



Mridul Buragohain

The Foldscope-An Innovative Educational Cum Research Tool

: A Study on Arsenic Resistant Bacteria

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Educational Cum Research Tool**
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Publisher:

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International Book Market Service Ltd., member of OmniScriptum

Publishing Group:

17 Meldrum Street, Beau Bassin 71504,

Mauritius Printed at: see last page

ISBN: 978-620-2-55765-8

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by

Dr. Mridul Buragohain

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Preface

I am pleased to present the book “The Foldscope -An *Innovative Educational Cum Research Tool: A Study on Arsenic Resistant Bacteria*”, a simplified form of my Research project entitled “A study of the role of Microorganisms (viz. anerobic metal-reducing bacteria) in the mobilization of arsenic and iron in Ground of Lakhimpur district of Assam by using Foldscope device”. The aim of this book is to facilitate the adoption of Foldscope as an educational and research tool by students, teachers, scholars, scientists and the general people. I hope that this book will not only provide pleasant reading but also practical knowledge which can be utilized by the user of this book in the area of Foldscope microscopy. I sincerely hope that the book will be appreciated by our learned colleagues. I shall be glad to receive constructive suggestions and will be gratefully acknowledged.

North Lakhimpur
31st March, 2020

Dr. Mridul Buragohain

Acknowledgement

I am thankful to Department of Bio Technology (DBT), Govt. of India, New Delhi for financial assistance in the form of Major Research Project vide no. BT/IN/INDOUS /FOLDSCOPE /39/2015, dated 20th March, 2018.

I am also thankful to Mr. Bhaba Kr Pegu, Ms. Nilakhi Kakoti, Ms. Puja Sarmah and Mr. Suman Raj Mahanta for their constant help during the entire project. I am thankful to Principal, Lakhimpur Girls’ College, Lakhimpur; HoD, Department of Life Sciences, Dibrugarh University, Dibrugarh and HoD, Department of Chemistry, B. Borroah College, Guwahati for providing the research facility. I am also thankful to Mr Dipmoni Gogoi, Department of Applied Geology Dibrugarh University, Dibrugarh for his kind help in GIS analysis.

I am also thankful to Dr. M. Gomathy, Dr. K. G. Sabarinathan, Assistant Professor, (Agriculture Microbiology), AC & RI, Killikulam, Tamilnadu and Dr. Dilip Saikia, Assistant Professor, Department of Physics, PDUAM, Behali, Biswanath, Assam for organizing the “Twinning Programme” of DBT-project under Foldscope scheme at Lakhimpur Girls’ College, Lakhimpur.

North Lakhimpur
31st March, 2020

Dr. Mridul Buragohain

Chapter 1

The Foldscope

1.1 Background

The foldscope is an origami (folding) based optical microscope (Fig.1a), that can be easily assembled with flat sheet of paper affordable for mankind and the physics of optical designing and imaging. The Foldscope was developed by a team led by Dr. Manu Prakash and his student Dr. Jim Cybulski (Fig.1b) from Stanford University, USA [1]. The cost of foldscope is less than US\$1 (~ INR Rs.70) to build and it can be easily purchased by all students. This tool is highly useful in biological science. The advantage over microscope is, it can be taken in pocket to any place and images can be documented by taking a picture in mobile devices. It is a single ball lens-based microscope similar to the one first used by Van Leeuwenhoek in 1674 to describe bacteria. The lens is made of borosilicate and spherical in shape, comes in two magnification type. The lower magnification 140X lens with diameter 2.4mm provides resolution up-to 2.2 μm and higher magnification 430X with diameter 0.8mm provides resolution up to 1.44 μm with LED modules [2]. It is a part of the “frugal science” movement which aims to make high-end scientific equipment and scientific exploration accessible to the

Foldscope is an optical microscope which is very easy and affordable for mankind. The Foldscope was developed by a team led by Dr. Manu Prakash and his student Dr. Jim Cybulski from Stanford University, USA. It is a part of the "frugal science" movement which aims to make cheap and easy tools available for scientific use in the developing world. Foldscopes allow for self-discovery learning, which promotes inquiry in the field. The foldscope technology that is available to students allows more use of technology both inside and outside the classroom that is helpful for learning. The uses for a foldscope in a classroom are endless. Application of this low-cost microscopy technology to a different domain of microscopic study would help people to better understanding microscopic world around us including microorganisms and micro-structure to the fields and further enhancing scientific temperament among the masses.



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978-620-2-55765-8