

Supplementary Materials

Table S1: Place of collection of infected samples from different crop-growing regions of Karnataka.

District and No. of isolates	Plot place No.	Rice cultivar
Kolar (39)	Diguvapalli	Hamsa
	Hosahalli	Kaveri
	Lakshmipura	Hamsa
	Nernahalli	Hamsa
	Palurahalli	Kaveri
	Gollahalli	Hamsa
Chikkaballapura (24)	Chintamani	Jaya
	Shidlaghatta	Kaveri
	Siddepalli	Hamsa
	Birur	Hamsa
	Gauribidnur	Jaya
Mysore (10)	Periyapatna	Rjabhoga
	Nanjangudu	Rajamudi
	Saligrama	MTU 1001
	Hunsur	Thanu
	Bannur	Jyothi
Tumkur (8)	Thuruvekere	Sona
	Kunigal	Hamsa
	Honnenahalli	Jaya

	Hokkodi	IR 20
	Bettadahalli	Sona
	Pandavapura	Mandya Vijaya
	Mandagere	IR 20
Mandya (0)	Haralahalli	BR
	Malavalli	Naga rice
	Shivalli	IR 20
	Hospet	Sonamasuri
Bellary (4)	Siruguppa	Sonamasuri

Table S2: Places of Rhizospheric soil sample collection

Place and No. of Rhizospheric soil samples collected	<i>Trichoderma</i> spp.	Plant
Chikkaballapura		
Adavigollavarahalli (2)	PGT1	1. <i>Eleusine coracana</i> (Ragi) 2. <i>Solanum lycopersicum</i> (Tomato)
Addagal (4)	PGT2	3. <i>Macrotyloma uniflorum</i> (Horse gram) 4. <i>Eleusine coracana</i> (Ragi) 5. <i>Lablab purpureus</i> (Hyacinath beans) 6. <i>Eleusine coracana</i> (Ragi)
Ittapanahalli (2)	PGT3	7. <i>Phaseolus vulgaris</i> (Beans) 8. <i>Zea mays</i> (Maize)
Hosahalli (3)		9. <i>Vigna unguiculata</i> (Cowpea) 10. <i>Cajanus Cajana</i> (L) Millsp. (Pigeon pea) 11. <i>Eleusine coracana</i> (Ragi)
Gollahalli (5)		12. <i>Mintha piperita</i> (Mint leaves) 13. <i>Macrotyloma uniflorum</i> (Horse gram) 14. <i>Vigna unguiculata</i> (Cowpea) 15. <i>Brassica nigra</i> (Mustard) 16. <i>Cajanus Cajana</i> (L) Millsp. (Pigeon pea)
Andrahalli (2)	PGT4	17. <i>Cucumis sativus</i> (Cucumber) 18. <i>Oriza sativa</i> (Rice)
Bommahalli (4)	PGT5	19. <i>Eleusinecoracana</i> (Ragi) 20. <i>Solanum melongena</i> (Brinjal) 21. <i>Phaseolus vulgaris</i> (Beans) 22. <i>Solanum melongena</i> (Brinjal)
Arikere (6)	PGT6	23. <i>Brassica oleracea var. capitata</i> (Cabbage) 24. <i>Vigna unguiculata</i> (Cowpea) 25. <i>Eleusinecoracana</i> (Ragi)

		26. <i>Punica granatum</i> (Pomegranate)
		27. <i>Raphanus sativus</i> (Raddish)
		28. <i>Solanum lycopersicum</i> (Tomato)
Bandahalli (4)		29. <i>Eleusinecoracana</i> (Ragi)
		30. <i>Raphanus sativus</i> (Raddish)
		31. <i>Cajanus cajana</i> (L)Millsp.(Pigeon pea)
		32. <i>Lablab purpureus</i> (Hyacinath beans)
Lakshmipathihalli (3)	PGT7	33. <i>Daucus carota</i> subsp. <i>sativus</i> (Carrot)
		34. <i>Eleusinecoracana</i> (Ragi)
		35. <i>Cajanus cajana</i> (L) Millsp.(Pigeon pea)
Chinthamani (5)	PGT8	36. <i>Eleusine coracana</i> (Ragi)
		37. <i>Phaseolus vulgaris</i> (Beans)
		38. <i>Lablab purpureus</i> (Hyacinath beans)
		39. <i>Zea mays</i> (Maize)
		40. <i>Solanum lycopersicum</i> (Tomato)
Battalahalli (2)		41. <i>Solanum lycopersicum</i> (Tomato)
		42. <i>Ricinus communis</i> (Castor)
Mudbagal		
Audugodi (4)	PGT9	43. <i>Phaseolus vulgaris</i> (Beans)
		44. <i>Solanumlycopersicum</i> (Tomato)
		45. <i>Zea mays</i> (Maize)
		46. <i>Eleusinecoracana</i> (Ragi)
Nangali (4)	PGT10	47. <i>Benincasa hispida</i> (Ash guard)
		48. <i>Solanumlycopersicum</i> (Tomato)
		49. <i>.Daucuscarota subsp. sativus</i> (Carrot)
		50. <i>Solanum lycopersicum</i> (Tomato)
Hanumanahalli (4)	PGT11	51. <i>Arachis hypogaea</i> (Groundnut)
		52. <i>Momordica charantia</i> (Bitter gourd)
		53. <i>Brassicoleracea var. botrytis</i> (Cauli flower)
		54. <i>Solanum tuberosum</i> (Potato)
Byrakur (3)	PGT12	55. <i>Cajanus Cajana</i> (L) Millsp.(Pigeon pea)
		56. <i>Zea mays</i> (Maize)
		57. <i>Zingiber officinale</i> (Ginger)
Mustur (3)		58. <i>Eleusine coracana</i> (Ragi)
		59. <i>Coriandrum sativum</i> (Corriander leaves)
		60. <i>Momordica charantia</i> (Bitter gourd)
Uttanur (5)	PGT13	61. <i>Allium cepa</i> (Onion)
		62. <i>Coriandrum sativum</i> (Coriander)
		63. <i>Allium sativum</i> (Garlic)
		64. <i>Solanum melongena</i> (Brinjal)
		65. <i>Eleusine coracana</i> (Ragi)
Hebbani (4)		66. <i>Eleusine coracana</i> (Ragi)
		67. <i>Cajanus Cajana</i> (L) Millsp.(Pigeon pea)
		68. <i>Eleusinecoracana</i> (Ragi)
		69. <i>Solanum lycopersicum</i> (Tomato)
Ramanagara		
Kailancha (3)		70. <i>Zingiber officinale</i> (Ginger)
		71. <i>Luffa acutangula</i> (Ridge gourd)
		72. <i>Lablab purpureus</i> (Hyacinth beans)
K P Doddi (3)	PGT14	73. <i>Solanum lycopersicum</i> (Tomato)
		74. <i>.Eleusine coracana</i> (Ragi)
		75. <i>Lablab purpureus</i> (Hyacinath beans)

Acchalu (2)	PGT15	76. <i>Punica granatum</i> (Pomegranate) 77. <i>Zea mays</i> (Maize)
Ramohalli (3)	PGT16	78. <i>Vigna unguiculata</i> (Cowpea) 79. <i>Cajanus Cajana</i> (L) Millsp.(Pigeon pea) 80. <i>Eleusinecoracana</i> (Ragi)
Avarehalli (2)		81. <i>Arachis hypogaea</i> (Groundnut) 82. <i>Momordica charantia</i> (Bitter gourd)
Gowdaiahna Doddi (3)		83. <i>Cajanus Cajana</i> (L) Millsp.(Pigeon pea) 84. <i>Lablab purpureus</i> (Hyacinath beans) 85. <i>Solanum lycopersicum</i> (Tomato)
Kempegowda Doddi (3)	PGT17	86. <i>Brassica</i> (Mustard) 87. <i>Solanum lycopersicum</i> (Tomato) 88. <i>Eleusine coracana</i> (Ragi)
Motte Doddi (3)	PGT18	89. <i>Lablab purpureus</i> (Hyacinath beans) 90. <i>Momordica charantia</i> (Bitter guard) 91. <i>Daucus carota subsp.</i>
Manchanmele (5)	PGT19	92. <i>Solanum lycopersicum</i> (Tomato) 93. <i>Eleusine coracana</i> (Ragi) 94. <i>Zea mays</i> (Maize) 95. <i>Murraya koenigii</i> (Curry leaves) 96. <i>Lablab purpureus</i> (Hyacinath beans)
Kengal (2)	PGT20	97. <i>Abelmoschus esculentus</i> (Lady's finger) 98. <i>Solanum tuberosum</i> (Potato)
Harohalli (5)	PGT21	99. <i>Zea mays</i> (Maize) 100. <i>Lablab purpureus</i> (Hyacinath beans) 101. <i>Vigna unguiculata</i> (Cowpea) 102. <i>Eleusine coracana</i> (Ragi) 103. <i>Eleusine coracana</i> (Ragi)
Bheemasandhra (2)	PGT22	104. <i>Arachis hypogea</i> (Groundnut) 105. <i>Solanum lycopersicum</i> (Tomato)
Girenahalli (2)		106. <i>Eleusinecoracana</i> (Ragi) 107. <i>Arachis hypogaea</i> (Groundnut)
Thamsandra (1)		108. <i>Macrotyloma uniflorum</i> (Horse gram)
Mudenahalli (3)	PGT23	109. <i>Brassica</i> (Mustard) 110. <i>Phaseolus vulgaris</i> (Beans) 111. <i>Solanum melongena</i> (Brinjal)
Marasandhra (2)	PGT24	112. <i>Phaseolus vulgaris</i> (Beans) 113. <i>Cajanus cajana</i> (L) Millsp.(Pigeon pea)
Kebbedhoddi (4)	PGT25	114. <i>Zea mays</i> (Maize) 115. <i>Coriandrum sativum</i> (Corriander leaves) 116. <i>Cucurbita</i> (Pumpkin) 117. <i>Zea mays</i> (Maize)
DhoddaSadhanahalli (5)	PGT26	118. <i>Raphanus sativus</i> (Raddish) 119. <i>Solanum lycopersicum</i> (Tomato) 120. <i>Allium cepa</i> (Onion) 121. <i>Arachis hypogaea</i> (Groundnut) 122. <i>Abelmoschus esculentus</i> (Lady's finger)
Gabbadi (2)		123. <i>Solanumlycopersicum</i> (Tomato) 124. <i>Phaseolus vulgaris</i> (Beans)
Tumkur		
Baragur (3)		125. <i>Zingiber officinale</i> (Ginger) 126. <i>Luffa acutangula</i> (Ridge gourd) 127. <i>Lablab purpureus</i> (Hyacinth beans)
Barakanallu (3)		128. <i>Zingiber officinale</i> (Ginger) 129. <i>Luffa acutangula</i> (Ridge gourd)

		130. <i>Lablab purpureus</i> (Hyacinth beans)
Bellagulla (3)	PGT27	131. <i>Arachis hypogaea</i> (Groundnut) 132. <i>Ricinus communis</i> (Castor) 133. <i>Allium cepa</i> (Onion)
Chikanayakanhalli (4)	PGT28	134. <i>Solanum tuberosum</i> (Potato) 135. <i>Eleusine coracana</i> (Ragi) 136. <i>Brassia</i> (Mustard) 137. <i>Beta vulgaris</i> (Beetroot)
Chowlakatte (5)	PGT29	138. <i>Eleusine coracana</i> (Ragi) 139. <i>Phaseolus vulgaris</i> (Beans) 140. <i>Beta vulgaris</i> (Beetroot) 141. <i>Daucus carota subsp. sativus</i> (Carrot) 142. <i>Coriandrum sativum</i> (Corriander leaves)
Dasodi (3)		143. <i>Zea mays</i> (Maize) 144. <i>Allium cepa</i> (Onion) 145. <i>Zingiber officinale</i> (Ginger)
Doddabidre (3)	PGT30	146. <i>Cajanus Cajana</i> (L) Millsp.(Pigeon pea) 147. <i>Cucurbita</i> (Pumpkin) 148. <i>Solanum lycopersicum</i> (Tomato)
Doddayenegere (2)		149. <i>Solanum lycopersicum</i> (Tomato) 150. <i>Ricinus communis</i> (Castor)
Dugudihalli (3)		151. <i>Lablab purpureus</i> (Hyacinath beans) 152. <i>Arachis hypogaea</i> (Groundnut) 153. <i>Solanum tuberosum</i> (Potato)
Ganadallu (3)	PGT31	154. <i>Solanum lycopersicum</i> (Tomato) 155. <i>Daucus carota subsp. sativus</i> (Carrot) 156. <i>Zea mays</i> (Maize)
Kolar		
Bangarpet (3)		157. <i>Cajanus Cajana</i> (L) Millsp.(Pigeon pea) 158. <i>Zea mays</i> (Maize) 159. <i>Solanum lycopersicum</i> (Tomato)
Mulbagal (3)	PGT32	160. <i>Cajanus Cajana</i> (L) Millsp.(Pigeon pea) 161. <i>Zingiber officinale</i> (Ginger) 162. <i>Solanum lycopersicum</i> (Tomato)
Malur (1)		163. <i>Allium sativum</i> (Garlic)
Srinivaspur (4)	PGT33	164. <i>Vigna unguiculata</i> (Cowpea) 165. <i>Capsicum annum</i> (Green chilli) 166. <i>Solanum lycopersicum</i> (Tomato) 167. <i>Eleusine coracana</i> (Ragi)
Harohalli (3)		168. <i>Eleusine coracana</i> (Ragi) 169. <i>Phaseolus vulgaris</i> (Beans) 170. <i>Oriza sativa</i> (Rice)
Bheemasandhra (4)	PGT34	171. <i>Oriza sativa</i> (Rice) 172. <i>Momordica charantia</i> (Bitter guard) 173. <i>Eleusine coracana</i> (Ragi) 174. <i>Cajanus Cajana</i> (L) Millsp.(Pigeon pea)

Girenahalli (6)	PGT35	175. <i>Benincasa hispida</i> (Ash guard)
		176. <i>Cajanus Cajana</i> (L) Millsp.(Pigeon pea)
		177. <i>Eleusinecoracana</i> (Ragi)
		178. <i>Zea mays</i> (Maize)
		179. <i>Solanum lycopersicum</i> (Tomato)
		180. <i>Oriza sativa</i> (Rice)

Table S3: Morphological and physiology characters of Rhizosphere *Trichoderma* spp. fungi.

Place	Code	Plant	Colony colour
Mudbagal	PGT1	<i>Solanum lycopersicum</i> (Tomato)	Green
Ramanagara	PGT2	<i>Eleusine coracana</i> (Ragi)	Green
Chikkaballapura	PGT3	<i>Phaseolus vulgaris</i> (Beans)	Green
Mudbagal	PGT4	<i>Cucumis sativus</i> (Cucumber)	Green
Tumkur	PGT5	<i>Solanum melongena</i> (Brinjal)	Green
Ramanagara	PGT6	<i>Punica granatum</i> (Pomegranate)	Green
Tumkur	PGT7	<i>Daucus carota</i> subsp. <i>sativus</i> (Carrot)	Green
Chikkaballapura	PGT8	<i>Solanum lycopersicum</i> (Tomato)	Green
Chikkaballapura	PGT9	<i>Phaseolus vulgaris</i> (Beans)	Green
Mudbagal	PGT10	<i>Benincasa hispida</i> (Ash guard)	Green
Tumkur	PGT11	<i>Brassicoleracea</i> var. <i>botrytis</i> (Cauliflower)	Green
Chikkaballapura	PGT12	<i>Zingiber officinale</i> (Ginger)	Green
Chikkaballapura	PGT13	<i>Coriandrum sativum</i> (Coriander)	Green
Ramanagara	PGT14	<i>Eleusine coracana</i> (Ragi)	Green
Mudbagal	PGT15	<i>Zea mays</i> (Maize)	Green
Ramanagara	PGT16	<i>Vigna unguiculata</i> (Cowpea)	Green
Chikkaballapura	PGT17	<i>Brassica</i> (Mustard)	Green
Chikkaballapura	PGT18	<i>Momordica charantia</i> (Bitter guard)	Green
Ramanagara	PGT19	<i>Murraya koenigii</i> (Curry leaves)	Green
Mudbagal	PGT20	<i>Abelmoschus esculentus</i> (Lady's finger)	Green
Mudbagal	PGT21	<i>Zea mays</i> (Maize)	Green
Ramanagara	PGT22	<i>Solanum lycopersicum</i> (Tomato)	Green

Chikkaballapura	PGT23	<i>Brassica</i> (Mustard)	Green
Chikkaballapura	PGT24	<i>Phaseolus vulgaris</i> (Beans)	Green
Ramanagara	PGT25	<i>Cucurbita</i> (Pumpkin)	Green
Ramanagara	PGT26	<i>Abelmoschus esculentus</i> (Lady's finger)	Green
Chikkaballapura	PGT27	<i>Ricinus communis</i> (Castor)	Green
Mudbagal	PGT28	<i>Brassia</i> (Mustard)	Green
Mudbagal	PGT29	<i>Phaseolus vulgaris</i> (Beans)	Green
Ramanagara	PGT30	<i>Cucurbita</i> (Pumpkin)	Green
Chikkaballapura	PGT31	<i>Solanum lycopersicum</i> (Tomato)	Green
Chikkaballapura	PGT32	<i>Zingiber officinale</i> (Ginger)	Green
Ramanagara	PGT33	<i>Solanum lycopersicum</i> (Tomato)	Green
Ramanagara	PGT34	<i>Momordica charantia</i> (Bitter guard)	Green
Chikkaballapura	PGT35	<i>Benincasa hispida</i> (Ash guard)	Green

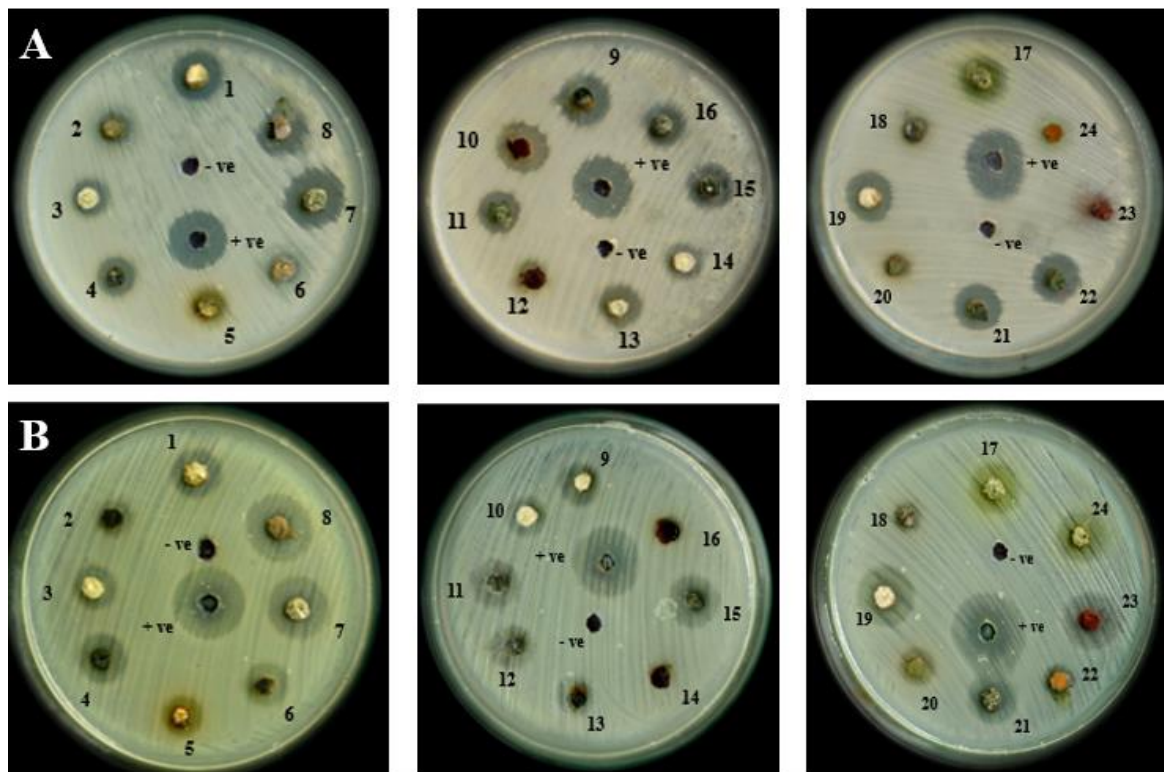


Figure S1. Screening of fungal discs (*Trichoderma* spp.) for antibacterial activity against *Xanthomonas oryzae* pv. *oryzae* A- MBXoo69, B- MBXoo53 (+ tetracycline - distilled water).

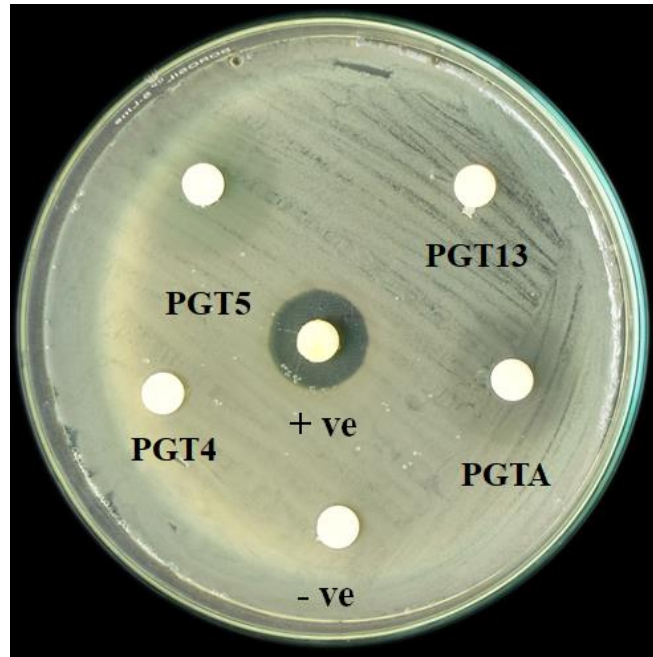


Figure S2: Antibacterial activity of zinc oxide nanoparticles (ZnO NPs) against *Xanthomonas oryzae* pv. *oryzae*(Xoo) by disc diffusion method (+ ve = tetracycline; - ve = distilled water).

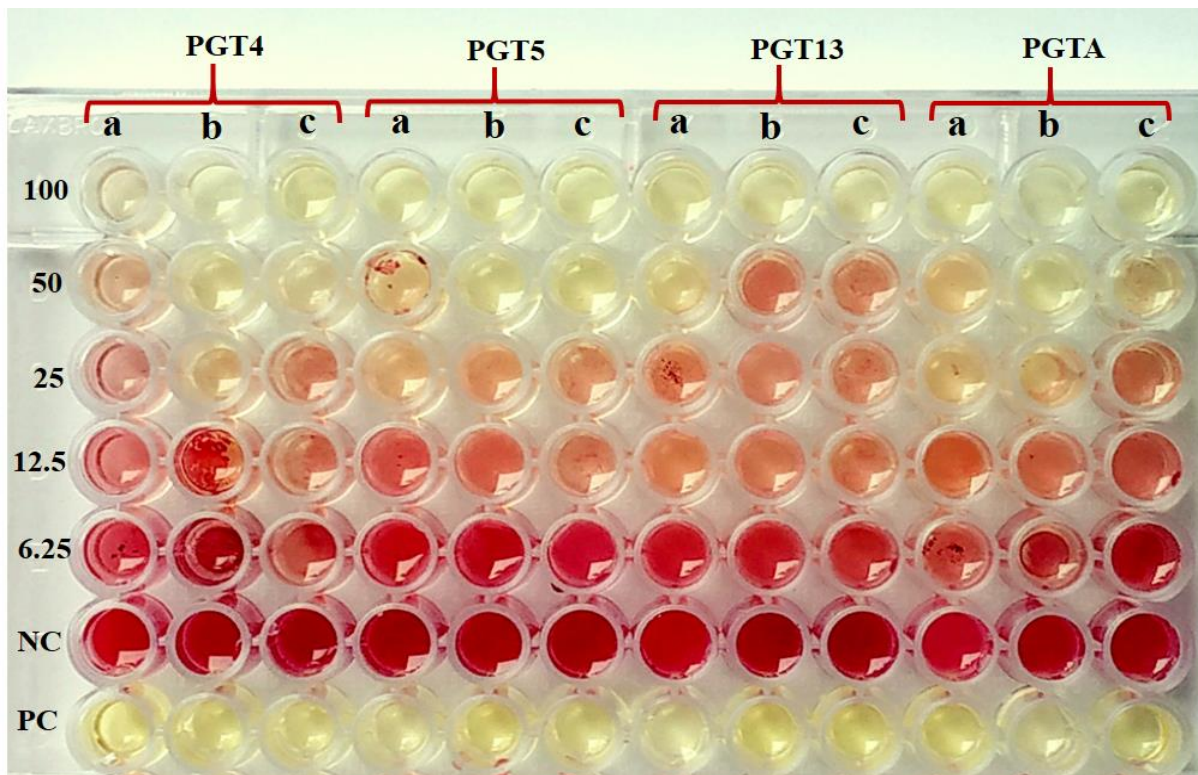


Figure S3: Bacterial sensitivity test of biosynthesized zinc oxide nanoparticles from *Trichoderma harzianum* (PGT4) (MH429899.1), *Trichoderma reesei* (PGT5)(MH429901.1), *Trichoderma reesei* (PGT13) (MH429900.1) and co-culture of *Trichoderma* sp. (PGTA) against different strains of plant pathogen *Xanthomonas oryzae* pv. *oryzae* (MF579736.1) (concentration in $\mu\text{g/ml}$) (a- Trail 1, b- Trail 2, and c- Trail 3).