



CALIFORNIA STATE SCIENCE FAIR 2016 PROJECT SUMMARY

Name(s) Anthony J. Castillo	Project Number S1803
Project Title Effects of Seed Priming on Germination and Seedling Vigor of Aged Yemeni Watermelon (<i>Citrullus lanatus</i>) Landrace Seeds	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals In Yemen, the production of native watermelon using landrace seeds has been disrupted due to civil war leaving farmers with aged seeds. Studies have shown that seed priming can improve germination of aged seeds. The objective of this experiment was to measure the effects of hydropriming, osmopriming, and hormonal priming solutions on the germination and seedling vigor of aged Yemeni watermelon (<i>Citrullus lanatus</i>) landrace seeds.</p> <p>Methods/Materials Using Jiffy pellets as the growing medium, eight-year-old landrace seeds were subjected to five different seed treatments (5 seeds per treatment): (A) hydropriming-Scarification and water soak, (B) osmopriming-H₂O₂ rinse followed by soak in oxygenated reverse-osmosis water with sucrose, (C) osmopriming-milk soak, (D) inorganic hormonal priming-Mad Farmer Nutrient Up-Take Solution with Silica sprayed on soil prior to planting (E) organic hormonal priming-HB-101 plant enhancer sprayed on soil prior to planting. Five untreated seeds were used as a control group. The pellets were placed on a tray indoors and observed for twenty-five days. Seeds were watered with 5 mL of reverse-osmosis water.</p> <p>Results Rates of Germination: Treatments A (hydropriming), B (osmopriming), D (inorganic hormonal priming), and Control 60% , Treatment C (osmopriming) 40%, E (organic hormonal priming) 20%. Qualitative analysis using the Seedling Vigor Classification Test showed that only 3 seedlings (one each from Treatments A, D, and E) were classified as strong with the potential of producing fruit if growing continued. Quantitative vigor was also used to analyze results. Treatment A had the highest measured and classified seedling vigor. Finally, growth rate was also measured in five day intervals, starting at Day 10. Treatment A (hydropriming) and D (inorganic hormonal priming) consistently had the highest growth rates. Treatment D had the highest with a growth rate of 1.9 cm/day from Day 10 to Day 15.</p> <p>Conclusions/Discussion The results of the experiment suggest that hydropriming with scarification is the most effective treatment to germinate viable Yemeni watermelon (<i>Citrullus lanatus</i>)landrace seedlings. Seeds treated with hydropriming and scarification consistently showed positive results in all measured categories: germination percentage, qualitative vigor, quantitative vigor, and growth rate.</p>	
Summary Statement By testing seed priming techniques as a way to increase germination and seedling viability in aged Yemeni watermelon landrace seeds, I determined that hydropriming with scarification is the most effective treatment.	
Help Received Wesam Qaid, Executive Director at Small Micro Enterprise Promotion Service provided information on watermelon farming in Yemen. Staff of La Habra Hydroponics gave suggestions on hormonal plant treatments. The experiment was designed and conducted entirely by myself.	