



SWAMI VIVEKANANDA UNIVERSITY

NEWSLETTER

**SCHOOL OF BASIC
SCIENCES**

VOL II, ISSUE V

SEPTEMBER - OCTOBER

2025

MESSAGE FROM THE HOD

It gives me the greatest joy to connect with you through this edition of the four-newsletter. The School of Basic Sciences continues to uphold its commitment to academic excellence, research, and innovation. Our dedicated faculty and bright students are making remarkable strides in the various fields, contributing to the ever-expanding frontiers of knowledge. This year, we have witnessed significant accomplishments, from groundbreaking research publications to student accomplishments in national and international forums. Our department remains focused on fostering a culture of inquiry, curiosity, and collaboration, ensuring that our students receive the best foundation in the fundamental sciences. I take this opportunity to express my sincere gratitude to our faculty, researchers, and students for their unwavering dedication. Let's continue to strive for excellence and work toward making meaningful contributions to science and society.



Dr. SUBHABRATA
MONDAL
HOD and Assistant
Professor
School of Basic Sciences

MESSAGE FROM THE CONVENOR

The School of Basic Sciences is committed to fostering a culture of curiosity, innovation, and academic excellence. As we embark on another exciting semester, I encourage everyone to explore the wonders of science, collaborate across disciplines, and push the boundaries of knowledge. Let's make the most of the opportunities ahead, whether in the lab, classroom, or beyond. Together, we can achieve remarkable milestones and contribute meaningfully to the scientific community. Wishing you all a productive and inspiring term ahead!



Dr. KAZI HASIBUR
RAHMAN
Assistant Professor
School of Basic Sciences

Editor's Note

TEACHER EDITOR'S

WE WOULD LIKE TO EXPRESS OUR GRATITUDE TO THE HOD SIR, SENIOR TEACHERS, EDITORIAL TEAM MEMBERS, AND ARTICLE CONTRIBUTORS FOR THEIR CONTRIBUTIONS TO THE NEWSLETTER'S FIFTH EDITION IN 2025. THIS NEWSLETTER'S CONTENT INCLUDES FASCINATING ARTICLES AND THE MOST RECENT SCIENTIFIC ADVANCEMENTS. BEING A MEMBER OF THE EDITORIAL TEAM IS AN EXCELLENT EXPERIENCE FOR US. STUDENTS ARE ENCOURAGED TO DEVELOP AN ENGROSSING INTEREST IN SCIENCE BY THIS NEWSLETTER.



Dr. Sagar Chakraborty

Assistant Professor
School of Basic Sciences



Mr. Tanmoy Pal

Assistant Professor
School of Basic Sciences



Dr. Shilpa Maity

Assistant Professor
School of Basic Sciences

Achievements

[illegible]

सत्यमेव जयते

ORIGINAL

पेटेंट कार्यालय, भारत सरकार

डिजाइन के पंजीकरण का प्रमाण पत्र | Certificate of Registration of Design

469028-001

तारीख / Date

08/08/2025

पारस्परिकता तारीख / Reciprocity Date

देश / Country

प्रमाणित किया जाता है कि संलग्न प्रति में वर्णित डिजाइन जो *SOLAR EMPOWERED ORGANIC COMPOSTER* से संबंधित है, का पंजीकरण, श्रेणी 09-09 में 1.Dr. Krishanu Chatterjee 2. Dr Arup Ratan Biswas 3.Prof. Asoke Kumar Paul 4.Dr. Abhro Mukherjee 5.Dr. Chiranjib Bhowmik 6.Dr. Shilpa Maity 7.Dr Arup Ratan Dey के नाम में उपर्युक्त संख्या और तारीख में कर लिया गया है।

Certified that the design of which a copy is annexed hereto has been registered as of the number and date given above in class 09-09 in respect of the application of such design to **SOLAR EMPOWERED ORGANIC COMPOSTER** in the name of 1.Dr. Krishanu Chatterjee 2. Dr Arup Ratan Biswas 3.Prof. Asoke Kumar Paul 4.Dr. Abhro Mukherjee 5.Dr. Chiranjib Bhowmik 6.Dr. Shilpa Maity 7.Dr Arup Ratan Dey.

डिजाइन अधिनियम, 2000 तथा डिजाइन नियम, 2001 के अध्याधीन प्रावधानों के अनुसरण में।

In pursuance of and subject to the provisions of the Designs Act, 2000 and the Designs Rules, 2001.

[illegible]

जारी करने की तिथि : 21/10/2025
Date of Issue :

अब्बास फ़ा. पंडित

महानियंत्रक पेटेंट, डिजाइन और व्यापार चिह्न
Controller General of Patents, Designs and Trade Marks

*पारस्परिकता तारीख (यदि कोई हो) जिसकी अनुमति दी गई है तथा देश का नाम। डिजाइन का स्वतन्त्राधिकार पंजीकरण की तारीख से दस वर्षों के लिए होगा जिसका विस्तार, अधिनियम एवं नियम के निबंधनों के अधीन, पाँच वर्षों की अतिरिक्त अवधि के लिए किया जा सकेगा। इस प्रमाण पत्र का उपयोग विधिक कार्यवाहियों अथवा विदेश में पंजीकरण प्राप्त करने के लिए नहीं हो सकता है।

The reciprocity date (if any) which has been allowed and the name of the country. Copyright in the design will subsist for ten years from the date of Registration, and may under the terms of the Act and Rules, be extended for a further period of five years. This Certificate is not for use in legal proceedings or for obtaining registration abroad.

The design patent- Solar Empowered Organic Composter
accepted- 24/10/2025, Journal no.- 43/2025

Events

Ph.D. Viva-Voce Examination in Department of Mathematics

17/ 10/ 2025



Ph.D. Viva-Voce Examination of Mr. Balaram Manna in Department of Mathematics under the supervision of Dr. Subhabrata Mondal.

Articles

WRITE-UPS THAT INSPIRE

Effect of vaccination to control measles epidemic in light of economic progression

International Journal of Dynamics and Control
https://doi.org/10.1007/s40435-025-01861-w

(2025) 13:359

Effect of vaccination to control measles epidemic in light of economic progression

Piu Samui¹ · Samapti Mondal² · Jayanta Mondal² · Amar Nath Chatterjee³

Received: 11 April 2025 / Revised: 21 August 2025 / Accepted: 10 September 2025
© The Author(s), under exclusive license to Springer-Verlag GmbH Germany, part of Springer Nature 2025

Abstract

Measles, an exceedingly contagious but vaccine-preventable disease, is a global peril causing an overwhelming (in excess of 95 %) count of deaths, especially of younger children taking place in lousy economic countries. In countries with poor socio-economic ambience, the health infrastructure is very fragile. Measles infection in adults having no vaccination against Measles or the adults whose immunity against Measles is waned is in substantial risk of being infected, and the infection might be life-threatening. The transmission chain of Measles in adults causes disruption in economic stability of low economy countries via disruption in labor supply chain. To systematically measure the impact of Measles transmission in economy of a geographical region (specially of low economy) and the effect of optimal vaccination level in mitigating the transmission, a novel seven-compartment ODE deterministic *SVIRPE* model is proposed in the present study. The qualitative behaviors of the model are studied, and the basic reproduction number of the model is computed. The steady states of the system are investigated, and we perform stability analysis of the system around the steady states. To ensure the maximum effectiveness of Measles vaccination with minimum cost, optimal control strategies are determined suggesting utilization of the vaccine on global basis. Moreover, we upgrade our proposed model to an impulsive differential equation model to find optimal vaccination time intervals and to determine the threshold count of infected persons for mass vaccination. The numerical results confirm the analytical predictions and illustrate that the model can predict Measles dynamics under different economic and vaccination scenarios. This epidemiological study provides practical guidance for health policy makers in making socio-economic policies of cost-efficient mass vaccination and in planning long-term control of Measles.

Keywords Measles · Economic progression · Vaccination · Optimal control · Impulsive differential equations · Mitigation level

1 Introduction

Measles, a life-threatening airborne respiratory disease, is highly communicable but vaccine preventable and spread by the Measles virus consisting of single-stranded and negative-sense, enveloped RNA belonging to the Paramyxoviridae family. According to the World Health Organization (WHO) report, approximately 107500 deaths have happened in the year 2023 [1]. According to WHO monthly updates in Measles, as of July, 2025, India bugged the third position among top 10 countries with Measles outbreak, worldwide with estimated 10,299 Measles-infected cases [2]. Direct contact of Measles occurs via droplets of infected persons that are coming out during coughing and sneezing; indirect contact occurs through contact with Measles-contaminated surfaces. Clinical symptoms of Measles are high fever, cough, runny or blocked nose, sneeze-

✉ Amar Nath Chatterjee
anathnath@gmail.com
Piu Samui
piusamui18@gmail.com
Samapti Mondal
samapti07@gmail.com
Jayanta Mondal
jayantamondal@gmail.com

¹ Department of Mathematics, Swami Vivekananda University, Baranagar, 700121, West Bengal, India

² Department of Mathematics, Diamond Harbour Women's University, Sarisha 743508, West Bengal, India

³ Department of Mathematics, K. L. S. College, Nawada, Magadh University, Bodh Gaya 805 110, Bihar, India

Published online: 03 October 2025



Author(s): Piu Samui, Samapti Mondal, Jayanta Mondal, Amar Nath Chatterjee

Journal: International Journal of Dynamics and Control

Publisher : Springer Berlin Heidelberg

Language: English

Publication Year: 2025

DOI: <https://doi.org/10.1007/s40435-025-01861-w>

IF : 1.2 (SCI)

DESCRIPTION

Measles, an exceedingly contagious but vaccine-preventable disease, is a global peril causing an overwhelming (in excess of 95 %) count of deaths, especially of younger children taking place in lousy economic countries. In countries with poor socio-economic ambience, the health infrastructure is very fragile. Measles infection in adults having no vaccination against Measles or the adults whose immunity against Measles is waned is in substantial risk of being infected, and the infection might be life-threatening. The transmission chain of Measles in adults causes disruption in economic stability of low economy countries via disruption in labor supply chain.