

3. Amylases in Sh₁ and sh₁.

The hypothesis that the phenotypic hollowness observed in sh₁sh₁sh₁ kernels is due to the action of a starch digesting amylase that is not present in the full-kernel Sh₁Sh₁Sh₁ types was investigated. In developing endosperm of maize kernels that had 0, 1, 2, and 3 doses of the Sh₁ allele, no differences were observed in amylolytic activity. Thus, the Sh₁ protein band observed in disc-gel electrophoresis of endosperm proteins and absent in sh₁ tissue is not associated with amylase activity.

Amylase is active in developing normal and sh₁ endosperm from twelve to thirty-six days after pollination. The level of the amylolytic activity decreases slightly as the kernels mature as seen in the table. Amylase activities were measured by the decrease in iodine blue color of starch.

Amylase Activities of Maize Endosperm

Dose of <u>Sh₁</u> Gene	0	1	2	3
Genotype	<u>sh₁sh₁sh₁</u>	<u>Sh₁sh₁sh₁</u>	<u>Sh₁Sh₁sh₁</u>	<u>Sh₁Sh₁Sh₁</u>
Phenotype	<u>shrunken</u>	<u>non-shrunken</u>		
Specific Activity (relative units/mg protein)				
13-day	8.5	8.5	8.5	9.3
18-day	8.3	8.1	7.6	6.8
24-day	6.2	6.6	5.5	6.7
30-day	6.3	6.3	5.0	6.0
36-day	5.0	4.0	6.5	5.3

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1. Genetic and biochemical studies of chlorophyll deficient mutants.

For the past few years we have been accumulating mutants that are defective in the chlorophyll but which might have near normal carotenoid synthesis. Mutants of this type would be expected to have a luteus phenotype, but we have also included pale yellow, yellow-green as well as some near albino types in this study. If the mutant had not been previously located to chromosome we attempted to do this and for most of