

to purify this inhibitory factor, and to determine if it differentially inhibits the various catalase isozymes.

References:

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2. De novo synthesis of soluble and mitochondrial forms of genetically determined isozymes of malate dehydrogenase.

Three classes of malate dehydrogenase (MDH) have been identified according to their subcellular location: those found in the soluble fraction (s-MDH), those associated with the mitochondrial fraction (m-MDH) and those associated with glyoxysomes (g-MDH). Seven electrophoretic variants of m-MDH have been found among 35 inbred lines examined.

The developmental control of the two s-MDH's and the five m-MDH's has been studied using the inbred strain W64A. During early sporophytic development (dry seed - 10 days), all of the scutellar s-MDH's and m-MDH's follow the same developmental pattern; however, the total m-MDH activity is only 60% that in the cytosol. Chloramphenicol (CAP) and cycloheximide (CH), two known inhibitors of protein synthesis, were employed to determine whether the MDH isozymes are affected during the course of development. CAP (0.5-2.0 mg/ml) did not have an inhibitory effect on MDH, whereas CH (2-10 µg/ml) inhibited 60-65% of the MDH activity in scutella by 96 hrs. after treatment. Both s-MDH's and m-MDH's are inhibited to the same extent. It is thus apparent that protein synthesis in the cytoplasm is essential for the increase seen in both s-MDH and m-MDH activities during development. This result is quite consistent with our earlier findings that mitochondrial MDH's are controlled by nuclear genes (Longo and Scandalios, 1969, PNAS 62:104).

In order to test whether the increased MDH activities in the developing scutella result from activation of pre-existing MDH molecules or

from de novo synthesis of the MDH molecules, density labeling experiments were performed. Our results showed that both s-MDH's and m-MDH's extracted from scutella grown in 70% D₂O with 10mM ¹⁵NH₄Cl do have higher buoyant densities than those grown in H₂O and ¹⁴NH₄Cl. This finding indicates that both s-MDH's and m-MDH's in the scutella of developing maize seedlings are de novo synthesized. These results suggest that in maize m-MDH isozymes are synthesized in the cytoplasm and then become associated with the mitochondria.

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1. Genetic studies of susceptibility to bacterial leaf freckles and wilt, *Corynebacterium nebraskense*.

A new bacterial wilt disease first discovered in Dawson County Nebraska in 1969 and later found in 23 counties in Nebraska, one in Iowa and one in Kansas, was observed to be much more severe on some hybrids than others in a demonstration plot in Dawson County in 1971. Therefore some preliminary studies have been conducted to obtain information on the genetic nature of susceptibility and tolerance in lines and their hybrids.

Twenty-three lines previously used in two diallel crosses (one 10 x 10 and one 13 x 13) were evaluated in the greenhouse in 1972. Two weeks after planting seeds in soil in pots, the plants were inoculated using a 25 gauge, 1 cc plastic tuberculin syringe. Two punctures were used, one just above ground level and the other about one inch above the first and at right angles to it. A total of 1 ml of inoculum containing approximately 1×10^8 bacterial cells from a mixture of 6 cultures was injected into each plant. Plants were each rated for susceptibility two weeks after inoculation using the following scale: 0 = no visible infection, 1 = slight infection, 2 = moderate infection, 3 = severe infection and 4 = dead. Since no plants were killed and the highest rating was 3, a