

EFFECT OF TEMPERATURE, LIGHT AND PRE-GERMINATION TREATMENTS ON SEED GERMINATION AND VIABILITY OF SPIDER PLANT (*Cleome gynandra*)

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ABSTRACT

The spider plant (*Cleome gynandra L.*) is an indigenous semi-domesticated African leafy vegetable belonging to the family Cleomaceae. This vegetable is nutritious and commonly consumed in many rural areas across Africa, where it is reported to play a crucial role in household food and nutrition security. However, a major constraint to the cultivation of *Cleome* is typically limited by low seed germination rates, which can be as low as 37% and 46% under field conditions. This is because seeds exhibit physiological dormancy despite their abundant production and availability. This study was conducted to determine the effects of temperature, light, and pre-germination treatments on the seed germination and viability of spider plants. Accessions were treated with different pre-germination treatments: preheating at 40°C for 24 h, application of GA3 500 ppm, soaking in 1 M H₂SO₄ for 10 min, and subjecting to constant temperature of 30 °C under darkness and alternating temperature of 30 °C 12 h in the light and 20 °C 12 h in dark. Final germination percentage (FGP), final seed viability (FSV), mean germination rate (MGR), and mean germination time (MGT) were also assessed. The results showed that seeds subjected to 30°C in constant darkness broke dormancy and enhanced seed germination of spider plants compared to those subjected to an alternating temperature of 30°C for 12 h in the light and 20°C for 12 h in the dark. Accessions ODS-15-038 and ODS-15-053, application of GA3 500 ppm increased seed germination at 30°C in constant darkness. The seed germination percentage was lower under pre-heating and soaking in sulfuric acid. The accessions showed variations in germination characteristics under both temperature and light conditions. The differences between seed viability and germination were significant across the accessions, this big difference indicating low-quality *C. gynandra* seeds. The spider plant's high seed viability, as demonstrated by this finding, does not necessarily indicate immediate germination. The final seed viability was calculated by including

both the seeds that germinated and those that were stained with TZ, revealing that the stained seeds were dormant yet viable, but unable to germinate.

Keywords: Accession, seed viability, tetrazolium test, seed dormancy, seed germination, mean germination time