QUANTITATIVE EVALUATION OF ENZYME ACTIVITIES IN SEEDS FROM FIELD AND PHYTOTRON-CULTIVATED PLANTS

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The comparison of protein and isozyme patterns in seeds from plants grown under normal and controlled environmental conditions revealed distinct qualitative differences in some genotypes, indicating substantial changes in gene expression (1). In addition to the esterase patterns, ADH bands also were analyzed after e1ectrophorectic separation in polyacrylamide gels. In the case of ADH we obtained two major bands and one minor one, according to the different growing conditions of the plants. In view of the ADH isozyme banding polymorphisms observed, the enzyme activities of ADH from dry cotyledons were investigated. The data presently available clearly show that there are marked differences in enzyme activities in seeds of plants cultivated under different conditions. Generally, the enzyme activities in single seeds from plants grown in the phytotron were 2-10 times higher than in those from the experimental field. Furthermore, each genotype analyzed showed some sort of genotype-specific increase in enzyme activity: in seeds of mutant 37 and recombinant R 507 there was an increase by a factor of two, in seeds of recombinant R 42I by a factor of three, and in those of mutant 142 by a factor of ten. The latter three genotypes not only showed striking differences in ADH but also in esterase isozyme patterns. Thus, the qualitative variability in banding pattern obviously indicates also distinct quantitative changes in enzyme activities. The relations between both traits call for further analysis.

1. Muller, H.P. 1985. PNL 17:61-62.

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