



Vidyasagar University



Midnapore, West Bengal

721102

3.7.1: Copies of collaboration

Phone : (03463) 262-751
to
262-756
E mail : vbplanning46@gmail.com

Visva-Bharati

FOUNDED BY
RABINDRANATH TAGORE



SANTINIKETAN
PIN- 731 235
WEST BENGAL
INDIA

A.K. Dasgupta Centre for Planning and Development

Ref. No.....

Date.....

Ref.: AKD/RP/001/2021-22

Date: 16.08.2021

To

Dr. Sumahan Bandyopadhyay
Professor, Department of Anthropology
Vidyasagar University
Midnapore, West Bengal

Sub: Acceptance of Research Proposal for Working Papers.

Sir,

With reference to your submission of Research Proposal for Working papers, A.K.Dasgupta Centre, Visva-Bharati is please to inform you that your research proposal entitled "*Economy and Livelihood of the Folk Artisan Patua Community in Purba and Paschim Medinipur districts of West Bengal under the impact of COVID 19: Survival Strategies, Impact of Pandemic and Need for Future Plans*" has been accepted. You are requested to initiate and carry out the research work as soon as possible.

Title of the Research Proposal: *Economy and Livelihood of the Folk Artisan Patua Community in Purba and Paschim Medinipur districts of West Bengal under the impact of COVID 19: Survival Strategies, Impact of Pandemic and Need for Future Plans*

Principle Investigator: *Dr. Sumahan Bandyopadhyay, Professor, Department of Anthropology, Vidyasagar University, West Bengal*

The Principle Investigator needs to inform the Centre about the progress of the study and the study should be completed within the scheduled time period.

With best wishes,

Daya Shankar Kushwaha
Secretary to Chair Professor
A.K.Dasgupta Centre, Visva-Bharati



MUSEUM OF INTERNATIONAL
FOLK ART

706 Camino Lejo
Santa Fe, New Mexico, USA 87505

Dr. Sumahan Bandyopadhyay
Professor, Department of Anthropology
Director, Centre for Adivasi Studies and Museum
Vidyasagar University
Midnapore, West Bengal

May 6, 2021

Dear Dr. Bandopadhyay,

Thank you for your continued collaboration in our project about creative responses to the global coronavirus pandemic. Your research contribution has made it possible to include rural artisans, such as the patua community of West Bengal, in the project. Your ethnographic interviews with the artisan Anwar Chitrakar are especially valuable to our project as it adds contextual information and personal experience to our understanding of his paintings. You have been instrumental in our access to the artwork, and to the artisans. We do not speak Bengali, so your contribution as a translator has been essential. Finally, your collaboration in coordinating video calls, communication, and shipping make it possible to represent rural Bengali folk art in our museum project.

While your collaboration has already been instrumental, we ask for your continued cooperation with forwarding funds to the abovementioned rural artisan, Anwar Chitrakar. Our International Folk Art Foundation is providing Anwar Chitrakar an honorarium for paintings we would like to acquire for the Museum of International Folk Art's non-commercial, educational and documentary Asian folk art collection. The Foundation's Bank is unable to conclude a wire transfer directly to Mr. Chitrakar due to lack of a SWIFT or BIC code. Therefore, we ask if we may send the wire transfer to you and for you to then send or transfer the funds on to Mr. Chitrakar. Please forward INR 53,000 from the International Folk Art Foundation to Mr. Anwar Chitrakar.

We again thank you so much for your continued collaboration and cooperation. Please let me know if there are any questions."

Kind regards,

Felicia Katz-Harris
Senior Curator / Curator of Asian & Middle Eastern Art
505.476.1221

Nuremberg University of Music • Veilhofstraße 34 • 90489 Nuremberg

Department Musiktheorie/Musikwissenschaften
und Schlüsselqualifikationen

Dr. Lisa Herrmann-Fertig
E-Mail lisa.herrmann-fertig@hfm-nuernberg.de

Nuremberg, 28 March 2022

Subject: Invitation to the class “Musics of India”/project “Musics Crossing Borders”; Nuremberg University of Music, Germany

Dear Professor Sumahan Bandyopadhyay,
dear Sir or Madam,

Referring to our previous exchange via email and Zoom, which was initiated by Professor Indranil Acharya in the context of the international conference “Connecting Germany and South Asia - The Future of Higher Education and Research Cooperation” (October 2021; organised by the *German Academic Exchange Service*), and with many thanks for your efforts as well as interest, I would like to kindly invite you, your colleagues, students and musicians related to the Vidyasagar University, West Bengal and the *Centre for Adivasi Studies and Museum* to the class “Musics of India” that I am currently teaching at the Nuremberg University of Music, Germany.

The class is taught in a hybrid format in summer semester 2022 (from mid-March to mid-July 2022) on Thursdays from 16:15 to 17:45 (CET), which means that in addition to the participation in the classroom in Nuremberg, the possibility to participate via Zoom exists. The hybrid format will be supported by additional online tools which we are currently evaluating (e.g., *Moodle*, *Nextcloud*, *Camtasia*, *Open Music Academy*, *Conceptboard*). Please find attached a list that contains the exact dates and the preliminary planning of the class in summer semester 2022 (Curriculum).

I would like to kindly invite you to participate in the class “Musics of India” in the form of guest lectures, research discussions and/or musical performances on two Thursdays in summer semester 2022 and, therefore, to take part in active discussions that transcend—and enable all of us to go beyond—academic disciplines, generations and continents. In order to realise a joint participatory format, I furthermore would like to offer you, your students of the Vidyasagar University and affiliated musicians to participate in the class “Musics of India” during several sessions that I will teach, in which students of the Nuremberg University of Music will probably perform musics, and in sessions which several guest lecturers from further Indian institutions will arrange. All of these sessions will be taught and discussed in English and I am happy to issue your students written confirmations of participation (no fees; no ECTS credits).

Your participation would be of great interest for us, a great pleasure for all of our participants, and we would gain a lot from your expertise, as it is a matter very close to my—an ethnomusicologist's—heart to make Ethnomusicology, Multispecies Studies and Human-Animal Studies accessible to students and colleagues of the Nuremberg University of Music, to sensitise all of us for these topics. At the same time, it is a concern of the class "Musics of India" and of the entire project "Musics Crossing Borders" to overcome species boundaries in and with the help of musics, as well as to consciously transcend established patterns of thinking, listening and acting, which would be greatly enriched by your expertise and the exchange with you, your colleagues, students and musicians.

I consider the following points to be our common mission in the context of a first exchange, which we intend to continue in winter semester 2022/23 (mid-October 2022 to mid-February 2023) in the context of an online symposium with concerts on stages in Germany and India, which will be organised and supported by a team of the Nuremberg University of Music, as well as in the context of an excursion to India:

- to make minority voices—human and/or other-than-human—audible in music research and practice;
- to discuss them from different perspectives;
- to sensitise students, colleagues and musicians for established concepts and understandings of music; to point out their potentials as well as limits in academic, artistic and pedagogical contexts;
- to increase the consideration of folk musics and musics that are not classified as European art music;
- to initiate and deepen intercultural as well as multidisciplinary exchange between the Nuremberg University of Music and the Vidyasagar University as well as the *Centre for Adivasi Studies and Museum*.

I am already looking forward to your reply and wish to thank you very much in advance for your kind efforts.

Yours sincerely,



Dr. Lisa Herrmann-Fertig
(Research Assistant in Music Research and Human-Animal Studies)



दूरभाष / Tel : 26962819, 26567373,
26562134, 26562122 (EPBAX)
फैक्स / Fax : 26569908, 26515637,
26863847, 26862418
वेबसाइट/website: www.dst.gov.in

भारत सरकार
विज्ञान और प्रौद्योगिकी मंत्रालय
विज्ञान और प्रौद्योगिकी विभाग
टेक्नोलॉजी भवन, नया महरौली मार्ग
नई दिल्ली-110 016

GOVERNMENT OF INDIA
MINISTRY OF SCIENCE AND TECHNOLOGY
DEPARTMENT OF SCIENCE AND TECHNOLOGY
TECHNOLOGY BHAVAN, NEW MEHRAULI ROAD
NEW DELHI-110 016

File No. DST/INT/SL/P-25/2016

Dated: 25.06.2021

To,

Dr. Braja Gopal Bag
Professor of Vidyasagar University
Department Of Chemistry and Chemical Technology
Midnapore, West Bengal -721102.

Sub: - Project extended up to 31.12.2021 in respect of Indo-SL joint research project entitled
"Renewal chemicals from the plants of Indian subcontinent: Isolation, self-assembly and
utilization in drug delivery, medicines and catalysis" Reg

Sir,

I am directed to refer to your letter dated 28.02.2021 and to inform you that your request for
extension of the project has been considered by Competent Authority of this Department and the
project/duration has been extended up to 31.12.2021 without any additional cost for the project.

Charu
25/6/2021
(Dr. Charu Agarwal)
Scientist -C

International Cooperation Division, DST

डॉ. चारु अग्रवाल/Dr. CHARU AGARWAL
वैज्ञानिक 'सी' / Scientist 'C'
अंतर्राष्ट्रीय सहयोग / International Cooperation
विज्ञान और प्रौद्योगिकी विभाग
DEPTT. OF SCIENCE & TECHNOLOGY
भारत सरकार / GOVERNMENT OF INDIA
नई दिल्ली

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HOLISTIC
REPRESENTATION OF
HUMAN BODY

NCCS
National Centre
for Cell Science

IISER PUNE

Persistent

Certificate of Participation

Dr. Sandip Kumar Sinha

Participated in '**Manav Faculty Level Survey** on scientific reading practices, capabilities and challenges of undergraduate and postgraduate students' conducted by **Project Manav**.

16th - 27th December 2021

Prof M. V. Krishna Sastry
Project Co-Ordinator & Principal
Investigator, Scientist G
NCCS, Pune

Dr. Nagaraj Balasubramanian
Principal Investigator,
Associate Professor,
IISER, Pune

Dr. Anamika Krishanpal
Principal Investigator,
Senior Domain Specialist,
Persistent LABS, Pune



Revathy Vishwanath
Deputy Director
RP Division Incharge
Tel #011-26716690
E-mail: rpsicssr@gmail.com

Indian Council of Social Science Research
(Ministry of Human Resource Development)
JNU Institutional Area, Aruna Asaf Ali Marg
New Delhi – 110067
Website: www.icssr.org

SANCTION ORDER

F.No. G-24/2021-22/ICSSR/RP

Dated: 21-03-2022

The Registrar,
Vidyasagar University,
Medinipur-721102, West Bengal

Subject: Sanction of Research Programme entitled "Lives and Livelihoods of Migrant Workers from West Bengal : Aftermath of the spread of COVID-19" to Dr. Tarak Nath Sahu, Associate Professor, Vidyasagar University, Medinipur-721102, West Bengal.

Dear Sir,

1. The Indian Council of Social Science Research (ICSSR) considered the above Research Programme project submitted by Dr. Tarak Nath Sahu, Associate Professor, Vidyasagar University, Medinipur-721102, West Bengal. Co-Project Directors of the study are: -1. Dr. Sudarshan Maity, Deputy Director, The Institute of Cost Accountants of India, 12- Sudder Street, Kolkata, -700016, West Bengal.
2. The study, as proposed by the researcher, is to be located at and financially administered by your institution as per the guidelines of this award.
3. The ICSSR has sanctioned a grant-in-aid of Rs.15,00,000 (Rupees Fifteen lakh only) for the above research project and the grant will be released as follows:

First instalment @40% :	Rs. 6,00,000/-
Second instalment @ 20%:	Rs. 3,00,000/-
Third instalment @ 10% :	Rs. 1,50,000/-
Fourth Instalment @10% :	Rs. 1,50,000/-
Final instalment @15%:	Rs. 2,25,000/-
Publication Grant* @ 5-6% :	Rs. 75,000/-
Total	Rs. 15,00,000/-
Overhead charges over and above 5% or maximum Rs.1,00,000 :	Rs. 75,000/- **

(* to be retained by the ICSSR. ICSSR would publish it subject to the recommendation by the expert and relevant Committees for the purpose, from the overall budget, so to be retained by the ICSSR).

**will be released on successful completion of project after evaluation.

(The break-up budget approved by the ICSSR of Rs.15,00,000/- is enclosed.)

Finance Department, V.U.

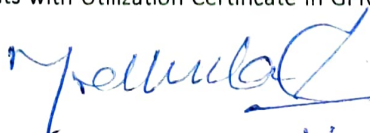
Received but Contents not Verified

Diary No. 25, Date 01/04/22

Time 3:52 Signature

[Handwritten Signature]

1. The **First** installment of the approved grant-in-aid will be released after receiving the grant-in-aid bill duly filled in, stamped and signed by the Project Director as well as the affiliating organization. (GIB already received).
2. In case, the study involves survey research, the finalized schedules/questionnaires (2 copies) designed to elicit information should be sent to the ICSSR as per the following schedule:
 - a) If the schedule /questionnaire for eliciting information is as per standard questionnaire, these will have to be sent to ICSSR immediately,
 - b) If the schedule /questionnaire for eliciting information are to be designed afresh keeping in view the requirements of the project, these will have to be sent to the ICSSR within a period of six months in any case.
6. The **Second instalment** will be released after receiving a satisfactory six/nine/ twelve months Progress Report (depending on the duration of the programme), simple statement of account of first instalment, published peer reviewed journal, signed minutes of the Advisory Committee approving progress made by the Project Director and recommending release of second instalment along with grant-in-aid bill towards the second instalment.
7. The **Third instalment** will be released will be released after receiving second Progress Report (depending on the duration of the programme), simple statement of accounts of the second instalment, signed minutes of the Advisory Committee approving progress made by the Project Director and recommending release of third instalment along with grant-in-aid bill towards the third instalment.
8. The **fourth instalment** will be released after receiving book length Final Report in soft copy (both word and PDF format), Executive Summary of Final Report in soft copy (both word and PDF format), 500 words abstract of the Final Report in soft copy, research papers published in peer reviewed journals duly acknowledging ICSSR, similarity index score sheet, simple statement of accounts of third instalment along with grant-in-aid bill towards the fourth instalment. Project Director is required to submit hard copies of the Final Report only after the confirmation from the ICSSR after incorporating the suggested changes. Such data or information relating to the research project as may be asked for by the ICSSR for preservation in its Data Archives should be given by the scholar.
9. The **publication grant** will be retained by the ICSSR & will be spent by the ICSSR Publication Division if the Final report is found publishable by an Expert Committee constituted by the ICSSR.
10. The scholar shall acknowledge support of ICSSR in all publications resulting from the project output (Research Paper, Books, Articles, Reports, etc.) and should submit a copy of the same to the ICSSR during its course and after completion.
11. **Final instalment** will be issued after receipt of recommendation of the expert for acceptance of the Final Report, Audited statement of accounts (AC) in prescribed format with utilization certificate (UC) in GFR-12A form for the entire approved project amount duly signed by the Finance Officer/Registrar /Director of the affiliating Institution, verification of all documents and decision on retaining of equipment and books etc. The institutions of which the accounts are not audited by CAG/AG, their utilisation certificate will be signed by the Finance Officer and a chartered accountant.
12. The **Overhead Charges** to the affiliating institution will be released after the Final Report has been accepted and documents verified by the ICSSR. The ICSSR reserves the right to change the affiliation if it is found that the affiliating institute is not co-operating with the scholar and it is not facilitating timely completion of the study.
13. The Project Director will ensure that the expenditure incurred by him conforms to the approved budget heads and relevant rules. Audited Statement of accounts with Utilization Certificate in GFR of 12A form is for the entire project amount approved for the project.



14. The University/Institution of affiliation will provide to the scholar office accommodation including furniture, library and research facilities and messengerial services. For this, the ICSSR shall pay to the University/Institution of affiliation **overhead charges @5%** over and above or maximum Rs.1,00,000 of the total expenditure incurred on the project only after successful completion of the project.
15. The Contingency Grant may be utilized for research and office assistance, books, stationary, computer cost, research assistance and the field work expenses of Project Director, Co-Project Directors and research personnel connected with the research work.
16. The overhead charges to the affiliating institution over and above @ 5% or maximum Rs.1,00,000 will be released only after successful completion of the project after evaluation. The accounts and the Utilization Certificate will be signed by the Finance Officer/Registrar/Principal/Director in the case of accounts of the institution are audited by CAG/AG. Otherwise, they need to be signed by the Finance Officer and the Chartered Account.
17. The Director of the research project will be **Dr. Tarak Nath Sahu** who will be responsible for its completion within **24 Months** from the date of commencement of the project, which is **07 March 2022**, as intimated by the scholar.
18. In case, the Project Director does not submit the periodic / final project report as per schedule with adequate justification, the scholar may be debarred from availing all future financial assistance from ICSSR.
19. All grants from ICSSR are subject to the general provision of GFR 2017.
20. The Project Director will ensure that the expenditure incurred by him conforms to the approved budget heads. The grant-in-aid is subject to all the conditions laid down in the Indian Council of Social Science Research (ICSSR) Research Projects available in the ICSSR website www.icssr.org
21. The expenditure on this account is debatable to the **Budget Head-ICSSR (Scheme Code 0877); OH 31.09 Research Projects**.
22. All project instalments will be transferred through **Public Finance Management System (PFMS)** and ICSSR shall implement the EAT module for ensuring transparency of expenditure at all levels and to ensure that there is no parking of funds.
23. As per MoE (Ministry of Education) instruction, the amount of grant sanctioned herein is to be utilized by **the end of the project duration**. Any amount of the grant remaining unspent shall be refunded to the ICSSR immediately after the expiry of the duration of the project. If the grantee fails to utilize the grant for the purpose for which the same has been sanctioned/or fails to submit the audited statement of expenditure within the stipulated period, the grantee will be required to refund the amount of the grant with interest thereon @ 10% per annum.
24. Any instalment release is subject to availability of grant, and satisfactory progress report of the scholar. Mere award of the study does not entitle the scholar for the release of any of the instalments.

Yours faithfully,


(Revathy Vishwanath)

For MEMBER-SECRETARY

Encl: as above.

Copy to:

1. Dr. Tarak Nath Sahu,
Associate Professor, Vidysasagr University,
Medinipur-721102, West Bengal
2. Dr. Dr. Sudarshan Maity,
Deputy Director, The Institute of Cost Accountants of India,
12- Sudder Street, Kolkata, -700016, West Bengal
3. Finance Branch, ICSSR, New Delhi
4. Record file


(Revathy Vishwanath)

For MEMBER-SECRETARY

Title: " **Lives and Livelihoods of Migrant Workers from West Bengal : Aftermath of the spread of COVID-19**"

By: **Dr. Tarak Nath Sahu**

S.No	Heads of Expenditure	Value (Rs.)
1	Project Director/Co-PD	
2	Research Staff: Full time/part time/Hired services	Not exceeding 45% of the total budget.
3	Field work	Not exceeding 35%
4	Equipment and study material	Not exceeding 12%
5	Contingency	Not exceeding 5%
6	Publication of report -	approx.5-7%
	Grand Total	ICSSR will finally make it 100%
	Affiliating Institutional overheads over and above the grand total	(Affiliating Institutional overheads @ 5% of the approved budget, subject to a maximum upper limit of Rs.1,00,000/-)

* The five percent (5-7%) publication amount will be spent by the ICSSR Publication Division if the Final report is found publishable by an Expert Committee constituted by the ICSSR.

➤ **Remuneration and Emoluments of Project Staff**

(a) Project staff could be engaged by the Project Director on a full/ part-time basis during the research work and the duration/consolidated monthly emoluments of their employment may be decided by the project director within the limits of the sanctioned financial allocation and as per the ICSSR rules (b) Research Associate @Rs.25, 000/- p.m. (Qualification – Post graduate in any social science discipline with minimum 55% marks and NET/SLET /M.Phil/Ph.D)(c)\Research Assistant @Rs.20, 000/- p.m.(Qualification-Ph.D./M.Phil./ Post graduate in social science discipline with minimum 55% marks(d) Field Investigator @ Rs.15, 000/-p.m. (not exceeding 6 months) (Qualification- Post graduate in any social science discipline with minimum 55% marks)(e).Retrospective payment for work already done is not permissible.

➤ **Re-appropriation:** The Project Investigator may with the permission of the Institution, re-appropriate expenditure from one sub-head to another, subject to a maximum of 5-7 % of the particular budget heads. If the study necessitates re-appropriation beyond 7%, it may be done only after the approval of the ICSSR

➤ **Selection of Research Staff** should be done through an advertisement and a selection committee consisting of (1) Project Director; (2) One outside Expert (other than the institute where the project is located); (3) a nominee of the Vice Chancellor/Head of the Institution and (4) Head of the Department)/Dean of relevant faculty duly approved by the competent authority.

➤ **For all field work related expenses** of Project Director, Co-Director and project personnel, rules pertaining to affiliating institutes shall be followed.

➤ **All equipment and books** purchased out of the project fund shall be the property of the affiliating institutions. On completion of the study, the Project Director shall submit an undertaking in this regard. The ICSSR, however, reserves the right to take charge of equipment and books, if it thinks it fit in a case.

➤ **Purchase of equipment/ assets** for the research Project is permissible only if it is originally proposed and approved by the ICSSR and does not exceed the permissible amount.

➤ **The scholar** should acknowledge the support of ICSSR in all publications resulting from the programme output (Research Paper, Books, Articles, Reports, etc.) and should submit a copy of the same to the ICSSR during its course and even after completion.

Art History and World

Art Studies

School of Art, Media and American Studies

University of East Anglia

Norwich, NR4 7TJ, UK

Direct Dial: 01603 592816

Email: D.Rycroft@uea.ac.uk

24th March 2022

Dear Prof Acharya,

Regarding:

**Academic Cooperation between Vidyasagar University (Department of English)
and the University of East Anglia (India Dialogue)**

Following a number of fruitful meetings between our two groupings, which we have found to be of immense interest value, especially in terms of our broad and shared agenda to implement Academic Social Responsibility as an integral component of education for sustainable development, I am pleased to write with the express intention of formalising this cooperation.

We hereby propose that four members of UEA's 'Humanities in India' partnerships programme - namely Prof Jon Cook, Dr Victoria (Tori) Cann, Prof Ralph Yarrow, and myself - commit to working with like-minded faculty members of the Department of English, with a view to our formulating and co-teaching a number of postgraduate classes in the coming months and years.

We would be very grateful if you could facilitate this process at your Department, and also to help us to organise the workings and timings of the classes. I would like to assure both yourself and your seniors that we would also like to commit to finding ways to involve student-to-student exchanges and field-based learning opportunities too.

For the upcoming phase of collaboration, we propose the following.

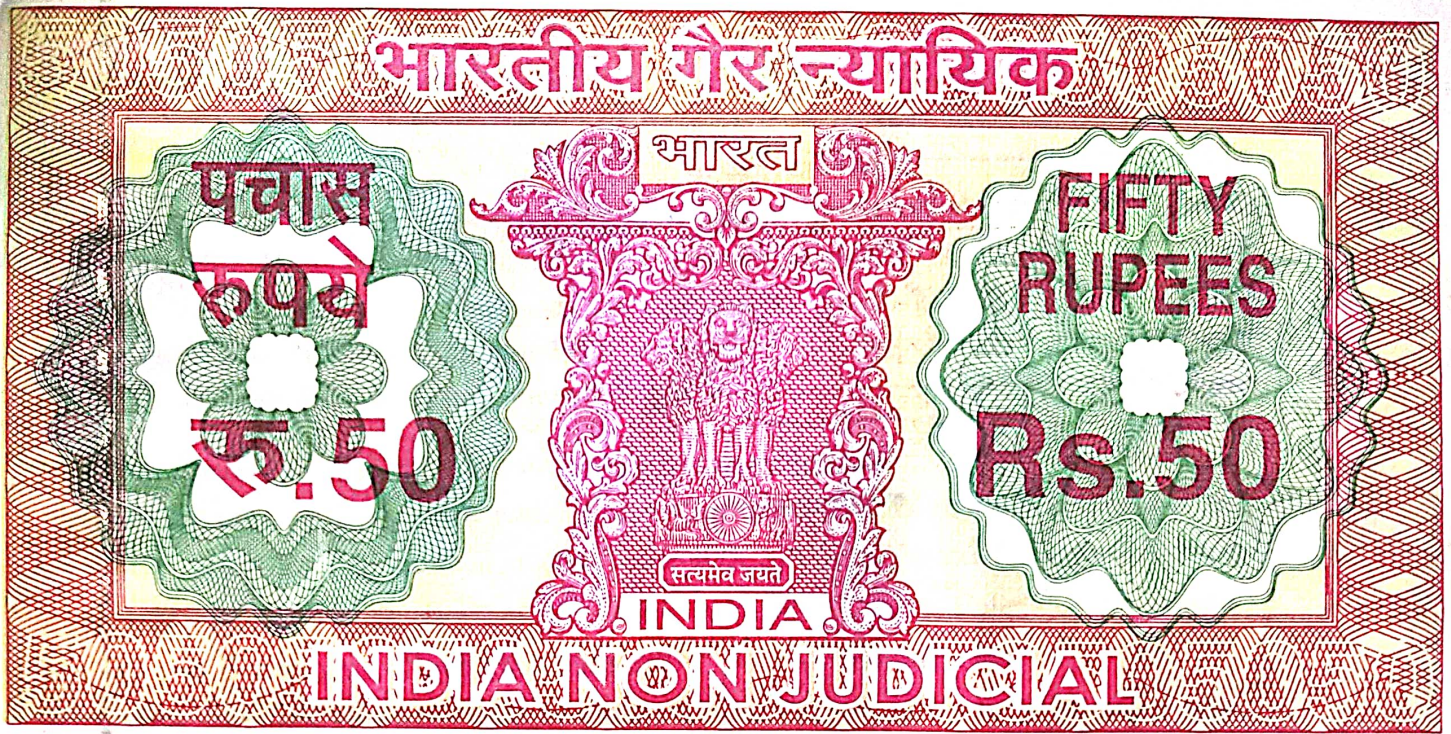
- Jon Cook: to either lead or co-teach a session on the poem entitled 'Looking Out' by Arvind Mehrotra, published in his Collected Poems (2014), concerning issues of decolonisation, translation, and perception.
- Ralph Yarrow: to either lead or co-teach a session on the work of Jana Sanskriti in India and of the Theatre of the Oppressed, with a view to understanding local experiences of activism and the process of writing and performing new social texts.
- Dan Rycroft: to either lead or co-teach a session on Adivasi Studies and anthropology in India, focusing on the resistance movements of Santal activists in the mid-nineteenth century and the memory of resistance in modern-day Jharkhand.

- Tori Cann: to contribute to a session to be devised and chaired by Dr Jolly Das on issues concerning gender equality.

We will be pleased to share further details about these plans for joint teaching, and to discuss these with the Department at the earliest opportunity. We thank you in advance for your consideration, look forward to further opportunities to engage these topics in view of your Department's own evolving pedagogy and our own series of Dialogues on Decolonisation.

Yours sincerely,

Dr Daniel J. Rycroft
Associate Professor, Arts and Cultures of Asia
Chair, India Dialogue (UEA)



पश्चिमबङ्ग पश्चिम बंगाल WEST BENGAL

AC 332789

Memorandum of Understanding (MoU)

Between

**ICAR-Central Inland Fisheries Research Institute, Barrackpore, West Bengal
(An Unit of Indian Council Of Agricultural Research, New Delhi)**

And

**Department of Fishery Sciences
Vidyasagar University, Midnapore, West Bengal**

This Memorandum of understanding (MoU) is made on this 23rd day of the month of December in the year 2021 by and between the ICAR-Central Inland Fisheries Research Institute, (ICAR-CIFRI) having its Head Office at Barrackpore, Kolkata-700120, West Bengal is the ONE PART and Department of Fishery Sciences, Vidyasagar University, Midnapore, West Bengal is the OTHER PART.

In accordance with the mutual consent to promote cooperation both the Institute and the University enter into a formal statement of collaboration in the form of Memorandum of Understanding (MoU) for the purpose of academic interaction as under:

1. Parties to the MoU

ICAR — Central Inland Fisheries Research Institute, Barrackpore

ICAR-Central Inland Fisheries Research Institute, Barrackpore under ICAR, a premier research Institute in the field of inland open water fisheries research, training and extension encompassing lacustrine, riverine, reservoir and floodplain environments, enhanced and culture-based fisheries, etc. besides conducting studies on aquatic pollution, behavior and migration of fishes and environmental impact assessment related to various developmental projects.

With the growing food scarcity in the country during and after the World War II, the need was felt for organizing fisheries research covering the entire country for harnessing the cultivable waters for fish production. This gave birth to Central Inland Fisheries Research Station (CIFRS) in March, 1947, at old Mint House, Strand Road, Calcutta. The present institution at Barrackpore, the oldest cantonment of India was formally declared open by Dr. B. C. Roy, the first Hon'ble Chief Minister of West Bengal on June, 17 in 1959. The administrative control of the CIFRI was transferred from the Ministry of Food and Agriculture, Government of India to the Indian Council of Agricultural Research with effect from October 01, 1967. The research programme of the Institute was thoroughly re-oriented and was re-drawn into priority laid and problem oriented projects during 1967.

The Institute has scientific cadre strength of 85 scientists working in inter-disciplinary mode in 5 full-fledged Divisions and two sections. In addition, the Institute has 4 Regional Centres and two Research Stations. The mandate of the Institute as approved by the ICAR is as follows:

- Basic and strategic research for sustainable management of inland openwater resources.
- Develop protocols for productivity enhancement in reservoirs and wetlands and aquatic ecosystems health management.
- Act as repository of information on inland open water fisheries resources.
- Human resource development through training, education and extension.

ICAR-CIFRI, Barrackpore is the Center of Excellence for research and innovation in the field of inland fisheries. This organization has a proven record for advance in researches in the field of fisheries science including riverine fisheries, fish breeding, population dynamics, climate change, health of aquatic ecosystems like river, wetland, reservoirs, lakes, tanks etc. on vital issues and other focused area covered under broader domains of advanced fish biology. Bio-informatics, molecular biology, disease diagnostics, econometrics and modeling beside this, Institute has expertise in enclosure culture and culture-based fisheries.

In order to encourage and facilitate best quality research, education and extension in inland openwater fisheries research and natural resource management in the country, ICAR— CIFRI, Barrackpore is keen to share its world class resources through collaborating with the universities/ organizations in this endeavor as per ICAR rules and guidelines.

Department of Fishery Sciences, Vidyasagar University (VU), Midnapore, West Bengal
Vidyasagar University is a State University and was established for enhancing academic environment of the rural areas of Medinipur and adjacent areas. Vidyasagar University came in to existence on 29th September, 1987 under the West Bengal State Universities (Amendment) Act, 1981 (West Bengal Act- 1/1981), and is presently functioning from Midnapore 721102. The Department of **Fishery Sciences** starts its journey in the year 2003 to fulfill the demand of different UG students of Vidyasagar University as well as Industrial Fish & Fisheries (IFF) of different state university. The department has crossed around 18 years of its academic journey producing more than 500 Post Graduate students and most of them have recruited in different corporate jobs including Government sectors. The Department of Fishery Sciences offers Master of Science (M.Sc.) and Doctor of Philosophy (Ph.D.) degree in Fisheries Science.

2. Scope of cooperation

The broad scope of work (but not limited to) are assisting Vidyasagar University in formulation of different Fisheries courses to create projects which can contribute to the development of the fisheries sector, the most vibrant sector under Agricultural domain through the acquired knowledge and skills and earned values while the students involved in such projects be engaged in public service or as an entrepreneur. On the other hand Department of Fishery Sciences, VU will assist **ICAR-CIFRI** in demonstration and conducting field trials of various technologies and tools including river ranching in Ganga and other rivers.

More specifically, ICAR-CIFRI and Department of Fishery Sciences, Vidyasagar University will extend cooperation in the following areas:

1. Capacity building of faculty members through in-service training in their specialized fields related to inland fisheries.
2. That the students of post-graduation and PhD Course registered with the Department of Fishery Sciences, Vidyasagar University will be allowed to undergo research programmes of specified duration with approval of both the Institutions and on payment of nominal charges (ICAR guidelines) as specified by ICAR-CIFRI, Barrackpore.

3. That the number of such students will be based on ICAR-CIFRI research agenda and availability of ICAR-CIFRI scientist's time to guide the students.
4. Identification of collaborative research programmes and field trials to be taken up.
5. Assisting in organizing study tours to the visiting faculty members and students and making them familiar with research and extension activities during their visit to CIFRI or its station or other research project sites.
6. Assisting in identification of potential in land fisheries intervention sites and lining them up for the Student Ready programme through on-site training and attachment to such sites.
7. Assisting in providing services of faculty members for the delivery of selected specialized courses and visits as and when required.
8. Collaboration in organizing joint seminars/ workshops.
9. Collaboration in conducting field trials of management practices, technologies and tools developed by ICAR-CIFRI, wherever appropriate
10. Development and demonstration of various forms of culture-based fisheries under community management
11. Both ICAR-CIFRI and Department of Fishery Sciences, VU will undertake jointly agreed student research programmes.

3. General Terms & Conditions

The MoU will be subject to the following terms and conditions between ICAR-CIFRI, Barrackpore and Department of Fishery Sciences, VU, Midnapore:

- I. The technical programme of research of the student will be decided by the Advisory committee in consultation with the Co-Guide/ Major Principal Guide of ICAR-CIFRI and Department of Fishery Sciences, VU as the case maybe.
- II. For guiding post-graduate and Ph. D. student as a major advisor/guide or co-guide in case of aforementioned joint programmes, staff members of the ICAR-CIFRI shall be accredited as faculty member by the university.
- III. The Department of Fishery Sciences, Vidyasagar University shall recognize the

ICAR Institute (ICAR-CIFRI, Barrackpore) and specific disciplines/ divisions/ departments as Centres for conducting research work for the award of post-graduate/ Doctoral degrees.

- IV. That the scientist/Officers of the ICAR-CIFRI, Barrackpore on their individual merit and in accordance with the UGC guidelines and University rules and regulations shall be recognized by Vidyasagar University as Supervisor/Co-supervisors/Guide/Co-guides/External supervisors for guiding research.
- V. That the Scientists and the Research Fellows/Young Professionals of the ICAR_CIFRI shall be allowed to register for Doctoral programs run by the Vidyasagar University. The scientists of the ICAR-CIFRI, Barrackpore may be incorporated in the Departmental Research Committee (DRC) as an expert in the relevant subject/field.
- VI. That the Department of Fishery Sciences, Vidyasagar University may invite ICAR-CIFRI Scientists/ Experts as visiting faculty members to deliver lectures as per requirement of the University in various courses. However, TA and DA may be borne by University; Suitable honorarium may also be given to concerned scientist as per University rules.
- VII. The programme of research duly approved by the Director ICAR-CIFRI and Dean/Principal Post-Graduate studies of Vidyasagar University pertaining to partial fulfillment of degree shall be termed as joint programme.
- VIII. For components of the teaching programme that require maintenance of academic record (attendance, conduct of examination, marks submission of results, etc.) of students, the concerned scientists shall ensure to maintain and submit the required records as per academic calendar and schedule of each other Institutions.
- IX. The student will be bounded by the rules and regulations of both the Institutions
- X. The implementation and regulation of MoU shall be monitored and discussed by the HOD/TIC, Department of Fishery Sciences, VU and the Director, ICAR-CIFRI from time to time and in case any interim modification/alternation that may be felt necessary shall be brought into force.
- XI. Any violation in aforesaid terms and conditions of the MoU may lead to termination of MoU after mutual discussion of the HOD/TIC, Department of Fishery Sciences, VU and the Director, ICAR-CIFRI.
- XII. Any dispute will be resolved amicably by holding discussions between the appropriate authorities of both the Institutions authorized by the respective Vice Chancellor/ Director. In all cases, the decision of the Vice-Chancellor/ Director of the Institute will be final and binding upon all concerned.

4. Intellectual Property Rights

i) That it is agreed that all outcomes of the ICAR-CIFRI, Barrackpore/Vidyasagar University, Midnapore pertaining to joint research activities, including all intellectual property rights (IPR), shall be jointly owned by both the parties.

ii) The University will be expected to ensure protection of Intellectual Property Rights generated or likely to be generated during the students' research work. The ICAR as the first applicant and the University shall be the joint applicants for IPRs and the students and involved scientific staff shall be included as the inventor/author. The "ICAR Guidelines for Intellectual Property Management and Technology Transfer/ Commercialisations" shall be the reference for exploitation of the generated intellectual property, and whose benefits sharing shall be mutually decided in each case.

iii) That, the research findings as a result of this collaborative work will be published in public interest after mutual agreement of both the parties. Any publication (s) resulting from the post-graduate research work must be processed jointly by the scientists/supervisors at ICAR-CIFRI, Barrackpore and the faculty at VU and explicitly recognize that work has been at ICAR-CIFRI, Barrackpore and VU, Medinipur. The norms already existing for publishing student's research at VU and that at ICAR-CIFRI, Barrackpore shall be followed. Research findings published by either party will give due credit to other party's contribution, but the publishing party shall be entirely responsible for flaw less conclusions and interpretations reported.

5. Effective Time Period

This agreement will be-in-effect from the date of signing this MoU by both the parties for five years and renewed further if mutually agreed. However, either party may terminate the agreement by written notification signed by the appropriate official of the Institution initiating the notice. Such notice must be received by the other party six months prior to the effective termination date. However, obligations and commitments already contracted shall be honored and continued by both the parties until such commitments are over. These commitments under agreement may be amended/modified/deleted after mutual agreement by means of exchange of letters between the Institute and the University. Once approved by both the parties, such amendment shall also become part of this Memorandum of Understanding (MoU).

6. IN WITNESS HEREOF, the Parties through their duly authorized representatives, hereby agree to the provisions of this Memorandum of Understanding drawn up in two originals.

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

Signed on behalf of First party

Director

ICAR-Central Inland Fisheries Research Institute,
Barrackpore, Kolkata WB

(Dr. B. K. Das)

7/11/2021
23/12/2021

Signed on behalf of Second Party

HOD/TIC
23/12/21

Department of Fishery Sciences
Vidyasagar University (VU)
Midnapore 721102, WB

Teacher-in-Charge
Dept. of Fishery Sciences
VIDYASAGAR UNIVERSITY
Midnapore-721102, W.B., India

Dr. Joydev
Maiti

Countersigned

Witness I

Witness I (DR. BASUDEB MANDAL)

23/12/2021

Witness II

Witness II

(Dr. Manoj K. Pati)

23/12/2021

105/106

Administrative
App. No. ENV/2017/29

No. BT/PR25092/NER/95/1009/2017
GOVERNMENT OF INDIA
MINISTRY OF SCIENCE & TECHNOLOGY
DEPARTMENT OF BIOTECHNOLOGY

Block 2, 6-8th Floors
CGO Complex, Lodhi Road,
New Delhi- 110 003
Dated: 23/09/2019

ORDER

Sanction of the President is hereby accorded, under Rule 18 of the Delegation of Financial Powers Rules, 1978, for the implementation of the project entitled: **"Cloning and expression of amylases from the microbes associated with hot springs niche and application of recombinant amylase for the production of 'limit dextrins' from starchy bioresources of Sikkim"** for a period of 3 Year 0 Month at a total cost of **Rs. 6269240** (Rupees Sixty Two Lakhs Sixty Nine Thousand Two Hundred and Fourty Only) on the terms and conditions detailed here under:-

2 The Project :

2.1 Title : "Cloning and expression of amylases from the microbes associated with hot springs niche and application of recombinant amylase for the production of 'limit dextrins' from starchy bioresources of Sikkim"

2.2 Details of the Investigators:

Project Coordinator

Dr. Nagendra Thakur
Assistant Professor
Department of Microbiology, Sikkim University,
6th Mile, Tadong, Gangtok, Sikkim, 737102

Principal Investigators:

Dr. Nagendra Thakur
Assistant Professor
Department of Microbiology, Sikkim University,
6th Mile, Tadong, Gangtok, Sikkim, 737102

Dr. Keshab Chandra Mondal
Associate Professor
Microbiology
Department of Microbiology Vidyasagar University
Midnapur, West Medinipur, West Bengal, 721102

Vaishali

2.3 Objectives:

Sikkim University:

1. To investigate the microbial diversity of hot-springs of Sikkim in different seasons using both culture-dependent and culture-independent techniques
2. To screen, isolate and characterize amylase producing thermophilic bacteria from the Hot Springs of Sikkim.
3. Isolation, screening and characterization of endoamylase related genes from the metagenome of Hot Springs of Sikkim.
4. Cloning of recombinant vector into suitable expressible host and Production of recombinant endoamylase.

Vidyasagar University, Midnapur

1. Scale-up for amylase production from recombinant organisms and Purification and characterization of recombinant endoamylase.
2. Optimization of reaction environment of free and immobilized enzyme for production of limit dextrans from raw starchy ingredients.
3. Isolation and characterization of limit dextrans.

2.4 Time Schedule:

The duration of the project is 3 Year 0 Month from the date of this sanction order.

2.5 Project Cost:

The total cost of the project is Rs. **6269240/-** (Rupees Sixty Two Lakhs Sixty Nine Thousand Two Hundred and Fourty Only) as per details given below :

Institute	Year I	Year II	Year III	Total Cost(Rs.)
1. Sikkim University	2106760	1051760	703600	3862120
2. Vidyasagar University, Midnapur	1021760	666760	718600	2407120
Total (Rs.)	3128520	1718520	1422200	6269240

Institute wise details are:

Budget Head	Year I	Year II	Year III	Total(Rs.)
1. Sikkim University				
Equipment	955000.00			955000.00
Manpower	401760.00	401760.00	453600.00	1257120.00
Overhead	50000.00	50000.00	50000.00	150000.00
Travel	50000.00	50000.00	50000.00	150000.00
Consumables	600000.00	500000.00	100000.00	1200000.00
Contingency	50000.00	50000.00	50000.00	150000.00
Total (Rs.)	2106760.00	1051760.00	703600.00	3862120.00
2. Vidyasagar University, Midnapur				
Equipment	300000.00			300000.00
Manpower	401760.00	401760.00	453600.00	1257120.00
Overhead	35000.00	30000.00	35000.00	100000.00
Travel	50000.00	50000.00	50000.00	150000.00
Consumables	200000.00	150000.00	150000.00	500000.00
Contingency	35000.00	35000.00	30000.00	100000.00
Total (Rs.)	1021760.00	666760.00	718600.00	2407120.00

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2.6 Equipment:

The details of the equipment sanctioned for the implementation of the project at Annexure-I

2.7 Manpower:

The details of the manpower sanctioned for the implementation of the project at Annexure-II

3. Head of Account:

The Non-Recurring expenditure involved is debitable to:

Demand No. 87	Department of Biotechnology
3425	Other Scientific Research 2019-2020
3425.60	Others (Sub Major Head)
3425.60.200	Assistance to other Scientific Bodies (Minor Head)
3425.60.200.29	Biotechnology Research and Development
3425.60.200.29.17	Assistance for Research and Development
3425.60.200.29.17.35	Grants for creation of capital assets

The Recurring expenditure involved is debitable to:

Demand No. 87	Department of Biotechnology
3425	Other Scientific Research 2019-2020
3425.60	Others (Sub Major Head)
3425.60.200	Assistance to other Scientific Bodies (Minor Head)
3425.60.200.29	Biotechnology Research and Development
3425.60.200.29.17	Assistance for Research and Development
3425.60.200.29.17.31	Grants -in-Aid General

4. Terms & Conditions:

Additional Terms and Conditions, specific for Twinning R and D program for NER

a. Both NER and Rest of India (RoI), Institutions scientists should work together for the objectives stated in the sanction of the project and any deviation from this would attract closure of the project at any point of time.

b. In the project review meetings, both the PIs from NER and RoI Institutions should participate and make presentation.

c. The outcomes of the project such as research papers, patents, copy rights etc. should be made jointly.

d. The NER Scientists are to be trained at the collaborating institute appropriately to empower the NER Scientists.

e. The project personal such as Research Associate, JRF or SRF, Research Assistant are also to be trained at least once in the collaborating national institute.

f. The collaborating institute scientist should visit NER institutions more frequently to guide NER scientists in design and conduct of experiments.

g. The Non-Recurring items must be procured and installed within 18-months of the sanction of the project, failing which the PIs have to return the remaining/unutilized Non Recurring grant with 10% of Interest.

h. In case the amount of grant-in-aid is refunded, the whole or a part amount of the grant, with an interest at 10% per annum there on shall be recovered.

4.1 The other terms and conditions governing this sanction are attached at Annexure- III.

4.2A Memorandum of Agreement (MoA) will be signed between the Department of Biotechnology and the grantee institution on Non-Judicial stamp paper Rs. 100/- in the enclosed format and the second release/installment will be made only after signing of MoA between the grantee institutions and DBT. In case of NGO's and Private Institution's, execution of MOA is mandatory before first release. A format of the MoA is enclosed in Annexure-IV

4.3 The Institute/Agency will keep the whole of the grant in a Bank Account earning interest, and the interest so earned should be reported to DBT in the Utilisation Certificate and Statement of Expenditure. The Interest so earned will be treated as created to the institute/Agency and shall be adjusted towards further installment of the grant and or at the time of Final Settlement of Accounts.

5. No International Travel will be undertaken from the sanctioned project grant unless specified otherwise.

6. The Registrar, Sikkim University, Gangtok, Sikkim and The Registrar, Vidyasagar University, Midnapur, West Bengal would be responsible for submission of Statements of Expenditure (SoE), utilization certificates (UC), Assets Certificates, Manpower staffing & expenditure details in prescribed DBT formats to DBT in respect of grants released in this project from time to time.

7. PI's of DBT sponsored projects can consider appointment of JRF from Category-II merit list of DBT-BET exam so that candidates can be paid fellowships at par with NET/GATE/BET qualified candidates as per DST OM No. A.SR/S9/Z-09/2012 dated on 21 Oct 2014. However, there is no compulsion on PI's to select candidates for JRF in their projects from Category-II of DBT-BET.

8. As per Rule 236 (1) of GFR 2017, the accounts of all Grantee Institutions or Organisations shall be open to inspection by the sanctioning authority and audit, both by the Comptroller and Auditor General of India under the provision of CAG(DPC) Act 1971 and internal audit by the Principal Accounts Office of the Ministry or Department, whenever the Institution or Organisation is called upon to do so.

9. If the Research Project involves biological resources, the obligations under the Biological Diversity Act 2002 as applicable shall be complied with by the Project Investigator, the details of such obligations can be accessed at www.nbaindia.org

10. If this project works requires any Statutory Clearance (such as Ethical Committee Clearance, Informed Consent, Animal Ethics Committee Clearance, Institutional Bio-safety Committee Clearance, National Biodiversity Authority approval etc.), Project investigator(s) and Host Institution(s) shall compulsorily comply the same before undertaking such activities.

11. This issues under the power delegated to this Department and with the concurrence of IFD vide their SAN No.102/IFD/SAN/1937/2019-2020 dated September, 21 2019.

12. This sanction order has been noted at serial no. 105/106 in the Register of Grants.


(Dr. Vaishali Panjabi)
Scientist 'E'

डॉ. वैशाली पंजाबी / Dr. VAISHALI PANJABI
वैज्ञानिक 'ई' / Scientist 'E'
बायोटेक्नोलॉजी विभाग / Deptt. of Biotechnology
विज्ञान और प्रौद्योगिकी, मंत्रालय / Mo Science & Tech.
भारत सरकार, नई दिल्ली
Page No. 174. Y. 77hi

To,

The Pay & Accounts Officer,
Department of Biotechnology,
New Delhi - 110 003.

Copy to:

- 1 The Principal Director of Audit (Scientific Departments), DACR Building, New Delhi- 110 002.
- 2 Dr. Nagendra Thakur (Project Co-ordinator), Department of Microbiology, 6th Mile, Tadong, Gangtok, Sikkim. 737102
- 3 The Registrar, Sikkim University, 6th Mile, Samdur, P. O. : Tadong, Gangtok - 737102, Sikkim
- 4 The Registrar, Vidyasagar University, Midnapur, West Medinipur - 721102, West Bengal
- 5 Dr. Keshab Chandra Mondal, Associate Professor, Department of Microbiology Vidyasagar University Midnapur - 721102, West Bengal
- 6 Dr. Nagendra Thakur, Assistant Professor, Department of Microbiology, Sikkim University, 6th Mile, Tadong, Gangtok - 737102, Sikkim
- 7 Cash Section, DBT (2 copies).
- 8 Sanction Folder.
- 9 File Copy.

Vaishali

(Dr. Vaishali Panjabi)
Scientist 'E'

डॉ. वैशाली पंजाबी / Dr. VAISHALI PANJABI
वैज्ञानिक 'ई' / Scientist 'E'
बायोटेक्नोलॉजी विभाग / Deptt. of Biotechnology
विज्ञान और प्रौद्योगिकी मंत्रालय / M/o Science & Tech.
भारत सरकार, नई दिल्ली / Govt. of India, N. Delhi

Annexure -I

Details of the Equipment sanctioned for the implementation of the project entitled "Cloning and expression of amylases from the microbes associated with hot springs niche and application of recombinant amylase for the production of 'limit dextrins' from starchy bioresources of Sikkim":

Sikkim University			
SNo.	Name of Equipment	No.	Cost(Rs.)
1.	Nanodrop Spectrophotometer	1	587000.00
2.	SDS Midi Gel Electrophoresis	1	368000.00
Total			955000.00
Vidyasagar University, Midnapur			
SNo.	Name of Equipment	No.	Cost(Rs.)
1.	PCR machine	1	300000.00
Total			300000.00



(Dr. Vaishali Panjabi)
Scientist 'E'

डॉ. वैशाली पंजाबी / Dr. VAISHALI PANJABI
वैज्ञानिक 'ई' / Scientist 'E'
बायोटेक्नोलॉजी विभाग / Dept. of Biotechnology
विज्ञान और प्रौद्योगिकी मंत्रालय / M/o Science & Tech.
भारत सरकार, नई दिल्ली / Govt. of India, N. Delhi

Annexure -II

Details of the manpower sanctioned for the implementation of the project entitled "**Cloning and expression of amylases from the microbes associated with hot springs niche and application of recombinant amylase for the production of 'limit dextrins' from starchy bioresources of Sikkim**":

Head	No. of Position	Year I	Year II	Year III	Total (Rs.)
1. Sikkim University					
JRF/SRF (1) (JRF @ Rs. 31000/- + 8 % HRA for the 1st & 2nd yr SRF @ Rs 35000/- + 8 % HRA for 3rd yr)	1	401760	401760	453600	1257120
Total(Rs.)		401760	401760	453600	1257120
2. Vidyasagar University, Midnapur					
JRF/SRF (1) (JRF @ Rs. 31000/- + 8 % HRA for the 1st & 2nd yr SRF @ Rs 35000/- + 8 % HRA for 3rd yr)	1	401760	401760	453600	1257120
Total(Rs.)		401760	401760	453600	1257120

Emoluments detail of research personal(s) mentioned in table(s) of Annexure-II shall be applicable only if candidate(s) met educational qualification and eligibility criteria as per DST OM No. SR/S9/Z-08/2018 dated 30.01.2019.

Vaishali

(Dr. Vaishali Panjabi)
Scientist 'E'

डॉ. वैशाली पंजाबी / Dr. VAISHALI PANJABI
वैज्ञानिक 'ई' / Scientist 'E'
बायोटेक्नोलॉजी विभाग / Deptt. of Biotechnology
विज्ञान और प्रौद्योगिकी, मंत्रालय / M/o Science & Tech.
भारत सरकार, नई दिल्ली / Govt. of India, N. Delhi

----- Forwarded message -----

From: **Katz-Harris, Felicia, DCA** <Felicia.Katz-Harris@state.nm.us>

Date: Tue, 25 Aug 2020 at 01:55

Subject: request for research collaboration

To: Sumahan Bandyopadhyay <sumahan.b@rediffmail.com>, sumahan Banerjee <sumahan.b@gmail.com>

Dr. Sumahan Bandyopadhyay

Associate Professor

Department of Anthropology

Vidyasagar University

Midnapore-721102, W.B.

India

Dear Dr. Bandyopadhyay,

I was given your contact information by our mutual colleague, Dr. Frank Korom.

I am the senior curator and curator of Asian folk art at the Museum of International Folk Art in Santa Fe, New Mexico, USA. We are preparing a small exhibition on folk artists' response to the global coronavirus pandemic. We are focusing on the creation and representations of face masks. I am writing to request your collaboration on research and also to help us acquire a Bengali patua scroll painting, by Svarna Chitrakar.

Our museum has worked with Svarna Chitrakar in the past, through Dr. Korom, who guest curated an exhibition on Bengali patas, and coordinated a program involving Svarna Chitrakar and other patuas who travelled to Santa Fe to demonstrate their craft. I recently saw Svarna's video of her performing a new scroll about coronavirus, depicting face mask wearing. It is this type of painting we would like to commission. We would request your help in contacting the artist and helping us coordinate the commission of her artwork. If it is possible, and with strict covid-safe practices in place, we would like to include a video of the artist singing and performing her scroll.

I recognize that this is asking for your time and we would like to offer a modest honorarium to you for your help. Of course we are happy to credit you for your role and for your help with interpreting and translating communications and the scroll's story, as I do not read or speak Bengali.

I look forward to being in touch.

Many thanks, and all the best,
Felicia Katz-Harris

.....
Felicia Katz-Harris, Senior Curator | Curator of Asian Folk Art

Museum of International Folk Art

706 Camino Lejo | Santa Fe, New Mexico, USA | 87505

Telephone + (505) 476-1221 | fax + (505) 476-1300

felicia.katz-harris@state.nm.us | www.internationalfolkart.org



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DISCLAIMER

Any views or opinions presented in this email are solely those of the author and do not necessarily represent those the University.

Letter of intent for collaborative research program

Data of professional cooperative partner:

Name of the organization : Maharaja Sriram Chandra Bhanja Deo University (MSCB University), Department of Biotechnology

Address : Takatpur, Baripada, Mayurbhanj, Odisha-757003, India

Authorized representative : Dr. Hrudayanath Thatoi, Professor

Data of Lead Partner :

Name of the organization : Vidyasagar University, Department of Microbiology

Address : Midnapore, West Bengal – 721102, India

Authorized representative : Dr. Keshab Chandra Mondal, Professor

The content of proposed collaboration

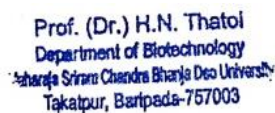
The above mentioned partners express their interest for collaborative research, student exchange and publications in the field of microbial biotechnology.

Vidyasagar University, May 16, 2020



Prof. Hrudayanath Thatoi

Principal researcher of MSCB University



Prof. Keshab Chandra Mondal

Principal researcher of Vidyasagar University



To Whom It May Concern

A linkage between Prof. G. Muhiuddin, Department of Mathematics, University of Tabuk, Saudi Arabia & his group and Prof. Madhumangal Pal, Department of Applied Mathematics, Vidyasagar University, India & his group have been created.

We have been working in different fields of fuzzy mathematics for the last five years, and from July 2021 to June 2022, the following papers have been jointly published.

- 1) Muhiuddin, G., Pramanik, T., Alanazi, A.M. *et al.* Independent Fuzzy Graph: A New Approach. *Proc. Natl. Acad. Sci., India, Sect. A Phys. Sci.* **92**, 373–389 (2022). <https://doi.org/10.1007/s40010-022-00769-w>
- 2) Sk. Amanathulla, G. Muhiuddin, D. Al-Kadi and M. Pal, Multiple Attribute Decision-Making Problem Using Picture Fuzzy Graph, *Mathematical Problems in Engineering* Volume 2021, Article ID 9937828, 16 pages <https://doi.org/10.1155/2021/9937828>
- 3) Chiranjibe Jana, G. Muhiuddin, Madhumangal Pal, and D. Al-Kadi, Intuitionistic Fuzzy Dombi Hybrid Decision-Making Method and Their Applications to Enterprise Financial Performance Evaluation, *Mathematical Problems in Engineering* Volume 2021, Article ID 3218133, 14 pages <https://doi.org/10.1155/2021/3218133>
- 4) Sk Amanathulla, G. Muhiuddin, D. Al-Kadi, and Madhumangal Pal, Distance Two Surjective Labelling of Paths and Interval Graphs, *Discrete Dynamics in Nature and Society* Volume 2021, Article ID 9958077, 9 pages <https://doi.org/10.1155/2021/9958077>
- 5) Jana, C., Muhiuddin, G. & Pal, M. Multi-criteria decision making approach based on SVTrN Dombi aggregation functions. *Artif Intell Rev* **54**, 3685–3723 (2021). <https://doi.org/10.1007/s10462-020-09936-0>
- 6) Chiranjibe Jana, G. Muhiuddin, Madhumangal Pal, and D. Al-Kadi, Intuitionistic Fuzzy Dombi Hybrid Decision-Making Method and Their Applications to Enterprise Financial Performance Evaluation, *Mathematical Problems in Engineering* Volume 2021, Article ID 3218133, 14 pages <https://doi.org/10.1155/2021/3218133>

Signature of collaborators with stamp



(Prof. G. Muhiuddin)

University of Tabuk




(Prof. Madhumangal Pal)

Professor Madhumangal Pal
Department of Applied Mathematics
Oceanology and Computer Programming
VIDYASAGAR UNIVERSITY
Midnapore-721102, W.B.



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कल्याण मंत्रालय, भारत सरकार

Indian Council of Medical Research
Department of Health Research, Ministry of Health
and Family Welfare, Government of India

File no. AMR/Adhoc/241/2020-ECD-II

Dated: 7/10/2020

To

The Registrar,
Vidyasagar University, Midnapore
West Bengal - 721102

Sub: Sanction and budget allotment for the New Schemes entitled "Molecular tracking of difficult-to-control carbapenem resistance among Enterobacteriales (Enterobacteriaceae) clinical isolates in West Bengal, India: Focusing on in vitro diagnostics for antimicrobial resistance (AMR) towards the optimization of antimicrobial and infection prevention stewardship program" under Dr. Surojit Das, Assistant Professor, Department of Bio-Medical Laboratory Science and Management, Vidyasagar University, Midnapore

Dear Sir,

The Director General of the Council sanctions the above mentioned research scheme initially for a period of **Three years** from 15.10.2020 subject to extension up to the total duration specified in para 3 below:

The Director General of the Council also sanctions the budget allotment of **Rs. 10,36,813/- (Rupees Ten Lakh Thirty Six Thousand Eight Hundred Thirteen Only)** as detailed in the attached statement for the period w.e.f. 15.10.2020 year ending on 14.10.2021 during 2020-21.

The grant in aid will be given subject to the following conditions:

1. The payment of the grant will be made in lump sum to the Head of the Institute. The first Installment of the grant will be paid generally as soon as report regarding the commencement of the project and appointment of the staff is received by the Council. The demand for payment of the subsequent installment of the grant should be placed with the Council in prescribed format attached.
2. The staff appointed on the project should be paid as indicated in the budget statement attached.

o/c

3. The approved duration of the research scheme is **Three Years**. The annual extension will be given after review of the work done on the research scheme during the previous years.
4. Fifteen copies of the annual progress report of work done be submitted to the Council every year after completion of ten months of the project. Failure to submit the report in time may lead to termination of the project.
5. The Institute will maintain a Separate Saving Bank Account of the receipts and expenditure incurred on the research scheme and will furnish a utilization certificate and an audited statement of the accounts pertaining to the grant.
6. **The grant shall be utilized after following provision laid down in GFR-2017 and TA rules.**
7. The other terms & condition are indicated in the website of ICMR (www.icmr.nic.in) for "Guidelines" for operation of projects for Grantees of ICMR's Extramural Research Projects". The receipt of the letter may please be acknowledged.
8. You are advised to seek concurrence of the council before disseminating the findings to journal, media or repositories

O/C

Yours Sincerely,

(Dr. Samiran Panda)
Head ECD, ICMR

No. AMR/Adhoc/241/2020-ECD-II

Copy forwarded for information to: -

1. Pl. Dr. Surojit Das, Assistant Professor, Dept. of Bio-Medical Laboratory Science and Management, Vidyasagar University, Midnapore-721102.
2. Accounts Section V, ICMR with two copies of the budget statement for information and necessary action.
3. Finance Section, ICMR with two copies of budget statement for compilation of the Council's budget.
4. IRIS Cell (2020-4919).
5. Mrs. Vandana, Sr. T.O.-II

(Dr. Samiran Panda)
Head ECD, ICMR


Budget Statement for 1st Year
Period from 15.10.2020 to 14.10.2021

S.No.	Head	1 st Year
1	Staff (One JRF) @ 31000/-pm + 8%HRA= 33480/-	4,01,760/-
2	Contingencies	
	Recurring (supplies, materials, consumables, etc.)	6,00,000/-
3	Travel	5,000/-
4	Overhead Charges (3%)	30,053/-
	Grand Total	10,36,813/-

Grand Total = Rs. 10,36,813/-

(Rupees Ten Lakh Thirty Six Thousand Eight Hundred Thirteen Only)

o/c


5/oct/2020
(Dr. Samiran Panda)
HEAD ECD, ICMR



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कल्याण मंत्रालय, भारत सरकार

Indian Council of Medical Research
Department of Health Research, Ministry of Health
and Family Welfare, Government of India

File No. AMR/Adhoc/241/2020-ECD-II
e-File No. 113315

Dated:.....

Subject:- Payment of 1st and final installment of 1st year grant-in-aid for the research scheme titled, **“Molecular tracking of difficult-to-control carbapenem resistance among Enterobacterales (Enterobacteriaceae) clinical isolates in West Bengal, India: Focusing on in vitro diagnostics for antimicrobial resistance (AMR) towards the optimization of antimicrobial and infection prevention stewardship program”** under **Dr. Surojit Das**, Assistant Professor, Department of Bio-Medical Laboratory Science and Management, Vidyasagar University, Midnapore

MEMORANDUM

The Director General, ICMR sanctions the payment of **Rs.10,36,813/- (Rupees Ten Lakh Thirty Six Thousand Eight Hundred Thirteen Only)** as the 1st and final installment of the 1st year grant for incurring expenditure in connection with the above mentioned research scheme. The amount of Rs.10,36,813/- may be debited from the provision of **Rs. 10,36,813/-** made for the above research scheme for the current financial year 2020-21.

A formal bill for **Rs. 10,36,813/-** is sent herewith for payment by **RTGS** for **Rs.10,36,813/-** to **“Vidyasagar University”**.

The amount may be debited to ICMR grant under ADHOC head.

o/c

[Signature]
(Dr. Samiran Panda)
Head ECD, ICMR

Accounts Section V, ICMR.
Copy to:-

1. The Registrar, Vidyasagar University, Midnapore, West Bengal - 721102.
2. Pl. Dr. Surojit Das, Assistant Professor, Dept. of Bio-Medical Laboratory Science and Management, Vidyasagar University, Midnapore, West Bengal-721102.
3. IRIS Cell (2020-4919).
4. Mrs. Vandana, Sr. T.O-II

[Signature]
Head ECD, ICMR



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कल्याण मंत्रालय, भारत सरकार

Indian Council of Medical Research
Department of Health Research, Ministry of Health
and Family Welfare, Government of India

File No. AMR/ADHOC/241/2020-ECD-II
e-File No. 113315

Dated: 15/06/2022

Subject:-Payment of 1st & Final installment of 2nd year grant-in-aid for the research scheme titled, “Molecular tracking of difficult-to-control carbapenem resistance among Enterobacterales (Enterobacteriaceae) clinical isolates in West Bengal, India: Focusing on in vitro diagnostics for antimicrobial resistance (AMR) towards the optimization of antimicrobial and infection prevention stewardship program” under Dr. Surojit Das, Assistant Professor, Department of Bio-Medical Laboratory Science and Management, Vidyasagar University, Midnapore.

MEMORANDUM

The Director General, ICMR sanctions the payment of **Rs.11,04,744/- (Rupees Eleven Lakh Four Thousand Seven Hundred Forty Four Only)** as the 1st & Final installment of the grant for 2nd Year for incurring expenditure in connection with the above mentioned research scheme. The provision of **Rs.11,04,744/-** made for the above research scheme for the current financial year 2022-23.

A sum of **Rs.11,003/-** is lying with the PI as unspent balance from the grant released during last year. A formal bill for **Rs.11,04,744/-** is sent herewith (i) for adjustment of **Rs.11,003/-** (ii) for payment of **Rs.10,93,741/-** by RTGS to “Vidyasagar University”.

The amount may be debited to ICMR grant under ADHOC head.

Ved Prakash
15/06/2022
(Ved Prakash)
Administrative Officer

Accounts Section V, ICMR.

Copy to:-

1. The Registrar, Vidyasagar University, Midnapore, West Bengal - 721102.
2. PI, Dr. Surojit Das, Assistant Professor, Dept. of Bio-Medical Laboratory Science and Management, Vidyasagar University, Midnapore, West Bengal.
3. IRIS Cell (Division of P&I, ICMR, **IRIS No. 2020-4919**)
4. Mrs. Vandana, Sr. T.O-II

Administrative Officer



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कल्याण मंत्रालय, भारत सरकार

Indian Council of Medical Research
Department of Health Research, Ministry of Health
and Family Welfare, Government of India

No. AMR/ADHOC/241/2020-ECD-II

Dated: 15/06/2022

To

The Registrar,
Vidyasagar University, Midnapore
West Bengal - 721102

Subject:- Continuation for the 2nd year for project entitled, **“Molecular tracking of difficult-to-control carbapenem resistance among Enterobacterales (Enterobacteriaceae) clinical isolates in West Bengal, India: Focusing on in vitro diagnostics for antimicrobial resistance (AMR) towards the optimization of antimicrobial and infection prevention stewardship program”** under **Dr. Surojit Das**, Assistant Professor, Vidyasagar University, Midnapore.

Sir,

The Director-General of the Indian Council of Medical Research sanctions an allotment for **Rs.11,04,744/- (Rupees Eleven Lakh Four Thousand Seven Hundred Forty Four Only)** as detailed in the attached budget statement for the above mentioned project for the year **01/01/2022 to 31/12/2022** during the year **2022-23** subject to the following conditions:

1. The grant will be released to the head of the Institution in 1st and final installment of 2nd year during the financial year on receipt of the demand in the prescribed form as indicated below:-

1st & Final installment of 2nd Year grant = Rs.11,04,744/-

While asking for the release of the installment it may be ensured that the amount for the pay and allowances of the staff who are actually in position is included. The unspent balance available out of the funds paid during the year 2020-21 should be intimated. This will be adjusted against the current year's grant.

2. A separate account for the grant received and expenditure incurred shall be maintained. The account will be subjected to audit by the authorized auditors of the Institutions. In case, facilities are not available for such auditing, the account will be audited by the Council's own internal auditors. Latest by the end of December, following the financial year for which the grant is paid, and audit certificate from the auditors to the effect that the accounts have been audited and that the money was actually spent on the objects for which it was sanctioned shall be submitted to the Council along with a list of non-expendable articles purchased out of the grant during the year. Any unspent balance would be refunded to the ICMR on termination of the scheme.

Further grants will be stopped unless audited statements of accounts and utilization certificate are received within a period of the year after the end of the financial year for which grant was sanctioned. Further grants will be stopped unless audited statements of accounts and utilization certificate are received within a period of the year after the end of the financial year for which grant was sanctioned.

3. The last installment of the grant will be paid on receipt of the audited certificate which should include all the liabilities of last year, expenditure incurred before but defrayed after termination of the scheme. The period to which the expenditure pertains should be shown clearly.

4. The grant will not be regarded as a subvention, towards the normal work of the Institution but should be exclusively utilized for the Research activity for which it has been sanctioned.

5. Expenditure should on no account exceed the allotment sanctioned for the enquiry. Expenditure incurred over and above the sanctioned amount against one or more subheads of expenditure such as pay allowances, contingencies, etc. shall be met without reference to the ICMR by re-appropriation of savings under remaining sub-heads provided that the total expenditure incurred during the financial year. No expenditure shall however, be incurred by re-appropriation of savings on items not sanctioned by the Council i.e. non-consumable equipment, stores not sanctioned by the Council Savings shall also not be re-appropriated for meeting on incurring expenditure on staff that has not been sanctioned by the Council.

6. The grant paid by the Council shall be refunded in full by the institution if and when the grantee concerned discontinues a scheme midway or does not follow the detailed technical programme laid down and approved.

7. Receipt, realized by the project officer on behalf of ICMR project, if any, will be remitted to the Council as miscellaneous receipts and not utilized for meeting expenditure of the project.

8. All facilities for conduct of the research scheme basic equipment and ordinary laboratory chemicals, glassware, furniture and other assistance, as may be required, for the smooth working of the research scheme shall be provided by the Institute.

9. The stores purchased out of the grant of the Council shall be entered in the property stock register and presented auditors for check and endorsement. The usual forms used for these registers and all purchases made in accordance with the procedure in vogue in your institution.

10. Only such equipment for which provision has been made in the budget shall be purchased.

11. All the non-expendable articles purchased out of the funds of the Council will be the property of the Council and will not be disposed of without their concurrence.

STAFF

12. The staff employed on the research schemes will not be the Council's employee but for all purposes be treated as employees of the Institute and will be subject to the rules and administrative control of the Institute and will be in accordance with the normal recruitment's rules and procedures of the Institute. The scale of pay, allowances etc. applicable to the staff of the schemes will be the same as admissible under the rules of the grantee Institution. Prior approval of the Council will however be necessary if pay higher than that admissible under the rules of the Institution is sought to be given e.g. by grant of advances increments or ad-hoc increase.

13. The Council will not be liable to bear any expenditure pension provident fund contribution and or leave salary contribution incurred or committed by the grantee and person appointed on deputation from any other organization.

Report of Work Done

14. The grant is being sanctioned on the condition that reports on the progress of work done on the research scheme will be submitted by you to the Council as and when called for. Normally a progress report of work done on the enquiry is to be submitted to the Council as and when required, the enquiry may be discontinued immediately unless there is sufficient justification for non-submission of the report of work done on the research scheme.

Publication

15. The financial assistance rendered by the Council will be acknowledged in any published account of work which the grant is given.

16. A list of papers published based on the work carried out on enquiry under the auspices of the ICMR shall be obtained before publication of any such paper in a foreign journal.

Patents

17. The Council shall have the right to take out patent in respect of invention/discoveries made under scheme protect financial by the Council. The Officer-in-charge or the staff employed on. ICMR scheme shall not apply or obtain patents for any invention/discovery made by them without prior approval of the Council.

18. All the patents will be registered in the name of the Indian Council of Medical Research.

Termination of Research Scheme

19. Prior permission of the Council shall obtained if the investigator desires to discontinue the research scheme. The reasons for discontinuing the scheme should invariably be stated.

20. A final report is required to be submitted within one month from the date of termination of the research scheme.

21. A list (in duplicate) of non-expendable and expendable articles together with property registers and suggestions for disposal of the articles should be sent to the Council within a month from the date of termination of the research scheme.

22. The Institute will maintain a **separate saving bank account** of the receipts and the expenditure incurred on the research scheme and will furnish a utilization certificate and an audited statement of the account pertaining to the grant.

The grant will be utilized after following provision laid down in GFR-2017 and TA rules.

The receipt of this letter may kindly be acknowledged.

Yours faithfully,

(Signature)
15/06/2020

(Ved Prakash)

Administrative Officer

File No.AMR/ADHOC/241/2020-ECD-II

Copy together with a copy of the budget statement forwarded for information to :-

1. PI, Dr. Surojit Das, Assistant Professor, Dept. of Bio-Medical Laboratory Science and Management, Vidyasagar University, Midnapore-721102.
2. Copy together with two copies of the budget statement forwarded to the **Accounts Section V, ICMR** for information and necessary action.
RFC No. (P-66)/ECD/Adhoc/26/2020-21, Dated:26/09/2020
3. IRIS Cell (Division of P & I), ICMR. **IRIS No. 2020-4919**
4. Mrs. Vandana, Sr. TO-II

Administrative Officer

Budget for 2nd Year
Period 01.01.2022 to 31.12.2022

Sr. No.	Head	2 nd Year
1.	Staff One JRF @ 31000/-pm + 9% HRA= 33,790/-	4,05,480/-
2.	Contingencies	
	Recurring (supplies, materials, consumables, etc.)	5,50,000/-
3.	Travel	10,000/-
4.	Overhead Charges (3%)	28,664/-
	Total	9,94,144/-

Additional Budget for Field Laboratory Attendant (01.06.2022 – 31.12.2022)

Sr. No.	Head	2 nd Year (for 7 months)
1.	Staff Field Lab. Attendant-1@ 15,800/- PM	1,10,600/-

Grand Total = 9,94,144 + 1,10,600 = 11,04,744/-/-

(Rupees Eleven Lakh Four Thousand Seven Hundred Forty Four Only)

Ved Prakash
15/06/2022

(Ved Prakash)
Administrative Officer



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Indian Council of Medical Research
Department of Health Research, Ministry of Health
and Family Welfare, Government of India

No. AMR/ADHOC/241/2020-ECD-II

Dated: 02/03/2023

To

The Registrar,
Vidyasagar University, Midnapore
West Bengal - 721102

Subject: - Continuation for the 3rd year for project entitled, **“Molecular tracking of difficult-to-control carbapenem resistance among Enterobacterales (Enterobacteriaceae) clinical isolates in West Bengal, India: Focusing on in vitro diagnostics for antimicrobial resistance (AMR) towards the optimization of antimicrobial and infection prevention stewardship program”** under Dr. Surojit Das, Assistant Professor, Vidyasagar University, Midnapore.

Sir,

The Director-General of the Indian Council of Medical Research sanctions an allotment for **Rs. 9,85,034/- (Rupees Nine Lakh Eighty Five Thousand Thirty Four Only)** as detailed in the attached budget statement for the above mentioned project for the year **01/01/2023 to 31/12/2023** during the year **2022-23** subject to the following conditions:

1. The grant will be released to the head of the Institution in two installments during the financial year on receipt of the demand in the prescribed form as indicated below:-

1 st installment	= Rs.8,86,531/-
2 nd installment	= Rs. 98,503/- (Second/Final Installment will be release on receipt of SOE/Audited Statement & final report of the project)
Total	= Rs.9,85,034/-

While asking for the release of the installment it may be ensured that the amount for the pay and allowances of the staff who are actually in position is included. The unspent balance available from previous year should be intimated. This will be adjusted against the current year's grant.

2. A separate account for the grant received and expenditure incurred shall be maintained. The account will be subjected to audit by the authorized auditors of the Institutions. In case, facilities are not available for such auditing, the account will be audited by the Council's own internal auditors. Latest by the end of December, following the financial year for which the grant is paid, and audit certificate from the auditors to the effect that the accounts have been audited and that the money was actually spent on the objects for which it was sanctioned shall be submitted to the Council along with a list of non-expendable articles purchased out of the grant during the year. Any unspent balance would be refunded to the ICMR on termination of the scheme.

Further grants will be stopped unless audited statements of accounts and utilization certificate are received within a period of the year after the end of the financial year for which grant was sanctioned. Further grants will be stopped unless audited statements of accounts and utilization certificate are received within a period of the year after the end of the financial year for which grant was sanctioned.

3. The last installment of the grant will be paid on receipt of the audited certificate which should include all the liabilities of last year, expenditure incurred before but defrayed after termination of the scheme. The period to which the expenditure pertains should be shown clearly.
4. The grant will not be regarded as a subvention, towards the normal work of the Institution but should be exclusively utilized for the Research activity for which it has been sanctioned.
5. Expenditure should on no account exceed the allotment sanctioned for the enquiry. Expenditure incurred over and above the sanctioned amount against one or more subheads of expenditure such as pay allowances, contingencies, etc. shall be met without reference to the ICMR by re-appropriation of savings under remaining sub-heads provided that the total expenditure incurred during the financial year. No expenditure shall however, be incurred by re-appropriation of savings on items not sanctioned by the Council i.e. non-consumable equipment, stores not sanctioned by the Council Savings shall also not be re-appropriated for meeting on incurring expenditure on staff that has not been sanctioned by the Council.
6. The grant paid by the Council shall be refunded in full by the institution if and when the grantee concerned discontinues a scheme midway or does not follow the detailed technical programme laid down and approved.
7. Receipt, realized by the project officer on behalf of ICMR project, if any, will be remitted to the Council as miscellaneous receipts and not utilized for meeting expenditure of the project.
8. All facilities for conduct of the research scheme basic equipment and ordinary laboratory chemicals, glassware, furniture and other assistance, as may be required, for the smooth working of the research scheme shall be provided by the Institute.
9. The stores purchased out of the grant of the Council shall be entered in the property stock register and presented auditors for check and endorsement. The usual forms used for these registers and all purchases made in accordance with the procedure in vogue in your institution.
10. Only such equipment for which provision has been made in the budget shall be purchased.
11. All the non-expendable articles purchased out of the funds of the Council will be the property of the Council and will not be disposed of without their concurrence.

STAFF

12. The staff employed on the research schemes will not be the Council's employee but for all purposes be treated as employees of the Institute and will be subject to the rules and administrative control of the Institute and will be in accordance with the normal recruitment's rules and procedures of the Institute. The scale of pay, allowances etc. applicable to the staff of the schemes will be the same as admissible under the rules of the grantee Institution. Prior approval of the Council will however be necessary if pay higher than that admissible under the rules of the Institution is sought to be given e.g. by grant of advances increments or ad-hoc increase.
13. The Council will not be liable to bear any expenditure pension provident fund contribution and or leave salary contribution incurred or committed by the grantee and person appointed on deputation from any other organization.

Report of Work Done

14. The grant is being sanctioned on the condition that reports on the progress of work done on the research scheme will be submitted by you to the Council as and when called for. Normally a progress report of work done on the enquiry is to be submitted to the Council as and when required, the enquiry may be discontinued immediately unless there is sufficient justification for non-submission of the report of work done on the research scheme.

Publication

15. The financial assistance rendered by the Council will be acknowledge in any published account of work which the grant is given.

16. A list of papers published based on the work carried out on enquiry under the auspices of the ICMR shall be obtained before publication of any such paper in a foreign journal.

Patents

17. The Council shall have the right to take out patent in respect of invention/discoveries made under scheme protect financial by the Council. The Officer-in-charge or the staff employed on. ICMR scheme shall not apply or obtain patents for any invention/discovery made by them without prior approval of the Council.

18. All the patents will be registered in the name of the Indian Council of Medical Research.

Termination of Research Scheme

19. Prior permission of the Council shall obtained if the investigator desires to discontinue the research scheme. The reasons for discontinuing the scheme should invariably be stated.

20. A final report is required to be submitted within one month from the date of termination of the research scheme.

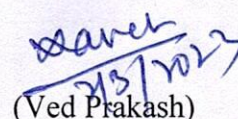
21. A list (in duplicate) of non-expendable and expendable articles together with property registers and suggestions for disposal of the articles should be sent to the Council within a month from the date of termination of the research scheme.

22. The Institute will maintain a **separate saving bank account** of the receipts and the expenditure incurred on the research scheme and will furnish a utilization certificate and an audited statement of the account pertaining to the grant.

The grant will be utilized after following provision laid down in GFR-2017 and TA rules.

The receipt of this letter may kindly be acknowledged.

Yours sincerely,


(Ved Prakash)

Administrative Officer

Copy to:-

1. PI, Dr. Surojit Das, Assistant Professor, Dept. of Bio-Medical Laboratory Science and Management, Vidyasagar University, Midnapore-721102.
2. Copy together with two copies of the budget statement forwarded to the **Accounts Section, ICMR** for information and necessary action.
RFC No : (P-66)ECD/Adhoc/26/2020-21 dt. 26/09/2020.
3. Copy together with two copies of the budget forwarded to the **Finance Section, ICMR** for compilation of the Council's budget.
4. IRIS Cell (Division of P & I), ICMR IRIS No. 2020-4919
5. Sr. T.O.-II

Administrative Officer

Budget for 3rd Year
Period from 01.01.2023 to 31.12.2023

Sr. No.	Head	3 rd Year
1.	Staff One SRF @ 35000/-pm + 9% HRA= 38,150/- PM	4,57,800/-
2.	Contingencies Recurring (supplies, materials, consumables, etc.)	3,00,000/-
3.	Travel	10,000/-
4.	Overhead Charges (3%)	22,734/-
	Total	7,90,534/-

Additional Budget for Field Laboratory Attendant (01.01.2023 – 31.12.2023)

Sr. No.	Head	3 rd Year (10% increment for last 7 months)
1.	Staff Field Lab. Attendant-1 @ 15,800/- PM	1,94,500/-

Grand Total = 7,90,534 + 1,94,500 = 9,85,034/-
(Rupees Nine Lakh Eighty Five Thousand Thirty Four Only)

(Signature)
(Ved Prakash)
Administrative Officer



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Indian Council of Medical Research
Department of Health Research, Ministry of Health
and Family Welfare, Government of India

File No. AMR/ADHOC/241/2020-ECD-II

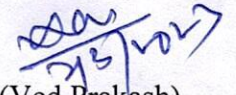
Dated: 02/03/2023

Subject: - Payment of 1st installment of 3rd year grant-in-aid for the research scheme entitled, "Molecular tracking of difficult-to-control carbapenem resistance among Enterobacterales (Enterobacteriaceae) clinical isolates in West Bengal, India: Focusing on in vitro diagnostics for antimicrobial resistance (AMR) towards the optimization of antimicrobial and infection prevention stewardship program" under Dr. Surojit Das, Assistant Professor, Vidyasagar University, Midnapore.

MEMORANDUM

The Director-General, ICMR sanctions the payment of **Rs.8,86,531/- (Rupees Eight Lakh Eighty Six Thousand Five Hundred Thirty One Only)** as the 1st installment of the 3rd year grant for the period from **2022-23** for incurring expenditure in connection with the above mentioned research scheme. The amount **Rs.8,86,531/-** may be debited in the provision of **Rs.9,85,034/-** made for the above mentioned research scheme for the current financial year.

A sum of Rs.23,552/- is lying with the PI as unspent balance from the grant released during last year. A formal bill for **Rs.8,86,531/-** is sent herewith for (i) adjustment of **Rs.23,552/-** (ii) for payment of **Rs.8,62,979/-** by RTGS to "Vidyasagar University".



(Ved Prakash)
Administrative Officer

Accounts Section, ICMR

Copy to: -

1. The Registrar, Vidyasagar University, Midnapore, West Bengal - 721102.
2. PI, Dr. Surojit Das, Assistant Professor, Dept. of Bio-Medical Laboratory Science and Management, Vidyasagar University, Midnapore, West Bengal-721102.
3. IRIS Cell (P & I) Section, ICMR, IRIS No. **2020-4919**.
4. Mrs. Vandana, Sr. T.O.-II

Administrative Officer

**Letter of intent for joint research proposal
(FP8, HORIZON 2020)**

based on the project concept

„In-silico detection of human mycotic traits arising out of Horizontal Gene Transfer and analysis from systems biology perspective.”

Data of Professional Cooperative Partner:

Name of the organisation: **Vidyasagar University, Department of Microbiology**

Address: **Midnapur - 721102 West Bengal, India**

Authorized representative: **Dr. Keshab Chandra Mondal, Associate Professor**

Data of Lead Partner:

Name of the Organisation: **University of Szeged**

Address: **Szeged, Dugonics tér 13. H-6720, Hungary**

Authorized representatives: **Prof. Dr. Gábor SZABÓ, Rector; Dr. Zoltán MAJÓ,
Economic and Financial Director**

The content of the proposed cooperation

The above mentioned partners, in connection with the content and aims of the abovementioned project concept, express their interest to work out and submit research proposal(s) within the European Union Framework Programme 8 (HORIZON 2020).

Szeged, May 05, 2020

Keshab Chandra Mondal

Dr. Keshab Chandra Mondal

Principal researcher of partner

Prof. Dr. Csaba Vágvolgyi

Principal researcher of University of Szeged

University of Szeged
Faculty of Science and Informatics
Department of Microbiology
6726 Szeged, Közép fasor 52.
Hungary



Letter of intent for joint research proposal
(FP8, HORIZON 2020)

based on the project
„Green Energy Higher Educational Cooperation”
(TÁMOP-4.1.1.C-12/1/KONV-2012-0012)

Data of Professional Cooperative Partner:

Name of the organisation: **Vidyasagar University, Department of Microbiology**
Address: **Midnapur - 721102 West Bengal, India**
Authorized representative: **Dr. Keshab Chandra Mondal, Associate Professor**

Data of Lead Partner:

Name of the Organisation: **University of Szeged**
Address: **Szeged, Dugonics tér 13. H-6720, Hungary**
Authorized representatives: **Prof. Dr. Gábor SZABÓ, Rector; Dr. Zoltán MAJÓ, Economic and Financial Director**

The content of the proposed cooperation

The above mentioned partners, in connection with the content and aims of the **TÁMOP-4.1.1.C-12/1/KONV-2012-0012** project, express their interest to work out and submit research proposal(s) within the European Union Framework Programme 8 (HORIZON 2020).

Szeged, May 05, 2020

Keshab Chandra Mondal

Dr. Keshab Chandra Mondal
Principal researcher of partner


Prof. Dr. Csaba Vágvolgyi

Principal researcher of University of Szeged



University of Szeged
Faculty of Science and Informatics
Department of Microbiology
6726 Szeged, Közép fasor 52.
Hungary



**MINUTES OF COOPERATION MEETING
RELATED TO THE SPECIAL ACTIVITY OF
TÁMOP-4.1.1.C-12/1/KONV-2012-0012**

held at Department of Microbiology, FSI, University of Szeged, Szeged, May 05, 2020, starting at 9.00 h and finished at 13.00 h.

Persons present at the meeting:

From Hungary (University of Szeged):

- Prof. Dr. Csaba Vágvolgyi
- Dr. Tamás Papp
- Dr. László Kredics
- Dr. Miklós Takó

From India (Vidyasagar University,
Department of Microbiology, Midnapur -
721102 West Bengal):

- Dr. Keshab Chandra Mondal

During the cooperation meeting, Hungarian and Indian participants

- started to discuss the possible joint scientific and administrative activities in the future based on the aims, activity and potential results of the TÁMOP-4.1.1.C-12/1/KONV-2012-0012 project
- discussed about the planned steps required for the successful cooperation
- overviewed the educational and scientific connections between the institutes of participants

The minutes of the meeting were prepared in 2 exemplars.

The attendance list is part of the minutes.

Szeged, May 05, 2020

Dr. Keshab Chandra Mondal
Researcher, Associate Professor

Prof. Dr. Csaba Vágvolgyi
Head of Department


.....

.....

University of Szeged
Faculty of Science and Informatics
Department of Microbiology
6726 Szeged, Közép fasor 52.
Hungary

**Letter of intent for joint research proposal
(FP8, HORIZON 2020)**

based on the project concept

„Strain development, validation and scale up for production of cellulase, hemicellulase and ligninase from fungal consortia and there application in the bioethanol production from lignocellulosic feedstock.”

Data of Professional Cooperative Partner:

Name of the organisation: Vidyasagar University, Department of Microbiology
Address: Midnapur - 721102 West Bengal, India
Authorized representative: Dr. Keshab Chandra Mondal, Associate Professor

Data of Lead Partner:

Name of the Organisation: University of Szeged
Address: Szeged, Dugonics tér 13. H-6720, Hungary
Authorized representatives: Prof. Dr. Gábor SZABÓ, Rector; Dr. Zoltán MAJÓ, Economic and Financial Director

The content of the proposed cooperation

The above mentioned partners, in connection with the content and aims of the abovementioned project concept, express their interest to work out and submit research proposal(s) within the European Union Framework Programme 8 (HORIZON 2020).

Szeged, May 05, 2020

Keshab Chandra Mondal

Dr. Keshab Chandra Mondal

Principal researcher of partner

Prof. Dr. Csaba Vágvolgyi

Principal researcher of University of Szeged

University of Szeged
Faculty of Science and Informatics
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6726 Szeged, Közép fasor 52.
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National Development Agency
www.ujszecsenyiterv.gov.hu
06 40 438 438



HUNGARY'S RENEWAL



The project is supported by the European Union
and co-financed by the European Social Fund.

To
The Registrar,
Vidyasagar University
Midnapore

Date: 31.07.2019

Sub: Act as Joint Supervisor of Ph.D. Research Scholar

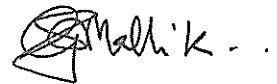
Respected Sir,

In connection with the earlier letter dated 02-04-2019 and the approval of the Hon'ble Vice-Chancellor I would like to supervise the doctoral research work (Ph.D.) of **Shantanu Ghosh** and **Nidhi Agarwala** jointly with Dr. Tarak Nath Sahu, Assistant Professor in Commerce, of your University.

I hope this collaborative will create a better research environment and the research scholars will be benefited. Please do the needful to make this endeavour success.

Thanking you,

Yours Sincerely,



(Dr. Girijasankar Mallik)

Western Sydney University
School of Business
169 Macquarie Street
Parramatta 2150
NSW, Australia



Sl. No.

331

VIDYASAGAR UNIVERSITY

বিদ্যাসাগর বিশ্ববিদ্যালয়

Midnapore- 721 102 ✪ West Bengal

Registration No. 331 / Ph.D. (Arts/ Com./ Sc.)

To : Sri/Smt. NIDHI AGARWALA

C/o-Mr. Binode Agarwala, Keranitol
Station Road, Midnapore-721101

Date 24.07.2021

Dear Sir/Madam,

I am directed to inform you that you have been granted Registration with effect from 20.04.2021 for the Ph. D. Degree of this University in Commerce in accordance with the UGC Regulation, 2016.

Title "Country Specific Factors, Firm Attributes and Environmental Sustainability: A Cross-Country Analysis"

Name of the Supervisor(s)

1. Dr. Tarak Nath Sahu

2. Dr. Girijasankar Mallik

3. _____



Registrar

Registrar

VIDYASAGAR UNIVERSITY
Midnapore-721102, W.B.



Seq12, Seq12m, and Seq13m, peptide analogues of the spike glycoprotein shows antiviral properties against SARS-CoV-2: An *in silico* study through molecular docking, molecular dynamics simulation, and MM-PB/GBSA calculations

Kunal Dutta^{a,*}, Ammar D. Elmezayen^b, Anas Al-Obaidi^b, Wei Zhu^d, Olga V. Morozova^e, Sergey Shityakov^f, Ibrahim Khalifa^c

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^c Food Technology Department, Faculty of Agriculture, Moshtohor 13736, Benha University, Egypt

^d College of Food Science and Technology, Huazhong Agricultural University, Key Laboratory of Environment Correlative Food Science, Ministry of Education, Wuhan 430070, China

^e I.N. Blokhina Nizhny Novgorod Research Institute of Epidemiology and Microbiology, 71 Malaya Yamskaya Str., Nizhny Novgorod 603950, Russian Federation

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ABSTRACT

At the very beginning of the new decade, the COVID-19 pandemic has badly hit modern human societies. SARS-CoV-2, the causative agent of COVID-19 acquiring mutations and circulating as new variants. Herein, we have found three new antiviral peptides (AVPs) against the SARS-CoV-2. These AVPs are analogous to the spike glycoprotein of the SARS-CoV-2. Antiviral peptides, *i.e.*, Seq12, Seq12m, and Seq13m, can block the receptor-binding domain (RBD) of the SARS-CoV-2, which is necessary for communicating with the angiotensin-converting enzyme 2 (ACE2). Also, these AVPs sustain their antiviral properties, even after the insertion of 25 mutations in the RBD (Rosetta and FoldX based). Further, Seq12 and Seq12m showed negligible cytotoxicity. Besides, the binding free energies calculated using MM-PB/GBSA method are also in agreement with the molecular docking studies. The molecular interactions between AVPs and the viral membrane protein (M) also showed a favorable interaction suggesting it could inhibit the viral re-packaging process. In conclusion, this study suggests Seq12, Seq12m, and Seq13m could be helpful to fight against SARS-CoV-2. These AVPs could also aid virus diagnostic tools and nasal spray against SARS-CoV-2 in the future.

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1. Introduction

At present, the entire World is facing challenges to handle the COVID-19 pandemic [1]. SARS-CoV-2 is the causative agent of COVID-19, and it is new to the scientific community. Therefore, in-depth monitoring of all aspects of the COVID-19 is ongoing. For example, signs and symptoms [2], mode of transmission [3], WHO-solidarity trials [4], contact tracing by mobile apps such as “Arogya Setu” by India [5], CRISPR based rapid diagnostic of SARS-CoV-2 [6], and also monitoring daily cases by crowd-sourcing (<https://www.covid19india.org/>). Besides, recent reports

suggest that repurposing known antiviral drugs [7], drugs [8], different phytochemicals [9] against COVID-19 could be fruitful. However, none of them has reached a final definitive clinical treatment for COVID-19. Indeed to address the urgent need for a safe and efficacious vaccine against the COVID-19 several vibrant initiatives have been started as never before. For example, vaccine manufacturing front-runner come-up with mRNA vaccines [10], viral vector vaccine [11], classical attenuated vaccine *etc.* [12]. However, reports showed COVID-19 vaccines would not be a silver bullet for the immunization of a community.

Furthermore, alternatives to traditional therapeutics would be necessary for the long run as before [13,14]. Moreover, SARS-CoV-2 acquires new mutations in its genome in a concise time frame [15], for instance, B.1.1.7, B.1.351, P.1, B.1.427, and B.1.429, *etc.* [16].

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Composition, functionality and structural correlates of mixed lipid monolayers at air-water interface

Emili Manna^{a,b}, Manas Barai^b, Manas Kumar Mandal^b, Habiba Sultana^b, Alexey G. Bykov^c, Alexander V. Akentiev^c, Boris A. Noskov^c, Shin-ichi Yusa^d, Amiya Kumar Panda^{b,*}

^a Centre for Life Sciences, Vidyasagar University, Midnapore-721102, West Bengal, India

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ARTICLE INFO

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Phospholipids
Langmuir trough
Monolayer
Membrane
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BAM

ABSTRACT

Physicochemical properties of lipid monolayer depend on its composition where a blend of lipids exhibit superior behaviour than the individual component. Surface pressure (π) – area (A) isotherms of mixed monolayer (PC_{mix}) formed by dipalmitoylphosphatidylcholine (DPPC), palmitoleylphosphatidylcholine (POPC), soyphosphatidylcholine (SPC) and hydrogenated soy phosphatidylcholine (HSPC) in combination with 30 mole % cholesterol (Chol) were obtained by using Langmuir trough. Effects of dipalmitoylphosphatidylethanolamine (DPPE) on its mutual miscibility at the air-water interface with DPPC + Chol, POPC + Chol, HSPC + Chol and SPC + Chol were also investigated separately, followed by studying the effects of DPPE and dipalmitoylphosphatidylglycerol (DPPG) to PC_{mix} + Chol and PC_{mix} + DPPE + Chol respectively. Lift-off area, minimum molecular area, excess molecular area, collapse pressure, Gibbs free energy of interfacial mixing, compressibility moduli values were evaluated by analyzing the isotherms. Deviations from the ideal mixing behaviours were dependent on the composition of the lipid blends. Surface dilatational rheology studies could assess monolayer elasticity, whereas the film morphologies were analysed by Brewster angle microscopic (BAM) studies. DPPE induced formation of condensed monolayer, whereas film rigidity was increased with the incorporation of DPPE and DPPG into mixed systems. Interactions among the lipid components of the investigated mixed systems were thoroughly discussed from the point of view of polar head and acyl chain saturation and obtained results follow the sequence: PC_{mix} + DPPE + DPPG + Chol > PC_{mix} + DPPE + Chol > individual PC + DPPE + Chol which could be translated into the bilayer studies. Such investigation of mixed lipid is important for class of its own composition and combined results are expected to contribute in better understanding the interaction of selected lipid in proposed blend.

1. Introduction

Cellular membrane is complex, in nature that comprises a variety of charged and uncharged lipids with varying degree of unsaturation [1,2]. Phosphatidylethanolamine (PE) and phosphatidylcholine (PC) are the major zwitterionic phospholipids found in natural cell membrane [3]. Desired membrane fluidity, by virtue of the presence of unsaturated phospholipids, facilitate the regulation of a variety of key cellular processes like diffusion of molecules, cellular signalling, adhesion [4], Na⁺/K⁺ balance transport [5,6] and ion pumping, [1,6] to mention a few. Functional properties of membrane, viz., fluidity, rigidity and

permeability are governed by its composition [3,7].

A blend of lipid monolayers at the air-water interface can be considered as a more generalized and simplified form of the single leaflet of membrane bilayer. Surface pressure (π) - area (A) isotherm of lipids, considered to be the major components of membrane, in their pure form or in the form of single and binary mixtures are well documented in the literature [8,9]. Isotherms of lipid blends comprising all the components are considered to provide important information in formulating efficient drug delivery systems, e.g., liposomes. However, such comprehensive studies are not so common in the literature. Blend of phospholipids like phosphatidylcholine (PC), phosphatidylethanolamine (PE),

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RESEARCH

Open Access



Nutritional and immunization status of under-five children of India and Bangladesh

Sreeparna Banerjee¹, Subir Biswas¹, Shimul Roy², Manoranjan Pal^{3†}, Md. Golam Hossain^{4*} and Premananda Bharati^{5†}

Abstract

Background: The nutritional and immunization status of children can play an important role in determining their future health status of a particular country. The aim of the present study is to investigate the nutritional and immunization status of under-five children in India and Bangladesh, and to find the difference in the status between these two countries.

Methods: We have used the National Family Health Survey data, 2015–2016 of India and Bangladesh Demographic Health Survey, 2017–2018 datasets. The sample sizes are 222,418, among them 8759 and 8759 children for India and Bangladesh respectively. The nutritional status of under-five children is measured by standard anthropometric indicators of height-for-age (HAZ) and weight-for-age (WAZ). Regarding child immunization status, only BCG, DPT, polio and measles vaccinations are considered for the present study. Multiple binary logistic model has been used for analysing the data.

Results: This study reveals that the prevalence of stunting and underweight of under-five children in India are higher than Bangladeshi children. Secondary and higher educated mothers are more likely of having normal HAZ and WAZ children than up to primary educated mothers for both countries. Chances of having normal HAZ and WAZ are higher among non-poor category for both countries. The present study also shows that immunization status of Bangladeshi children is better than Indian children except measles. Religion of mother also shows influence on immunization status of children in India whereas Bangladesh shows no significant results regarding religion. Mother's educational attainment and wealth index show influence on immunization status among children for both countries.

Conclusions: The study concludes that a remarkable number of under-five children are suffering from under nutrition for both countries, however Bangladeshi children have better nutritional and immunization status compared to Indian children. Higher wealth index, better educational attainment and lower unemployment of Bangladeshi mothers may be the causes for better nutritional and immunization status of children. Mother's socio-economic factors have significant impact on determining the child's health status. Our findings can help to government of Indian and Bangladesh for taking health policy to improve under-five children nutritional and immunization status.

Keywords: BCG, DPT, Polio, Measles, Underweight, Stunting

Background

Malnutrition is the silent killer that affects human development and economy of any country. Children of today are citizens of tomorrow, so children's nutritional status plays an important role in determining the future of our country and should be prioritized. Child height and

weight are considered as important indicators of population health and human capital [1, 2]. United Nations Children's Fund pointed out that globally 165 million children under the age-5 years are found to be stunted (low- height-for -age), 101 million children are underweight (low weight for age) and 52 million children are wasted (weight for height) [3]. According to WHO 2002 estimated that in developing countries, 60% of the 10.9 million deaths that occurs annually among children aged less than 5 years are association with under nutrition,

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Manoranjan Pal and Premananda Bharati are retired professor.

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Full list of author information is available at the end of the article



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An Image Authentication and Tampered Detection Scheme Exploiting Local Binary Pattern Along with Hamming Error Correcting Code

Pabitra Pal¹ · Biswapati Jana¹ · Jaydeb Bhaumik²

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Abstract

Local Binary Pattern (LBP) has been widely used for texture analysis, feature extraction, visual investigation, pattern matching, and image authentication. It is essential to investigate the effectiveness of LBP, for tamper detection, tamper localization, and ownership identification of a watermarked image, which are highly desirable in many human-centric applications like health-care, military communication, remote sensing, and law enforcement. In this article, a Reversible Watermarking Technique has been introduced to verify image integrity, authenticity and error correction using LBP and Hamming codes. The LBP values have been calculated from (2×2) original pixel block of the cover image. Then the watermark is inserted within the Least Significant Bit of the interpolated pixels. Here, LBP operator is used to solve image authentication and tamper detection problem whereas Hamming code is used to detect and correct the error in the extraction phase. Some standard NIST recommended steganalysis have been performed to evaluate the robustness and imperceptibility. It is observed that the proposed scheme is secure and robust against various attacks. It can also detect tampered locations and can verify the ownership of an image. Experimental results are compared with the existing watermarking schemes to demonstrate the superiority of the proposed scheme. It also shows good perceptible quality with a high payload and less computational cost.

Keywords Reversible watermarking · Linear Binary Pattern (LBP) · Tamper detection · Image authentication · Hamming code

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² Department of ETCE, Jadavpur University, Kolkata 700032, India

Wideband monopole antenna with dual band rejection characteristics

Susmita Bala¹, P. Soni Reddy²,
Sushanta Sarkar², Partha Pratim Sarkar²

A wideband printed monopole antenna with two rejection bands is proposed in this article. The antenna provides a wideband from 5.4 GHz to 17.2 GHz with two rejection bands covering 6.9 to 7.4 GHz and 8.3 to 9.2 GHz with two peak notch frequencies of 7.2 GHz and 8.6 GHz respectively. Tested peak gain at two peak notch frequencies of 7.2 GHz and 8.6 GHz are 2.5 dBi and -1.5 dBi respectively. These two rejection bands are effectively used to avoid undesired intrusion from the C band and the X band. The lower rejection band has been realized by cutting an open ring circular slot on the metal patch whereas U like slot has been inserted on the ground plane just beneath the feed line to achieve the upper rejection band. Simulated and tested S_{11} parameter, gain, radiation efficiency, E-H radiation patterns, and surface currents of the antenna are presented here. The antenna uses small dimensions and it is very simple to design. The proposed antenna confirms that it is useful for short-range and fast data communication systems.

Key words: printed monopole antenna, two rejection bands, radiation efficiency, radiation patterns

1 Introduction

The demand for miniaturized broadband antennas with band rejection characteristics increases day by day. To avoid interferences of existence different wireless application bands (like WLAN, WiMAX, C band, X band, *etc.*) with the broadband applications, an antenna with band rejection characteristics is of high demand. A very popular and easy way to achieve band rejection characteristics is to introduce different shapes of slots, parasitic elements, strips, and resonators on the radiating patch and also the ground plane of the antenna which were previously reported in various articles.

Two notch bands have been achieved by embedding four circular stubs on the metal patch and two open circular rings on the ground plane are reported in [1]. Two W-type slots are used for two band notches in [2]. U-like monopole antenna uses two T slots on the two sides of the U patch and two rectangular SRR (split-ring resonator) placed at two sides of the feed line to obtain two-notch frequencies covering WiMAX and WLAN band in [3]. A new technique of sticking a patch on the available substrate to obtain two notch bands in WLAN and ITU band is reported in [4]. A co-planar waveguide feed circular patch antenna was suggested for two rejection band applications in [5]. It consists of a stub and a parasitic element to achieve two-band notches in the WLAN and

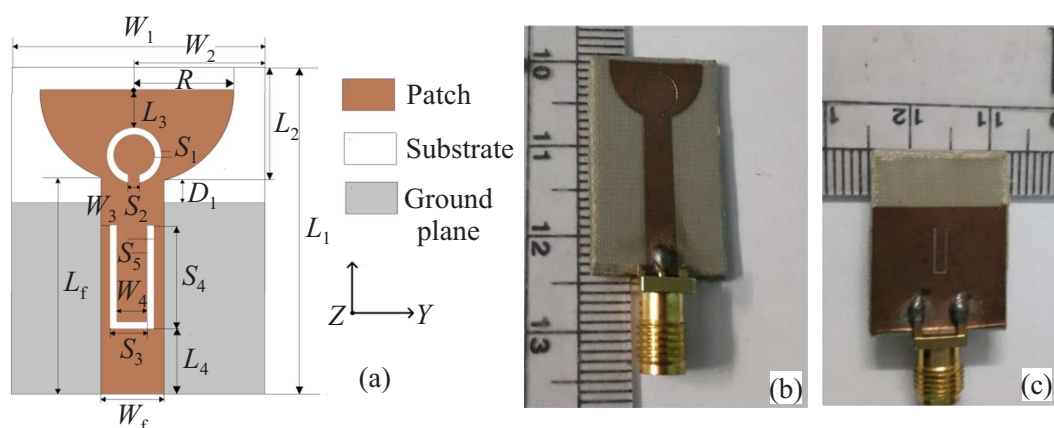


Fig. 1. Showing: (a) – details of the proposed antenna, (b) and (c) – snapshots of the proposed antenna

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OPEN

Micro-structural investigations on oppositely charged mixed surfactant gels with potential dermal applications

Manas Barai¹, Emili Manna², Habiba Sultana¹, Manas Kumar Mandal¹, Kartik Chandra Guchhait³, Tuhin Manna³, Anuttam Patra⁴, Chien-Hsiang Chang⁵, Parikshit Moitra⁶, Chandradipa Ghosh³, Anna-Carin Larsson⁴, Santanu Bhattacharya^{6,7} & Amiya Kumar Panda¹✉

Dicarboxylic amino acid-based surfactants (*N*-dodecyl derivatives of -aminomalonate, -aspartate, and -glutamate) in combination with hexadecyltrimethylammonium bromide (HTAB) form a variety of aggregates. Composition and concentration-dependent mixtures exhibit liquid crystal, gel, precipitate, and clear isotropic phases. Liquid crystalline patterns, formed by surfactant mixtures, were identified by polarizing optical microscopy. FE-SEM studies reveal the existence of surface morphologies of different mixed aggregates. Phase transition and associated weight loss were found to depend on the composition where thermotropic behaviours were revealed through combined differential scanning calorimetry and thermogravimetric studies. Systems comprising more than 60 mol% HTAB demonstrate shear-thinning behaviour. Gels cause insignificant toxicity to human peripheral lymphocytes and irritation to bare mouse skin; they do not display the symptoms of cutaneous irritation, neutrophilic invasion, and inflammation (erythema, edema, and skin thinning) as evidenced by cumulative irritancy index score. Gels also exhibit substantial antibacterial effects on *Staphylococcus aureus*, a potent causative agent of skin and soft tissue infections, suggesting its possible application as a vehicle for topical dermatological drug delivery.

Formation of gels and different liquid crystalline phases by oppositely charged mixed surfactant systems depend on the composition, surfactant chain length, salinity, temperature, pH and external field, etc.^{1–5}. Artificial gels possess regulated super-structure^{6–10}, where the properties of the fabricated liquid crystals depend on electrostatic, hydrogen bond, hydrophobic, and van der Waals interactions among the components^{11–13}. Gels are associated with two independent transitions, viz., the sol–gel transition of the gelator and anisotropic–isotropic transition of the liquid crystals^{9,10,14–18}. Gelatinous property, structure, and shape of surfactant aggregates largely depend on the molecular architecture of the aggregating species^{14,19,20}.

Gels have versatile applications in tissue engineering²¹, hemostasis bandages^{22–26}, photo-patterning^{17,27–30}, 3D-printing^{31,32}, electrochemistry³³, pharmaceutical formulation^{5,34–36}, and regenerative medicine^{10,37–39}, etc. Recent advances in the design and synthesis of dicarboxylic amino acid-based surfactants (AAS) have opened up their wide range of applications as chelator in metal extraction⁴⁰. Due to its “green nature”, aggregation behaviour of AAS in combination with HTAB have been studied in detail where some mixed surfactants can form gel¹⁶. This has encouraged the present research group to undertake further investigations on such aggregates at higher concentrations to explore the possibility of using those for topical dermatological drug delivery.

The main aim of the present work is to undertake physicochemical investigations on different types of aggregates formed by AAS + HTAB. While HTAB shows antimicrobial activities, AASs are biocompatible⁴¹. Because

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Article

A New Group Decision-Making Technique under Picture Fuzzy Soft Expert Information

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Abstract: As an extension of intuitionistic fuzzy sets, the theory of picture fuzzy sets not only deals with the degrees of rejection and acceptance but also considers the degree of refusal during a decision-making process; therefore, by incorporating this competency of picture fuzzy sets, the goal of this study is to propose a novel hybrid model called picture fuzzy soft expert sets by combining picture fuzzy sets with soft expert sets for dealing with uncertainties in different real-world group decision-making problems. The proposed hybrid model is a more generalized form of intuitionistic fuzzy soft expert sets. Some novel desirable properties of the proposed model, namely, subset, equality, complement, union and intersection, are investigated together with their corresponding examples. Two well-known operations AND and OR are also studied for the developed model. Further, a decision-making method supporting by an algorithmic format under the proposed approach is presented. Moreover, an illustrative application is provided for its better demonstration, which is subjected to the selection of a suitable company of virtual reality devices. Finally, a comparison of the initiated method is explored with some existing models, including intuitionistic fuzzy soft expert sets.

Keywords: picture fuzzy set; soft expert set; virtual reality; algorithm; group decision making



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1. Introduction

Multi-attribute group decision making (MAGDM) is an efficient procedure that has the ability to provide the rankings for an available finite family of objects based on multiple parameters associated with these objects. A significant problem in practical decision-making processes is how to describe a numeric value to a given alternative more accurately and efficiently. Due to the existence of fuzziness in various complex decision-making real-world problems, it was not possible to describe objects with exact values. To overcome this issue, Zadeh [1] was the first who initiated the notion of a fuzzy set (FS), which is a superset of the classical set. FS actually deals with the conception of partial truth between “absolute true” and “absolute false”. The membership function that delivers the membership values to objects from closed unit interval is very important.

The theory of FSs cannot work properly in some practical situations. For instance, when an expert gives judgment on a piece of information involving non-membership degree of an object that is obtained by considering the standard negation of the membership degree. To deal with such types of difficulties, Atanassov [2] proposed the theory of intuitionistic fuzzy sets (IFSs) as a generalization of FSs. Atanassov [2] modified the definition of FSs

Article

Multi-Product Multi Echelon Measurements of Perishable Supply Chain: Fuzzy Non-Linear Programming Approach

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Abstract: The perishable milk products industry has to deal with multiple pressures such as demand forecasting, price fluctuations, lead time, order batching, and inflated orders along with difficulties of climatic and traffic conditions, storage areas and shipment in unfavorable circumstances. The Indian dairy industry faces immense wastage issue due to improper infrastructure for the cold chain storage facilities, resulting in unsatisfied customers. A study is undertaken to comprehend the supply chain framework that handles perishability issues in production and distribution. Researchers propose a multi-objective mixed-integer non-linear supply chain coordination model under uncertain environments to minimize the cost of transportation, offset wastage of products and neutralize the losses due to insufficiencies of transit and storage amenities. The proposed model is meant for managing the delivery with lesser deterioration losses for producers, warehouses, and retailers. The model considers various costs for holding, halting, discounts on purchased cost, transportation cost for truckload policy under regular and unforeseen circumstances of curfew, and identify the rate of deterioration to know the impact on the cost for all players involved in the SCM framework. To handle uncertainty of objective functions, fuzzy set concepts and the defuzzification method are imposed, and fuzzy non-linear programming algorithms are used to get the single objective function from the defuzzified multi-objective functions. Data analysis is done on Lingo 18.0 software. Rate of deterioration is highest for the warehouse, which indicates that efforts should be made to augment warehouse facilities for less spoilage to reduce losses in cost. Finally, the study ends with main findings, conclusions, limitations and future scopes.

Keywords: supply chain network; inventory; product's decay and deterioration; fuzzy set; non linear multi-objective optimization



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1. Introduction

The challenges posed by deterioration are not new for the supply chain of perishable products, as this phenomenon is a common and ordinary one and accounts for significant losses in terms of cost. Deterioration in the general term refers to a process of decay, damage, expiry, and devaluation of a product with time [1]. Deterioration is a realistic and physical phenomenon, so the formulation of an appropriate strategy for managing the perishability of deteriorating items is established and expected fact. The management of perishable products requires an efficient supply chain coupled with a comprehensive warehouse with a temperature-controlled facility and an uninterrupted cold chain system throughout to keep the rate of deterioration and cost under control. Supply chains for perishable products are complex owing to the perishable nature of the products, as the value of



OPEN

Artemisinin combination therapy fails even in the absence of *Plasmodium falciparum* *kelch13* gene polymorphism in Central India

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Artemisinin is the frontline fast-acting anti-malarial against *P. falciparum*. Emergence and spread of resistant parasite in eastern-India poses a threat to national malaria control programs. Therefore, the objective of our study is to evaluate the artesunate-sulfadoxine-pyrimethamine efficacy in Central India. 180 monoclonal *P. falciparum*-infected patients received standard ASSP therapy during August 2015–January 2017, soon after diagnosis and monitored over next 42-days. Artemisinin-resistance was assessed through in-vivo parasite clearance half-life ($PC_{1/2}$), ex-vivo ring-stage survivability (RSA), and genome analysis of *kelch13* and other candidate gene (*pfcr*, *pfmdr1*, *pfatpase 6*, *pfdhfr* and *pfdhps*). Of 180 *P. falciparum* positive patients, 9.5% showed increased $PC_{1/2}$ (> 5.5 h), among them eleven isolates (6.1%) showed reduced sensitivity to RSA. In 4.4% of cases, parasites were not cleared by 72 h and showed prolonged $PC_{1/2}$ (5.6 h) ($P < 0.005$) along with significantly higher RSA (2.2%) than cured patients (0.4%). None of day-3 positive isolates contained the *pfkelch13* mutation implicated in artemisinin resistance. Parasite recrudescence was observed in 5.6% patients, which was associated with triple *dhfr-dhps* (A₁₆₁S₅₁R₅₉N₁₀₈I₁₆₄–S₄₃₆G₄₃₇K₅₄₀G₅₈₁T₆₁₃) combination mutation. Emergence of reduced sensitivity to artesunate-sulfadoxine-pyrimethamine, in central India highlighted the risk toward spread of resistant parasite across different parts of India. Day-3 positive parasite, featuring the phenotype of artemisinin-resistance without *pfkelch13* mutation, suggested *kelch13*-independent artemisinin-resistance.

Drug resistant *P. falciparum* is one of the major factors for death in malaria. 445,000 deaths and an estimated 216 million confirmed malaria cases—including an increase of about 5 million cases over and above what was recorded in 2015—were reported in 2016¹. Malaria transmission in India potentially occurs through either *P. falciparum* or *P. vivax* infection^{2,3}. In India, 844,558 malaria cases were reported in 2017, of which 529,530 cases were *P. falciparum* positive⁴. North-eastern states and central Indian states contributed 80% of the total cases⁵. Chhattisgarh, one of the states in central India, contributed the second highest malaria incidence in India over the years⁶. National vector borne disease control program (NVBDCP) had launched artemisinin-based combination therapy (ACT) to wipe-out the burden of chloroquine (CQ) and sulfadoxine-pyrimethamine (SP) resistant malaria in 2009^{7–9}. Success of ACT depends on a combination of fast-acting short half-life artemisinin derivatives with late-acting longer half-life 4-aminoquinolines or antifolates¹⁰. Global mortality and morbidity associated with malaria were considerably reduced after the introduction of ACT, but emergence and subsequent spread of artemisinin-resistant parasites in the Greater Mekong sub-region had seriously threatened the global malaria control and elimination progress^{11–14}. Artemisinin resistance is characterized by drug failure reflected in slow parasite clearance as assessed by increased in vivo parasite clearance half-life ($PC_{1/2}$) along with reduced sensitivity of ex-vivo ring-stage parasites to artemisinin^{15–17}. Genome based transfection studies proved the

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Study of the optical properties and frequency-dependent electrical modulus spectrum to the analysis of electric relaxation and conductivity effect in zinc oxide nanoparticles

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ABSTRACT

In this article, the optical and dielectric properties along with electric relaxation behaviour of the zinc oxide nanoparticles (ZnO NPs) with an average size ≈ 32.5 nm were studied. The band gap, and free carrier concentration of the ZnO NPs have been found to be 3.73 eV, and $\approx 5.55 \times 10^{12}$ per cm^3 , respectively. Dispersion parameters and nature of dispersion have been studied from optical spectrum. X-ray diffraction investigation revealed that the crystalline phase is hexagonal with atomic fraction $\approx 75.44\%$. The overall behaviour of the dielectric constants of ZnO NPs has obeyed Koops model. Relaxation behaviour and defect state response inside ZnO NPs have been observed in the dielectric studies. The relaxation time varies from 8.0585×10^{-5} to 7.8447×10^{-5} s with temperature (T) ranges from 323 to 573 K, respectively, calculated from the electric modulus study. The AC conductivity complies the Jonscher's universal power law and the observed hopping of electron is the correlated barrier hopping. The activation energy of the ZnO NPs is found to be ≈ 93 meV from the temperature-dependent DC conductivity analysis. The real part of complex impedance showed a negative temperature coefficient of resistance nature with increase the temperature from 473 to 673 K in the low-frequency zone. The equivalent circuit for the complex impedance analysis at $T = 673$ K has been studied from Cole- Cole equation and Nyquist plot. The observed properties of ZnO NPs are very important for electric storage, sensing and optical semiconductor devices.

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Multi-item two-stage fixed-charge 4DTP with hybrid random type-2 fuzzy variable

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Abstract

Parameters of some real-life decision-making problems are simultaneously uncertain, imprecise, and vague. In this paper, for the first time, we introduce two such new hybrid uncertain variables—random type-2 trapezoidal (RT2TF) and gamma fuzzy (RT2GF) variables, their derandomization and defuzzification methods, and applications. Mimicking two-stage public distribution system of the developing countries, breakable multi-item two-stage fixed-charge four-dimensional transportation problems (MITSFC-4DTPs) are formulated and solved. Here, some breakable items are transported from sources to destinations via warehouses using some conveyances, traveling through connecting routes and incurring transportation costs and fixed charges at each stage. The objective is to find suitable conveyances, appropriate travel routes, and corresponding transported amounts at each stage so that total transportation cost is minimum. The model's parameters—transportation costs, fixed costs, availabilities, demands, and conveyances' capacities are considered as RT2TF and RT2GF. The models' random type-2 fuzzy objectives and constraints are first derandomized using expectation and probability chance constraint techniques, respectively. The reduced type-2 fuzzy models are transformed into type-1 fuzzy problems by the CV-based reduction technique (CV-bRT), which are then converted to deterministic ones using two methods—generalized credibility measures (GCM) theory and centroid techniques (trapezoidal fuzzy problem only) separately. All these deterministic models are solved by the generalized reduced gradient (GRG) method using LINGO 12.0 and numerically illustrated. A real-life problem and several particular models under different uncertain environments are solved using some input data. Results from two CV-based methods—CV-bRT-GCM and CV-bRT-centroid for type-2 fuzzy, are compared, and superiority of proposed CV-bRT-GCM is established. In 4DTPs, the importance of multi-routes is numerically illustrated. Some managerial insights are also presented.

Keywords Two-stage multi-item 4D transportation problems · Random type-2 trapezoidal and gamma fuzzy variables · CV-based reduction method · Generalized credibility measure technique · CV-centroid method

1 Introduction and motivation

Transportation problems (TPs) are designed to minimize the transportation cost of different products from various sources to destinations under some source and destination constraints. The basic/two-dimensional TP (2DTP) was initially developed by Hitchcock (1941) and later modified by Koopmans (1949). This problem is to minimize the transportation cost from sources to destinations with availability and demand constraints. In most real-life situations, products are delivered from sources to destinations by different conveyances like trucks, goods trains, cargo flights, etc. When different choices of conveyances are available in a TP, it is called a solid TP (STP) or three-dimensional TP (3DTP). Haley (1962) introduced the STP, although Shell (1955) first proposed this concept.

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Probe response of a two-mode cavity with $\chi^{(2)}$ non-linearity, non-reciprocity and slow and fast light

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Abstract

We analyze optically induced transparency in a two-mode rotating cavity with $\chi^{(2)}$ non-linearity. The transmission of a weak probe field is studied when the cavity is driven from its right and left sides. The transmission spectra show nonreciprocal behaviour. Both the absorption and dispersion properties are analyzed for different system parameters. Double Fano line-shape profile is observed in the transmission spectrum. The line-shape structures may be tuned via decay rate, hopping strength. The transmission profile exhibits multi-optically transparency windows which is useful for multi-channel optical communications. The phase of the transmitted field shows both normal and anomalous dispersion and this indicates the group velocity is both positive and negative. The present system exhibits slow-to-fast light. Our findings may offer applications in ultrafast signal processing and motion sensing.

1 Introduction

Induced transparency with group delay and induced attenuation with group progression in different optical systems have the impact to be used for potential applications, such as power switching, optical sensing, signal progressing, optical modulators, stealth and information technology, ultrabroadband invisibility of large objects and quantum computing etc. [1–10]. Different types of induced transparency are electromagnetically induced transparency (EIT), optomechanically induced transparency (OMIT), optically induced transparency (OIT), plasmon induced transparency (PIT), coupled-mode induced transparency (CMIT) etc. All are quantum interference phenomena, observed in the dynamics of atomic, optomechanical, optical, plasmonic, coupled-mode system, respectively. In different atomic systems single EIT as well as multiple EITs have been extensively studied, such as K-type atomic medium [11], N-type atomic system [12] and Y-type atomic system [13]. The multiple EITs have two or more transparent windows with potential utilities in multi-channel quantum information,

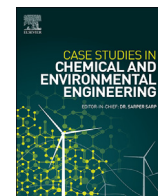
optical communication, signal processing etc. [9, 14–20]. The similar phenomenon is also observed in the dynamics of OMS which is termed as OMIT. This phenomenon has been theoretically described and experimentally demonstrated in different OMSs [21–25]. It has potential utility in charge measurements [26], wavelength conversion [27], single photon router [28], ultra-slow light [29–31] and so on. Slow light has advantages in quantum and optical network [32], quantum memory [33], telecommunication [34] etc. Slow and fast light propagation has been analyzed in detail in different physical systems, such as atomic media [35–37], ultracold gas [38], quantum wells [39, 40], semiconductor quantum dot [41, 42], metamaterial waveguides [43], photonic crystals [44], plasmonic waveguides [45] and so forth.

As different optical cavity systems, such as microspheres, micro-disks, micro-cavities, micro-rings and micro-resonators, provide an attractive platform to study the above phenomenon. The researchers' attention has been fascinated by such systems due to high Q-factor and compact in size—which are relevant for device applications. In this article, we have analyzed the OIT in rotating micro-cavity system. OIT has recently been discussed in the systems, such as in bosonic lasers [46], parity-time-symmetric coupled micro-cavity [47] and four-wave-mixing [48]. In that context, we have also addressed the possibility of nonreciprocal transmission of the input probe field in present system. The optical non-reciprocity has importance in both fundamental studies and applied

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Natural medicinal plant products as an immune-boosters: A possible role to lessen the impact of Covid-19

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ABSTRACT

Transmissible Covid-19, caused by novel corona virus since last of 2019 has outspread widely until now. Where, India was the second most affected country and 3rd in mortality rate. In world ancient history, medicinal plants were played a crucial role to cure several diseases. In present study, we show some novel natural medicinal plant metabolites as the potential inhibitors against papain-like protease (PLpro), main protease (Mpro) and RNA-dependent RNA polymerase (RdRp), transmembrane proteinase Serine 2 (TMPRSS2) and angiotensin converting enzyme-2 (ACE-2) of Covid-19. Plant metabolites were having been proven to inhibit SARS-CoVs, which also actively walkable against Covid-19.

1. Introduction

Coronavirus disease (Covid-19) is an acute respiratory infectious disease caused by SARS-CoV-2 a novel coronavirus strain that has emerged a pandemic issue and greatly effects public health widely in 2019–20 [1,2,3]. First case of Covid –19 was initially reported in Wuhan capital of Hubei Province of China and then it spread widely in 215 countries [4,5]. The World Health Organization (WHO) declared Covid-19 as a Public Health Emergency of International Concern in 30th January (<https://www.who.int/>), [6]. This disease spread has led to more than 108,153,741 affirmed cases and 2,381,295 passed away around the globe on February 14, 2021, and India was the second most affected country (10,904,940 affirmed cases) and 3rd position in deaths (1,55,642) cases (<https://covid19.who.int/table>) in February 14, 2021. Still to date the number of affected cases in Covid-19 was steadily increasing across the globe, and so far, due to its high mortality rate and rapid transmission by human-to-human connection (WHO, 2020) [7,8,3]. After SARS-CoV in 2002 and MERS-CoV in 2012, Covid-19 ranked third disease epidemic situation in human population during 21st century [9,10,11]. Covid-19 are

identified as β -coronavirus, enveloped, positive ss-RNA viruses with varied genome size ranging from 26 to 32 kilobase pairs and genome sequence similarity with MERS-CoV and SARS-CoV [12,5,3]. Nomenclature of Covid-19 based on its 82% identity to the SARS-CoV genome sequence by the taxonomists Coronavirus Study Group (CSG) under the aegis of International Committee on Taxonomy of Viruses (ICTV) [13]. In Indian subcontinent history, herbal medicinal plants were used to cure various diseases based on health healing systems. It was established that various medicinal plant such as: *Angelica keiskei* inhibit cysteine proteases of SARS-CoV [14], *Ecklonia cava* as a SARS-CoV 3CLpro inhibitor [15], *Salvia miltiorrhiza* effects on cardiovascular system during SARS-CoV [16], *Torreya nucifera* (L.) acts as a SARS-CoV 3CLpro inhibition [17], *Isatis indigotica* an Anti-SARS coronavirus 3C-like protease inhibitor [18] and *Lycoris radiata* have antiviral activities against SARS-associated coronavirus [19] were used for disease cure through ayurveda treatments. It was reported that, different compounds extracted from medicinal plant like steroids, polysaccharides, alkaloids, glycosides, etc have anti-viral, anti-bacterial, anti-fungal, anti-inflammatory, analgesic, anti-diabetic, anti-stress, anti-tumourneuro protective, rejuvenating, cardioprotective and

Abbreviations: ACE-2, angiotensin converting enzyme-2; Covid-19, corona virus disease-2019; CSG, Coronavirus Study Group; E, small envelope protein; ICTV, International Committee on Taxonomy of Viruses; N, nucleocapsid protein; M, matrix protein; Mpro, main protease; nsps, non-structural proteins; PLpro, papain-like protease; RBD, receptor binding domain; RdRp, RNA-dependent RNA polymerase; S, spike protein; ST, swine testicular; TMPRSS2, transmembrane proteinase Serine 2; WHO, world health organization; IC, Inhibitory concentration.

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Plastic waste footprint in the context of COVID-19: Reduction challenges and policy recommendations towards sustainable development goals

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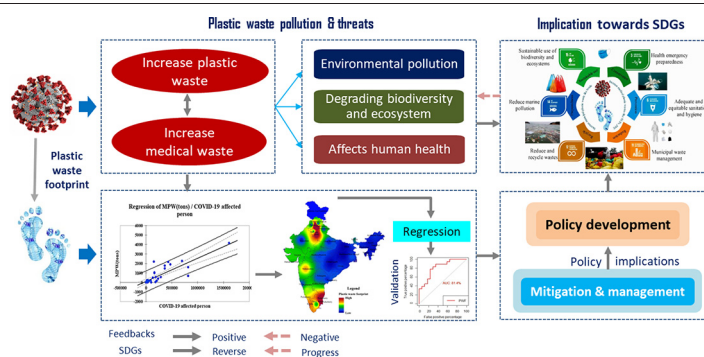
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HIGHLIGHTS

- Single-use plastics become a new challenge in waste management during the pandemic.
- Bio-medical waste threats throughout India enormously.
- Upsurges medical plastic waste for COVID-19 hampers the sustainable development goals.
- Needs people awareness, strict government regulations, and inclusive research
- Sustainable policy recommendation is needed for plastic waste management in India.

GRAPHICAL ABSTRACT



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Sustainable development goals

ABSTRACT



The sudden surge in demand to use plastic products due to COVID-19 pandemic has increased plastic pollution. It has resulted into degradation of a broad range of habitats and ecosystems by destroying natural functions, water quality, and environmental sustainability. However, the government agencies, scientific communities, and the public, have started to give attention to this issue. So, in the present study, we used the correlation methods to check the relationship between COVID-19 affected population with the medical plastic waste (MPW) that has developed a conceptual model of the inter-linkages between the preventive measures of COVID-19 pandemic problems and the reduction challenges of plastic waste during and after pandemic scenarios. Emerging issues in the waste management during and after the COVID-19 are established by reviewing the literature, reports, policy briefs, and information from the website concerning COVID-19. Considering MPW management issues, we selected India as a case study to analyse the plastic waste footprint (PWF) due to COVID-19 pandemic. The correlation results showed COVID-19 affected population and MPW; COVID-19 affected population and PWF have a significant relationship ($R^2 = 0.60$; Area under ROC curve 81.4%). It suggests an urgent need for plastic waste management initiatives. Moreover, substantial plastic products, human awareness, strict government regulations, and inclusive research can check plastic waste footprints in India and worldwide. Then discuss the specific pathways through which the immediate and long-term impacts operate and highlight the issues of hampering the sustainable development goals (SDGs) progress in India and beyond. Finally, call for coordinated assessment, support and appropriate short- and long-term mitigation and the policy measures of plastic waste problems during and after the COVID-19 pandemic.

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Redox nanomedicine ameliorates chronic kidney disease (CKD) by mitochondrial reconditioning in mice


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Targeting reactive oxygen species (ROS) while maintaining cellular redox signaling is crucial in the development of redox medicine as the origin of several prevailing diseases including chronic kidney disease (CKD) is linked to ROS imbalance and associated mitochondrial dysfunction. Here, we have shown that a potential nanomedicine comprising of Mn_3O_4 nanoparticles duly functionalized with biocompatible ligand citrate (C- Mn_3O_4 NPs) can maintain cellular redox balance in an animal model of oxidative injury. We developed a cisplatin-induced CKD model in C57BL/6j mice with severe mitochondrial dysfunction and oxidative distress leading to the pathogenesis. Four weeks of treatment with C- Mn_3O_4 NPs restored renal function, preserved normal kidney architecture, ameliorated over-expression of pro-inflammatory cytokines, and arrested glomerulosclerosis and interstitial fibrosis. A detailed study involving human embryonic kidney (HEK 293) cells and isolated mitochondria from experimental animals revealed that the molecular mechanism behind the pharmacological action of the nanomedicine involves protection of structural and functional integrity of mitochondria from oxidative damage, subsequent reduction in intracellular ROS, and maintenance of cellular redox homeostasis. To the best of our knowledge, such studies that efficiently treated a multifaceted disease like CKD using a biocompatible redox nanomedicine are sparse in the literature. Successful clinical translation of this nanomedicine may open a new avenue in redox-mediated therapeutics of several other diseases (e.g., diabetic nephropathy, neurodegeneration, and cardiovascular disease) where oxidative distress plays a central role in pathogenesis.

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Preparation of rice fermented food using root of *Asparagus racemosus* as herbal starter and assessment of its nutrient profile

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Abstract

The popularity of traditional fermented food products is based on their healthiness. The addition of a starter brings consistent, desirable, and predictable food changes with improved nutritive, functional, and sensory qualities. The addition of a mixture of plant residues as a starter or source of microbes is an age-old practice to prepare traditional fermented food and beverages, and most of the reported data on traditional foods were based on the analysis of the final product. The contribution of an individual starter component (plant residue) is not experimentally substantiated for any traditional fermented food, but this data are very essential for the formulation of an effective starter. In this study, *Asparagus racemosus*, which used as a common ingredient of starter for preparation of rice fermented food in the Indian sub-continent, was used as a starter for the preparation of rice fermented food under laboratory scale, and its microbial and nutrient profile was evaluated. The fermented product was a good source of lactic acid bacteria, *Bifidobacterium* sp., yeast, etc. The food product was acidic and enriched with lactic acid and acetic acid with titratable acidity of 0.65%. The content of protein, fat, minerals, and vitamins (water-soluble) was considerably improved. Most notably, oligosaccharide (G3-matotriose), unsaturated fatty acids ($\omega 3$, $\omega 6$, $\omega 7$, and $\omega 9$), and a pool of essential and non-essential amino acids were enriched in the newly formulated food. Thus, the herbal starter-based rice fermented food would provide important macro- and micronutrients. They could also deliver large numbers of active microorganisms for the sustainability of health. Therefore, the selected plant part conferred its suitability as an effective starter for the preparation of healthier rice-based food products.

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An extract of *Stephania hernandifolia*, an ethnomedicinal plant, inhibits herpes simplex virus 1 entry

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Abstract

Stephania hernandifolia (Nimukho), an ethnomedicinal herb from rural Bengal, has been used traditionally for the management of nerve, skin, urinary, and digestive ailments. Here, we attempted to confirm the antiviral potential of aqueous, methanol, and chloroform extracts of *S. hernandifolia* against herpes simplex virus type 1 (HSV-1), the causative agent of orolabial herpes in humans, and decipher its underlying mechanism of action. The bioactive extract was standardized and characterized by gas chromatography-mass spectroscopy, while cytotoxicity and antiviral activity were evaluated by MTT and plaque reduction assay, respectively. Two HSV strains, HSV-1F and the clinical isolate VU-09, were inhibited by the chloroform extract (CE) with a median effective concentration (EC_{50}) of 4.32 and 4.50 $\mu\text{g/ml}$ respectively, with a selectivity index (SI) of 11. Time-of-addition assays showed that pre-treatment of virus-infected cells with the CE and its removal before infection reduced the number of plaques without lasting toxicity to the cell, indicating that the CE affected the early stage in the viral life cycle. The number of plaques was also reduced by direct inactivation of virions and by the addition of CE for a short time following attachment of virions. These results together suggest that modification of either the virion surface or the cell surface by the CE inhibits virus entry into the host cell.

Abbreviations

ATCC	American Type Culture Collection
CC_{50}	Median cytotoxic concentration
CE	Chloroform extract
CPE	Cytopathic effect
DMEM	Dulbecco's modified minimum essential medium
DMSO	Dimethyl sulfoxide
EC_{50}	Median effective concentration
FBS	Fetal bovine serum
gB	Glycoprotein B
gC	Glycoprotein C
gD	Glycoprotein D

GC-MS	Gas chromatography-mass spectroscopy
HSV	Herpes simplex virus
MTT	3-(4,5-Dimethylthiazol-2-yl)-2,5-diphenyl tetrazolium bromide
PFU	Plaque-forming unit
PRA	Plaque reduction assay
RT-qPCR	Quantitative real-time polymerase chain reaction
SH	<i>Stephania hernandifolia</i>
SI	Selectivity index

Introduction

Herpes simplex virus (HSV), a very common viral pathogen, usually infects the skin and mucosa and is classified into two types (1 and 2). HSV-1 causes herpes labialis, keratitis, and encephalitis in the upper part of the body, while HSV-2 is the causative agent of herpes genitalis in the lower body parts [1, 2]. The virus is transmitted silently from an infected person through sex, body fluids, cuts, and wounds. HSV is a unique contagious virus due to its ability to cause mild to severe infection, latency in nerve ganglia with asymptomatic shedding, periodic reactivation, and silent epidemic potential with hide-and-seek nature [3]. After entry, HSV

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