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Optimizing *Solanum lycopersicum* seed germination using *Aloe vera* gel extraction

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Solanum lycopersicum. L is an important crop plant that is highly used in consumption. A high seed germination rate is essential for the efficient establishment of *S. lycopersicum*. Seed germination can be enhanced using commercially available chemicals including growth regulators, vitamins, and antioxidants. In addition, natural biostimulants are used for seed germination enhancement as an environmentally friendly alternative to chemicals. In this study the effect of *Aloe vera* gel extraction on *S. lycopersicum* seeds was evaluated. Five concentrations (0%, 20%, 40%, 60%, 80%, and 100%) of *A. vera* gel extractions were prepared. One hundred eighty healthy *S. lycopersicum* seeds were selected and surface sterilized. They were then immersed in sterile distilled water for two hours. Ten seeds were placed on each petri dish layered with filter paper moistened with 2.5 mL of the corresponding *A. vera* treatment separately. The respective *A. vera* gel extractions were added every two days. Three replicates were conducted for each treatment. Treated seeds were incubated at 27 °C for six days and seed germination was recorded daily. Mean Germination Rate (MGR), Mean Germination Time (MGT), Mean Germination Index (MGI), and Mean Coefficient of Velocity of Germination (MCVG) were calculated. One-way ANOVA and Tukey pairwise tests were applied for data analysis at $\alpha = 0.05$ level. Based on the results, 80% of *A. vera* gel extraction recorded the highest germination rate for *S. lycopersicum* seeds (14.43 ± 2.12 %) compared to the 0% *A. vera* treatment. It has significantly increased the germination rate of *S. lycopersicum* compared to the other treatments (One-way ANOVA, $p < 0.05$). The lowest mean germination time was recorded by 80% *A. vera* treatment. Based on the germination rates, 80% treatment was 8.25 % more effective than the control (0% *A. vera)*. *Aloe vera* gel extraction (80%) can significantly enhance the *S. lycopersicum* seed germination by increasing the germination speed and hence it can be recommended to the field application.

Keywords: *Aloe vera*, Germination enhancement, Germination rate, Seed germination, *Solanum lycopersicum*