERTIFICATE

This is certify that Dr.S.SARANYA, Assistant Professor, Department of Biotechnology, Dr.N.G.P.Arts and Science College, Coimbatore. Acted as the Chief Guest of our Association Meeting held on 23/02/2024 and delivered an Information packed lecture on "FERMENTATION TECHNOLOGY".

PRINCIPAL

PRINCIPAL,
Dr. R.V. ARTS AND SCIENCE COLLEGE
Mettupalayam Main Road,
KARAMADAI-641 104.

www.drrvasc.ac.in rvascprincipal@gmail.com Phone : 04254 - 272202, 272254