



Electrophoretic Analysis of Alpha-Amylase Enzyme and Identification of Reciprocal Effect of Parental Lines of Corn Hybrid Seeds

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INTRODUCTION

Evaluation of enzyme patterns in seeds allows the identification of the beginning of deterioration and its consequences, consisting of an excellent indicator of the physiological potential decrease. Alpha-amylase is an important enzyme in the starch hydrolysis, accounting for 90% of amylolytic activity in corn seeds. Lots with increased expression of this enzyme can provide carbohydrates to the embryo more easily, resulting in higher germination and vigor.

OBJECTIVE

This research aimed to verify the applicability of electrophoresis analysis of alpha-amylase enzyme in identifying reciprocal effect of parental lines of corn hybrids seeds.

MATERIALS AND METHODS

Twelve corn hybrid seeds (HS 13, HS 14, HS 15, HS 23, HS 24, HS 25, HS 31, HS 41, HS 51, HS 32, HS 42, HS 52) were evaluated after nine months of storage by:

Seed water content (SWC): 2×25 seeds, oven method 105 ± 3 °C for 24 h;

Germination (GE): 4×50 seeds, in rolls of germination paper, kept in a germination chamber at 25 °C; seedling evaluations at 4 and 7 days;

Vigor - First count of germination (FC): conducted with germination test, seedling evaluation at 4 days

Vigor - Cold test (CT): 4×50 seeds, in rolls of germination paper with soil, kept in a cold room chamber at 10 °C for 7 days; 25 °C for 4 days;

Vigor - Accelerated aging (AA): 250 seeds, 45 °C / 72 h;

Vigor - Electrical conductivity (EC): 4×50 seeds, 75 mL, 25 °C / 24 h;

Seedling emergence in the field (SE): 4×50 seeds, distributed in 2.5 m rows and 0.05 m spacing between row. Seedling emergence evaluation at 21 days;

Electrophoretic pattern of alpha-amylase enzyme: determined using seeds endosperm after three days of germination

RESULTS

Table 1. Physiological potential of 12 corn hybrid seed lots after nine months of storage: seed water content before (SWC) and after accelerated aging (SWCa), germination (GE), first count of germination (FC), cold test (CT), accelerated aging (AA), seedling emergence in the field (SE) and electrical conductivity (EC) tests.

Lots	SWC	SWCa	GE	FC	CT	AA	SE	EC
HS 13	12.6	25.8	94 b	76 c	62 e	0 d	92 b	20.3 e
HS 14	12.1	26.2	98 a	86 b	79 d	0 d	98 a	17.8 d
HS 15	12.6	25.1	90 b	75 c	61 e	0 d	84 c	19.4 e
HS 23	12.7	24.4	100 a	92 a	98 a	68 b	97 a	10.8 b
HS 24	12.0	24.4	100 a	86 b	100 a	75 b	100 a	11.2 b
HS 25	12.0	23.9	99 a	79 c	98 a	64 b	98 a	10.0 b
HS 31	12.6	25.1	96 a	79 c	92 b	28 c	98 a	16.4 c
HS 32	12.5	25.4	97 a	94 a	86 c	26 c	98 a	18.4 d
HS 41	10.5	24.0	96 a	88 b	94 b	88 a	98 a	9.4 b
HS 42	12.3	23.9	100 a	96 a	99 a	95 a	96 a	7.8 a
HS 51	12.3	25.5	100 a	95 a	90 b	8 d	98 a	18.0 d
HS 52	12.5	25.3	96 a	74 c	94 b	72 b	94 b	16.9 c
CV (%)	-	-	2.6	7.1	4.7	13.6	2.4	7.4

Means followed by the same letter in the column do not differ significantly at 5% level of probability according to Scott-Knott. CV (%) = Coefficient of Variation.

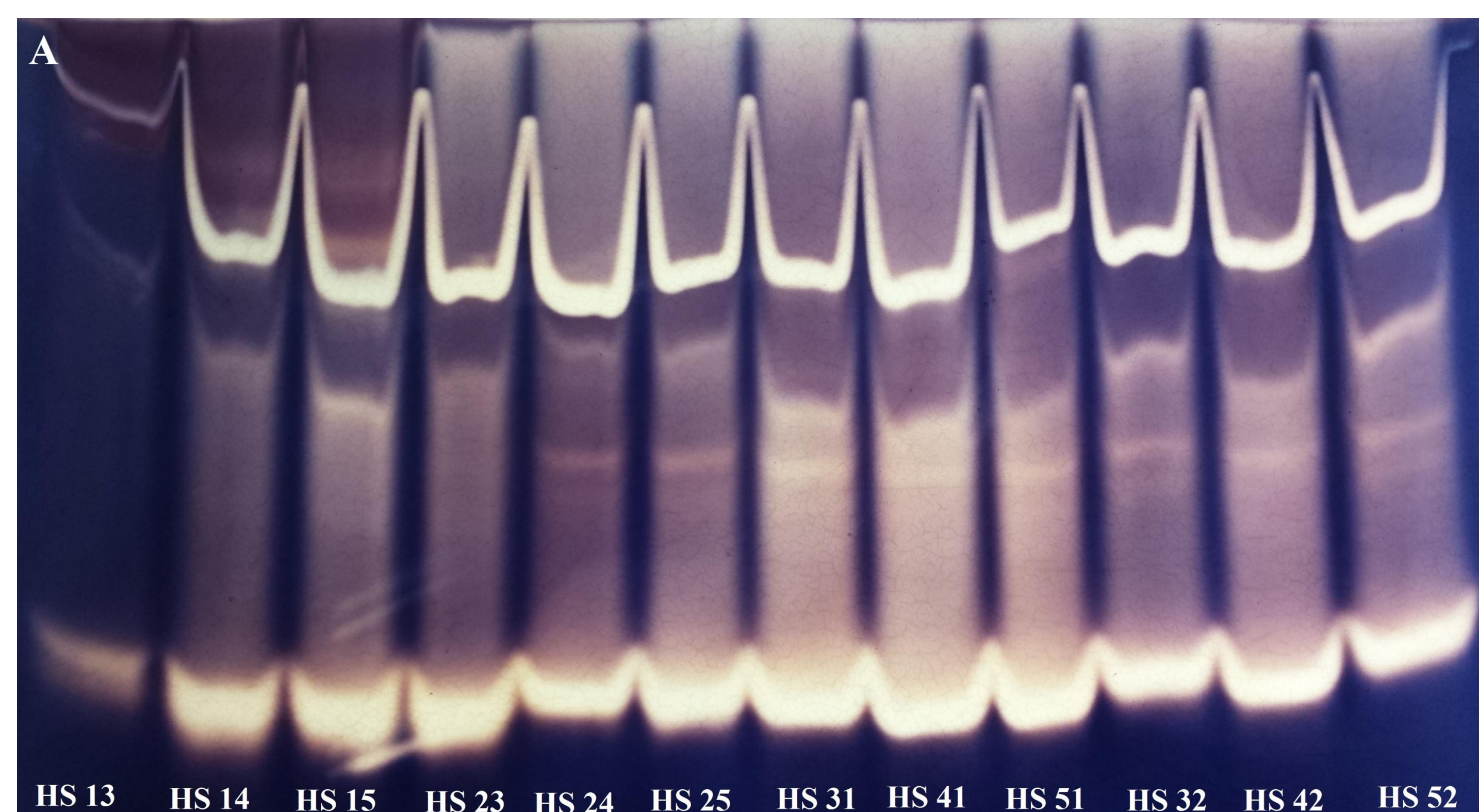


Figure 1. Electrophoretic pattern of alpha-amylase enzyme in endosperm of seeds obtained from twelve corn hybrid seed lots after nine months of storage.

CONCLUSIONS

Alpha-amylase enzymatic analysis may be considered an important tool in identifying the reciprocal effect of parental lines in corn hybrid seeds.

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