

## THE EFFECTIVENESS OF THREE POTENTIAL BIOCONTROL AGENTS AGAINST FUSARIUM ROT IN CUCUMBER

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The effect of three antagonistic bacteria *Bacillus macerans*, *Flavobacterium sp.* and *Pantoea agglomerans* on *Fusarium oxysporum* causing Fusarium rot in cucumber was investigated. These organisms were previously isolated from food sources and have shown to be effective against a range of fungal pathogens.

Water and saline were tested for the suitability of preparing antagonist suspensions. Standard plate counts were done using suspensions prepared in water or saline left at room temperature for 1 hour and 24 hours respectively. The number of viable cells appeared to reduce when suspensions were left for 24 hrs. As the viable cell counts were slightly higher when saline was used, for inoculation of fruits cell suspensions ( $10^8$  CFU ml<sup>-1</sup>) of antagonists were made in saline.

Cell suspensions (50 µl) of each antagonist and combinations of either two or three antagonists were inoculated to cucumbers with 3 wounded sites on each, on the longitudinal axis. The controls were saline only (50 µl) and sterile distilled water (50 µl). After inoculation, the fruits were incubated in moisture chambers for 24 hrs at room temperature. Thereafter the wounded sites which were inoculated with antagonists or distilled water or saline, were inoculated with a conidial suspension (50 µl) of *F. oxysporum* ( $10^5$  CFU ml<sup>-1</sup>). The fruits were observed daily and lesion diameters were measured on 7<sup>th</sup>, 10<sup>th</sup>, and 12<sup>th</sup> days. The experiment was designed as randomised complete block and repeated 3 times.

Treatments with each antagonist in saline, and saline alone reduced the incidence of Fusarium rot while the distilled water treatment (control) showed the highest lesion expansion. Both saline and antagonists appeared to have a similar effect on lesion expansion on 7<sup>th</sup> day, but with time, the highest inhibition was observed in the presence of the antagonists. When the individual effects of all three antagonists were compared, they were equally effective up to the 10<sup>th</sup> day but thereafter the effect of *B. macerans* was more prominent. However, lesion expansion was significantly ( $P < 0.05$ ) reduced only with *B. macerans* and *Pantoea agglomerans*. The effect of *B. macerans* was prominent throughout the period of 12 days. All combinations of antagonists also reduced lesion development significantly ( $p < 0.05$ ). The combination of *B. macerans*, and *P. agglomerans* was the most effective while the combination of *P. agglomerans* and *Flavobacterium sp.* was the least effective. The combined effect of two antagonists on lesion expansion was greater than the combination of three antagonists up to the 10<sup>th</sup> day but the effectiveness of the latter treatment increased by the 12<sup>th</sup> day. None of the treatments were able to completely eliminate the rot but it was suppressed by the antagonists. *B. macerans* has the potential to be developed as a biocontrol agent against Fusarium rot in cucumber.