Gene dosage effect of regulatory genes for pectate lyase in Erwinia chrysanthemi strain EC 16

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Transconjugants of positive regulatory genes, crp and pir, were confirmed to increase Pel production while those of negative regulatory genes, kdgR and pecS were confirmed to repress its synthesis. From the gene dosage survey using the cosmid transconjugants that a cosmid, p5A, showed the remarkable reduction in Pel production and in maceration of potato and radish. One subclone from p5A, namely p5A-T1, retained the same gene dosage effect and contained one major ORF which showed significant homology with ddl gene of E. coli and of S. typhimurium which encode D-ala-D-ala ligase, and it complemented the ddl deficient mutant of E. coli.

The expression of this gene was controlled by low MW fraction of potato extract by Northern blot. The gel shift assay by using promoter region of pelE as the target DNA indicated that Ddl protein might regulate Pel production indirectly by altering the binding of other known regulatory proteins. The ddl gene was also found to affect growth lags and Pel production in the presence of 100 mM NaCl, KC1, MgCl2, Na2SO4 and MgSO4.