

**Summary of Major Research Project in Botany entitled**  
**Genetic Diversity and Control of *Xanthomonas***  
***campestris* pv. *mangiferaeindicae***  
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**By**

**Dr. B.T. Pawar**

M.Sc., Ph.D., F.S.O.E., F.I.S.C.A.  
**Principal Investigator,**  
**Asst. Professor & Research Guide,**  
**Research Center in Botany,**  
**Shri Muktanand College,**  
**Gangapur – 431 109,**  
**Dist. Aurangabad (M.S.) INDIA.**

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### **Objectives of the Project:**

- To create a data bank; providing information about genetic diversity in *Xcmi* strains for researchers of Biotechnology and Bioinformatics.
- To screen out various medicinal plants to control the bacterial diseases of plants.
- Development of economically and technically viable, Bio-ecologically compatible field formulations for management of plant bacterial diseases.
- To present a worldwide report of yellow-pigmented strains of *Xcmi*.
- To file a patent regarding the formulations of controlling MBCD.

### **Achievements from the Project:**

- Twenty five strains were identified and detailed information has been reported in the final report so that the data bank will be helpful for the future investigators and research scholars.
- Extract of more than 100 medicinal plants were screened for antibacterial properties
- Various plant part like leaf, root, stem, bark, flower, fruit and seed extracts were assessed against *Xcmi* strains
- In-vitro as well as in-vivo experiments were designed in the search of economically and technically viable, Bio-ecologically compatible field formulations for management of plant bacterial diseases

### **Summary of the Findings: (In 500 words)**

- More than 1000 references concerned with the field of bacteriology were collected from various sources like research journals, libraries, hand outs & booklets published by local publishers, internet reports, reports published by government authorities, surveys along with interaction etc.
- During the present investigation near about all the districts of Maharashtra have been visited in search of MBCD disease.
- More or less the disease was recorded in all districts but the disease was recorded more severe in Ahmednagar district followed by Pune district; while minimum disease occurrence was surprisingly recorded in Ratnagiri district, where the maximum mango production was observed
- Severe infection of mango bacterial canker disease (MBCD) was observed in several orchards of the study area.
- Twenty five strains of MBCD pathogen *Xanthomonas campestris* pv. *mangiferaeindicae* (*Xcmi*) were isolated from various districts of Maharashtra
- Thin Layer Chromatography was employed for studying the genetic diversity in 25 strains of *Xcmi*
- Some promising strains were selected for further analysis
- Then genetic diversity was recorded on the basis of 16S DNA gene sequence

- All the strains were analyzed for 16S DNA gene sequence based biological species identification with available global database of National Center for Biotechnology (NCBI)
- *In-vitro* control of 25 strains of *Xcmi* was assessed by using some leaf, root, stem, bark, flower, fruit and seed extracts of more than 100 medicinal plants by using cup plate method.
- During the present investigation the antibacterial activity of leaf extracts 63 plants were tested against *Xcmi* strains
- However, only leaf extract of 37 plants were found positive in larger or smaller quantity against 25 strains of *Xcmi*.
- Out of 37 leaf extracts, maximum antibacterial activity was recorded in leaf extract of *Jasminum officinale*, followed by *Tridax procumbens* and minimum activity was recorded in *Jatropha curcas*
- Out of 12 root extracts, maximum antibacterial activity was recorded in root extract of *Datura innoxia* and minimum activity was recorded in *Carica papaya*
- Among 12 stem extracts, maximum antibacterial activity was recorded in stem extract of *Tridax procumbens* followed by *Ocimum sanctum*
- Among 11 bark extracts, maximum antibacterial activity was recorded in bark extract of *Jatropha curcas*
- Fifteen flower extracts tested against *Xcmi* strains and maximum antibacterial activity was recorded in flower extract of *Calotropis gigantean*
- Fruit extract of *Terminalia thorelii* showed maximum antibacterial activity among 14 fruit extracts tested against *Xcmi* strains
- Among 17 seed extracts tested, maximum antibacterial activity was recorded in seed extract of *Syzygium cumini*; while minimum activity was recorded in *Allium sativum* and *Coriandrum sativum*
- Of all the plant part extracts maximum antibacterial activity was recorded with leaf extract of *J. officinale*; while minimum activity amongst all plant part extracts was recorded in flower extract of *T. grandis*
- *In-vitro* assessment were carried out to observe the activity of known antibiotics by using octodisc method
- Out of 16 antibiotics tested against *Xcmi* strains, maximum activity was recorded in Chloramphenicol (30 mcg), followed by Streptomycin (25 mcg) and minimum activity was recorded in Tobramycin (10 mcg)
- Statistical methods were applied to the generated data for correct conclusions
- *In-vivo* studies were performed by using mango leaves in natural conditions.
- Experiments were designed to study the activity of antibiotics and plant part extract on diseased mango tree in controlling the disease.

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