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VIRUDHUNAGAR, TAMILNADU**

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This is awarded to

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Tamil Nadu.

In recognition of the Publication of Book Chapter entitled

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# Recent Advances in Arts, Science and Social Sciences

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Science and Social Sciences***

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## Chapter - 8

### Studies to determine the variation in physico- chemical properties and population of soil microflora of Bt and Non- Bt cotton grown soil.

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#### ABSTRACT

*Bacillus thuringiensis* (Bt) is a useful alternative to chemical pesticide in agriculture. In recent years the cotton economy has been accelerating at a much faster pace on all criteria viz. production, consumption, yield, and export. Introduction of Bt cotton is one of the factors responsible for this increased production. A comparative study was conducted to determine the physiological approach exhibited by Bt cotton (BGII) and non-Bt cotton (Bunny) varieties under controlled environment. Rhizospheric soil samples were collected at seedling, vegetative, flowering, boll and boll maturing stage. Physico-chemical parameters such as pH, soil moisture, bulk density, specific gravity, soil colour, texture, effect of various salts were analysed. Chemical analysis of soil includes the estimation of Ca, Na, P, K, NH<sub>3</sub>-N. Each soil samples were subjected to plate count method to isolates different soil bacteria, fungi and actinomycetes using the prescribed medium. Serial dilution technique was used for isolation of bacteria, fungi and actinomycetes. After isolation CFU were used for further studies. The pH of the soil exhibited increasing trend in both the cotton soil after boll stage however the BGII soil turned more alkaline than non-Bt grown soil. The chemical characterization of soil sample showed slight increase in organic phosphorous in BGII soil till flowering stage and significant increase in ammonia nitrogen level in all stages of plant growth. There is no significant change in other minerals. Microbial flora exhibited in both Bt and Non-Bt grown soil showed the presence of Gram-positive cocci and rod bacteria as well as Gram-negative rod were recorded in BGII soil whereas, Gram-positive cocci was recorded in non-Bt grown soil. There is no difference in the fungal isolates in both the soil. Biochemical analysis of isolates showed difference in Gram's nature and biochemical parameters.

#### KEYWORDS

*Bacillus thuringiensis*, Bt cotton, Non Bt cotton, Soil environment, Microbial flora

#### INTRODUCTION

Farming practices by human started about 12000 years ago helped to increase the food production dramatically and paved the way for life style improvement and civilization. Innovative agricultural practices are being examined for their environmental impacts (Hails, 2001; Tilman *et al.*, 2001). Such scrutinizing is currently focused on genetically modified (GM) crop plants which are the recent agricultural innovations showing robust growth (Altieri, 2000; Shelton *et al.*, 2002). Transgenic strategies for protecting crops against pests depend on the transfer and expression of defence genes to the crop species of interest. Among the most widely known and studied examples of induced resistance are those based on the use of the delta-endotoxin of the bacterium *Bacillus thuringiensis* Berliner, 1915, also known as Bt crops. This bacterium occurs naturally in soil and has the ability to form crystal proteins during the stationary and/or sporulation phase (Vasconcelos *et al.*, 2011). Among the commercial crops, cotton is the most cultivated crop for its valuable fiber. Bt cotton has undergone (Manunath, 2011) all safety assessment and risk management tests prescribed by the concerned regulatory authorities in each country including India. Bt cotton cultivation has steadily



**Prof. Dr. K. MUTHUCHELIAN** is currently serving as Pro Vice Chancellor in Dayananda Sagar University, Bengaluru, Karnataka (formerly Vice Chancellor, Periyar University, Salem, Tamilnadu). He is a world renowned biology scientist with more than 30 years of teaching and research experience at different hierarchical levels. He has published more than 220 research articles, 26 books, 42 book chapters and more than 500 popular scientific articles in leading SCI journals and magazines to attain his 'h' index 23. He served as Chairman of NAAC Peer Team visits in many institutions across India and active member for different panels and committees in UGC, DST, MNRES and MoEF & CC. He received 40 prestigious International and National awards to his academic credentials.



**Dr. P. SUNDARA PANDIAN** is a writer and thinker on Commerce and Management Studies for more than a quarter of a century. He is the Principal of V.H.N. Senthikumara Nadar College (Autonomous), Virudhunagar since 2011. He has produced 43 M.Phil., and 14 Ph.D scholars. He has credit in authoring 43 books and published 226 research articles in National and International journals and edited books. He was the recipient of Best Teacher Award & Best NSS Programme Officer Award by Government of Tamilnadu and Nehru Life Time Achievement Award from Nehru Groups of Institutions. From 2013 onwards he was serving as Senate Member in Madurai Kamaraj University. He is one of the Accreditation Member in NAAC Peer Team.



**Dr. N. JEYAKUMARAN** is presently the Dean-Research & Associate Professor of Physics in V.H.N. Senthikumara Nadar College (Autonomous), Virudhunagar. He has guided 8 Ph.D Scholars and 59 M.Phil Scholars. He has published 6 books and 78 articles in National and International journals. He has served as Coordinator for B.Voc. Renewable Energy Programme and Career Oriented Course on Renewable Energy funded by UGC. He was awarded the Best Renewable Energy Scientist Award by PEARL foundation for Educational Excellence and received the Best Teacher Award from V.H.N.S.N College (Autonomous), Virudhunagar. He has delivered more than 450 lectures in Seminars and Conferences.



**Dr. J. PANDIARAJAN** is presently working as an Assistant Professor of Physics in V.H.N. Senthikumara Nadar College (Autonomous), Virudhunagar. He has 8 years of teaching and 11 years of research experience in the field of Nano Physics and Thin Films. He has published 4 books and 35 research articles both in National and International journals. He has presented 54 papers at Seminars/Conferences and has also won accolades for 3 best paper presentations in the same. He is on the editorial board and serves as reviewer of various international journals. He is a versatile academician in his institution.

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