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Summary

The main objective of the present study was to select potential biocontrol agents within the fluorescent pseudomonads to be used in managing the root diseases of sugar beet caused by *Rizoctonia solani.*

A number of 103 isolates of fluorescent pseudomonads were recovered from rhizosphere of sugar beet plants at seedling and mature stages of plant growth. Of these, 44 isolates were highly efficient in inhibiting the radial growth of *R.solani* in the Lab. Screening of these potent isolates for their efficient as seed treatment to control root diseases of sugar beet was carried out in greenhouse. Twelve out of these isolates could manage root diseases at both seedling and mature stage of plant growth. A number of eight bioagents gave the best effect in improving the plant stand and decreasing the disease severity compared with the rest ones. Sucrose content in produced roots, the main target for planting the crop, significantly increased by five bioagents, which considered the most efficient among all bioagents under study.

The capacity to produce antibiotics, biosurfactants, HCN, IAA, enzymes and siderophores, that offer these

isolates the potency to control root was studied. A considerable variation in the production of these metabolites was found. Results revealed that DAPG and PLT could be, only produced by isolates under study. Strains K311 and K312 were found to have the potential to produce both antibiotics. Whereas, strains B1016 and B3541 were able to produce PLT. Biocurfactants were found to be produced by six of the bioagents. HCN and IAA, however, could be produced by K311, K312, K3110, K10 and K11. Study some enzymes production showed that nine bioagents could produce protease, but three of them had the capacity to produce lipase enzyme. Studying the motility revealed that three isolates, namely, B3541, B3812and B3704 have very high motile activity.

Productions of iron chelating compounds, siderophores were estimated. It was found that all bioagents have the ability to produce siderophores in CAS agar. Quantitative assay (by spectrophotometer) as well as the antagonistic effect of the produced siderophores against *R.solani* showed that strains B3704, K10, and K11 were superior in producing these compounds in the growing medium.

Present work indicated that sodium alginate was the most suitable carrier in survival rates of bioagents for prolonged periods of storage (90 days of storage). Strain K311 followed by B3541 and B1016 showed the highest rates of survival compared with the other bioagents.

Sugar beet root colonization with bioagents in sodium alginate based-formulation was done in greenhouse. At 28 days of planting, the overall rhizosphere competence of the isolates has been determined statistically as; K311> B3541> B35412> B3702> B1016> K10> B1012.

The twelve isolates of fluorescent pseudomonads having the potency to act as bioagents in managing root diseases of sugar beet caused by *R.solani* were subjected to identification by phenotypic characterizations. Eight isolates were identified as *P.fluorescens* with different biovar, two as *P.aeruginosa* and two as *P.putida*. These results were confirmed by the molecular characterization using the Pseudomonas-specific primers.

The accurate method for identification, phylogenetic tree constructed from sequence of the 16S rDNA gene done throughout the present investigation showed that the bioagent strains B3704 and K311 were classified into the

flourescens cluster, B1016 strain was grouped into the putida cluster and K312 strain into aeruginosa cluster.

The most interesting results obtained during the identification by the 16S rDNA gene sequencing evolved a distinct phyletic line in the pseudomonas gene tree under the fluorescens cluster. Accordingly, a different *pseudomonas* species, B35142 is anticipated.