|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Strains** | ***F. moniliforme*** | ***F. oxysporum*** | ***R.solani*** | ***M.phaseolina*** | **Mean** | **Strain** | ***F. moniliforme*** | ***F. oxysporum*** | ***R.solani*** | ***M.phaseolina*** | **Mean**  **Inhibition** |
| SM-1 | 33.3±0.3 s | - | - | 45.2±0.1o | 19.6 | SM-22 | 38.0±0.3q | 47.6±0.2l | 61.9±0.1h | 50±0kl | 49.4 |
| SM-2 | - | - | 61.9±0.3h | - | 15.4 | SM-23 | 42.8±0.1n | 45.2±0.1nop | 66.6±0.2f | 57.1±0.5g | 52.9 |
| SM-3 | - | - | 45.2±0.1n | - | 11.3 | SM-24 | 57.1±0.1d | 47.6±0.5l | 66.6±0.3f | 57.1±0.1g | 57.1 |
| SM-5 | 40.4±0.1 op | 59.5±0.2e | 64.2±0.2g | 52.3±0.3j | 54.1 | SM-25 | 47.6±0.2j | 47.6±0.3l | 66.6±0.2f | 54.7±0.1hi | 54.1 |
| SM-6 | - | 73.8±0.4a | 71.4±0.1b | 52.3±0.4j | 49.4 | SM-27 | 35.7±0.3r | 45.2±0.1nop | 66.6±0.4f | 47.6±0.2n | 48.8 |
| SM-7 | 42.8±0.1n | 54.7±0.2fg | 69.0±0.1cd | 57.1±0.1g | 55.9 | SM-28 | - | 52.3±0.3l | 69.0±0.1cd | 50±0kl | 42.8 |
| SM-8 | 47.6±0.2i | 38.0±0.1v | 64.2±0.3g | 40.4±0.3q | 47.6 | SM-29 | 52.3±0.1f | 52.3±0.2i | 64.2±0.4g | 59.5±0.2f | 57.1 |
| SM-10 | 50±0.3g | 52.3±0.2i | 66.6±0.2f | 54.7±0.1hi | 55.9 | SM-30 | 47.6±0.5i | 40.4±0.8r | 57.1±0.1j | 50±0.3k | 48.8 |
| SM-11 | - | - | 59.5±0.3i | - | 14.8 | SM-31 | 50±0.1g | 40.4±1.0rs | 66.6±0.4f | 47.6±0.2n | 51.1 |
| SM-12 | - | - | 47.6±0.2m | - | 11.9 | SM-32 | 50±0.3g | 45.2±0.2no | 66.6±0.2f | 54.7±0.3i | 54.1 |
| SM-13 | 30.9±0.1t | 42.8±0.2q | 57.1±0.2j | 50±0kl | 45.2 | SM-33 | - | 38.0±0.7u | 57.1±0.1j | 42.8±0.1p | 34.5 |
| SM-14 | 42.8±0.3n | 47.6±0.1l | 66.6±0.4f | 52.3±0.1j | 52.3 | SM-34 | - | 50±ok | 45.2±0.1n | - | 23.8 |
| SM-15 | - | 40.4±0.1t | 71.4±0.1b | 52.3±0.2j | 41.0 | SM-36 | - | - | 64.2±0.2g | 47.6±0.2n | 27.9 |
| SM-16 | 42.8±0.1n | 42.8±0.2q | 64.2±0.2g | 54.7±0.1hi | 51.1 | SM-37 | 38.0±0.1q | 42.8±0.16q | 59.5±0.2i | 42.8±0.7p | 45.8 |
| SM-17 | 40.4±0.3op | - | 50±0.1l | - | 22.6 | SM-38 | 50±0.2g | - | 42.8±0.1o | - | 23.2 |
| SM-18 | 38.0±0.2q | 38.0±0.4uv | 57.1±0.1j | 40.4±0.4q | 43.4 | SM-39 | 61.9±0.1b | 64.2±0.2c | 73.8±0.3a | 66.6±0.2b | 66.6 |
| SM-19 | 45.2±0.1lm | 42.8±0.1q | 66.6±0.4f | 50±0kl | 51.1 | SM-40 | 40.4±0.2o | 47.6±0.2l | 52.3±0.1k | 50±0.3kl | 47.6 |
| SM-20 | 35.7±0.4r | - | - | - | 8.9 | SM-42 | 45.2±0.1lm | 45.2±0.1nop | 61.9±0.1h | 45.2±0.6o | 49.3 |
| SM-21 | - | 45.2±0.2p | 50±0.1l | 50±0.3kl | 36.3 | SM-43 | 42.8±0.1n | 50±0.3jk | 66.6±0.1f | 52.3±0.6j | 52.9 |

**Table: S1** Percent inhibition of different root rot pathogens by wheat associated bacteria

The values are mean of three replications and having different letters within same bar are significantly different from each other according to Fischer’s LSD test at p≤ 0.05., F=*Fusarium*, R= *Rhizoctonia M* =*Macrophomina,* - = non antagonistic

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Strains** | ***F. moniliforme*** | ***F. oxysporum*** | ***R.solani*** | ***M.phaseolina*** | **Mean** | **Strain** | ***F. moniliforme*** | ***F. oxysporum*** | ***R.solani*** | ***M.phaseolina*** | **Mean**  **Inhibition** |
| SM-44 | - | - | 35.7±0.4q | - | 8.9 | SM-64 | - | 38.0±0.4u | 61.9±0.1h | 40.4±0.5q | 35.1 |
| SM-45 | - | 50±0k | 57.1±0.3j | 42.8±0.1p | 37.4 | SM-65 | - | 40.4±0.3t | 61.9±0.1h | 35.7±0.1r | 34.5 |
| SM-46 | - | 47.6±0.2l | 61.9±0.2h | 50±0kl | 39.8 | SM-66 | 40.4±0.2p | 40.4±0.4t | 66.6±0.2f | 40.4±0.3q | 47.0 |
| SM-47 | - | 52.3±0.1i | 69.0±0.3cd | 57.1±0.1g | 44.6 | SM-67 | 42.8±0.1n | 50±0.2jk | 66.6±0.2f | 45.2±0.1o | 49.9 |
| SM-48 | - | 33.3±0.1x | - | - | 8.3 | SM-68 | - | 42.8±0.3q | 59.5±0.3i | 52.3±0.3j | 38.6 |
| SM-49 | 47.6±0.1i | 50±0.6j | 66.6±0.3f | 57.1±0.1g | 55.3 | SM-69 | 45.2±0.1m | 42.8±0.1q | 61.9±0.1h | 52.3±0.2j | 50.5 |
| SM-50 | 47.6±0.2i | 54.7±0.3f | 59.5±0.2i | 50±0.3k | 52.9 | SM-70 | 42.8±0.1n | 33.3±0.2x | 42.8±0.1o | 50±0.6k | 42.2 |
| SM-51 | - | 38.0±0.4uv | 52.3±0.1k | - | 22.6 | SM-72 | 57.1±0.4d | 50±0k | 73.8±0.2a | 52.3±0.4j | 58.3 |
| SM-52 | 40.4±0.2op | 40.4±0.2t | 64.2±0.2g | 45.2±0.1o | 47.6 | SM-73 | - | 50±0.4j | 71.4±0.1b | 52.3±0.1j | 43.4 |
| SM-53 | 42.8±0.2n | 47.6±0.4l | 57.1±0.3j | 52.3±0.1j | 49.9 | SM-75 | 42.8±0.1n | 45.2±0.1nop | 61.9±0.2h | 50±0kl | 49.9 |
| SM-54 | 47.6±0.2i | 45.2±0.5no | 66.6±0.2f | 50±0kl | 52.3 | SM-77 | - | - | 30.9±0.3r | - | 7.7 |
| SM-55 | 45.2±0.1kl | - | 28.5±3.0r | - | 18.4 | SM-82 | - | - | 45.2±0.1n | - | 11.3 |
| SM-57 | - | 40.4±0.9t | 57.1±0.5j | 46.6±0.4n | 36.0 | SM-83 | 45.2±0.3kl | 45.2±0.3nop | 66.6±0.4f | 54.7±0.2i | 52.9 |
| SM-58 | - | - | - | 66.6±0.7b | 16.6 | SM-84 | 45.2±0.1lm | 50±0k | 59.5±0.2i | 57.1±0.1g | 52.9 |
| SM-59 | - | 47.6±0.3l | 61.9±0.3h | 55.5±0.2h | 41.2 | SM-85 | - | 40.4±0.1st | 52.3±0.1k | 35.7±0.5r | 32.1 |
| SM-60 | - | 42.8±0.1q | 59.5±0.3i | 48.8±0.1lm | 37.8 | SM-86 | - | 59.5±0.2e | 69.0±0.4c | 47.6±0.2mn | 44.0 |
| SM-61 | 42.8±0.1n | 52.3±0.1i | 64.2±0.3g | 50±0.3kl | 52.3 | SM-87 | 59.5±0.2c | - | - | - | 14.8 |
| SM-62 | 35.7±0.2r | 35.7±0.2v | 57.1±0.1j | 40.4±0.6q | 42.2 | SM-88 | 38.0±0.3q | 30.9±0.7y | 52.3±0.2k | 45.2±0.5o | 41.6 |
| SM-63 | 42.8±0.4n | 40.4±0.3st | 69.0±0.1d | 47.6±0.2n | 49.9 | SM-89 | - | 44.4±0.3p | 60±0i | - | 26.1 |

**Table: S1** (Continued)Percent inhibition of different root rot pathogens by wheat associated bacteria

**Table: S1**(Continued)Percent inhibition of different root rot pathogens by wheat associated bacteria

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Strains** | ***F. moniliforme*** | ***F. oxysporum*** | ***R. solani*** | ***M. phaseolina*** | **Mean** | **Strain** | ***F. moniliforme*** | ***F. oxysporum*** | ***R. solani*** | ***M. phaseolina*** | **Mean Inhibition** |
| SM-90 | 44.4±0.3m | 62.2±0.4d | 68.8±0.2cd | 61.9±0.3e | 59.1 | SM-111 | - | 54.7±0.1g | 66.6±0.2f | 57.1±0.1g | 44.6 |
| SM-91 | - | 66.6±0.2b | - | - | 16.6 | SM-112 | 54.7±0.2e | 50±0.4jk | - | 59.5±0.2f | 41.0 |
| SM-92 | - | 33.3±0.3x | - | - | 8.3 | SM-114 | - | - | 45.2±0.1n | - | 11.3 |
| SM-93 | 64.4±0.2a | 55.5±0.3f | 68.8±1.3de | 64.2±0.1d | 63.2 | SM-116 | 59.5±0.3c | 52.3±0.3i | 64.2±0.2g | 52.3±0.1j | 57.1 |
| SM-94 | 44.4±0.3lm | 53.3±0.4h |  | 69.0±3.3c | 54.2 | SM-117 | 50±0.1g | - | - | - | 12.5 |
| SM-95 | 44.4±0.3m | 53.3±0.3h | 64.4±0.4g | 54.7±0.2hi | 54.2 | SM-120 | 33.3±0.2s | - | 40.4±0.4p | - | 18.4 |
| SM-96 | - | 46.6±0.2m | - | - | 11.6 | SM-121 | 48.8±0.6h | 47.6±0.3l | 61.9±0.2h | 50±0.3kl | 52.0 |
| SM-97 | 42.8±0.1n | 52.3±0.1i | 66.6±0.3f | 61.9±0.3e | 55.9 | SM-122 | 62.2±0.4b | 50±0k | 64.2±0.1g | 52.3±0.1j | 57.2 |
| SM-98 | - | 50±0k | 57.1±0.6j | 59.5±0.2f | 41.6 | SM-124 | 30.9±0.2t | - | 30.9±0.1r | - | 15.4 |
| SM-99 | 54.7±0.2e | 35.7±0.2w | 64.2±0.3g | 61.9±0.1e | 54.1 | SM-125 | 45.2±0.1n | - | 66.6±0.3f | 59.5±0.2f | 42.8 |
| SM-100 | - | 61.9±0.3d | 64.2±0.4g | 71.4±0.1a | 49.4 | SM-127 | - | 45.2±0.5n | 66.6±0.4ef | 52.3±0.1j | 41.0 |
| SM-101 | - | 42.8±0.1q | 50±0l | - | 23.2 | SM-128 | - | 45.2±0.3n | 52.3±0.5k | - | 24.4 |
| SM-102 | - | 47.6±0.2l | 42.8±0.3o | - | 22.6 | SM-129 | - | - | - | 42.8±0.1p | 10.7 |
| SM-103 | - | 28.5±0.5z | 42.8±0.1o | - | 22.6 | SM-130 | - | 38.0±0.3u | 64.2±0.2g | 42.8±0.1p | 36.3 |
| SM-110 | 42.8±0.1n | 54.7±0.2fg | - | 54.7±0.1hi | 38.6 | SM-136 | 64.2±0.8a | 59.5±0.3e | 69.0±0.1cd | - | 48.2 |

The values are mean of three replications and having different letters within same bar are significantly different from each other according to Fischer’s LSD test at p≤ 0.05., F=*Fusarium*, R= *Rhizoctonia M* =*Macrophomina,* - = non antagonistic