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Accelerated Aging (AA) Test for Soybean Seed V.72021

INTRODUCTION

The Accelerated Aging (AA) test has been used to evaluate soybean seed vigor for nearly 40 years. As growers continue to plant soybeans earlier, seed companies may want to use the AA test to evaluate soybean seed vigor. The AA test is commonly conducted on bin lots to identify issues (green or high moisture seed) prior to conditioning seed. Finished lots should also be tested to assure seed moisture changes have not impacted vigor.

CONCEPT

Seed is aged in a water-jacketed chamber for 72 hours at 41C in a high humidity regime. Inner chamber trays, similar to the one shown in Figure 1, are used within the chamber. Seed moisture typically increases from 12% to 28–30% during the aging process. After 72 hours of aging, seed is placed on moist crepe cellulose paper and covered with sand for a seven day germination test. The AA test is our most requested vigor test for soybeans as we conduct about 5,000 of these tests annually.

FIGURE 1. Soybean seed placed on AA screen prior to 72 hours of aging, note 40 ml of water below but not touching seed.

FIGURE 2. Yellow cotyledon seed (left 3 columns) slightly green cotyledons (right 3 columns), AA of 71% and 41%, respectively.

SEED VIGOR

Generally, mature yellow spherical-shaped new production soybeans will be high vigor. When green seed exists from a maturity issue related to field uniformity or early death, vigor can be reduced (Figures 2 and 3). High moisture soybeans (above 13%) may have reduced vigor depending on actual moisture, storage temperature and duration of storage. Commonly, carry-over soybean seed not held in conditioned storage will have lower vigor.

RECOMMENDATIONS

Accelerated aging is SoDak Labs recommended vigor test for soybeans. A value within 15% of standard germination is considered strong, 16–30% difference is considered moderate and >30% difference is questionable. Cold testing soybeans is not recommended due to seasonal seed moisture variation impacting cold test results. Data presented in Table 1. shows AA responses compared to standard germination methods.

FIGURE 3. Green cotyledon seed (left) vs. yellow cotyledon seed (right) AA test. The result for green seed is 41 percent and yellow seed is 71 percent, respectively. Seeds were from same lot and field.

TABLE 1. Comparison of Standard Germination and Accelerated Aging responses from 4,906 seed lots

Standard Germination[1] Quality Ranges	Count	Percent of total Samples	Strong Normal, %	
			Standard Germination[1]	Accelerated Aging
>96	2264	46	97	93
91–95	1904	39	93	86
86–90	467	10	89	77
81–85	132	3	83	71
<80	139	3	67	49

[1]7/2020 to 6/2021 Standard germination (AOSA TC or TCS methods)