

Effects on germination and early growth of *Triticum aestivum* L. cv. "Jordão" under different concentrations of selenium

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Currently, it is estimated that the deficit of micronutrients in food affects several hundred million people worldwide. Selenium (Se) is a micronutrient that is usually ingested in lower amounts than the daily dose prescribed by the Food and Agriculture Organization. The consumption of dietary supplements allows you to adjust the proper amount of Se and other essential and beneficial micronutrients for our well-being. Insufficient intake of Se has been linked to various health problems such as reduced fertility and immune system, problems associated with oxidative stress and increased risk of cancer. Wheat is one of the most important cereal crops for human food. So, the wheat seed fortification with Se can be one of the main actions to overcome this specific need. However, this approach promotes greater availability of inorganic form of Se in organic form, not adding high nutritional value of the food. On the other hand, the selenium supplementation during germination can be an alternative for the production of Se-proteins, which, besides being able to promote an increase in the production of grain and biomass can further mitigate the effect of several abiotic stresses and to increase the grain nutrition value. This work intended to evaluate the effect of wheat seed priming with Se during the early stages of development in bread wheat plants cv. "Jordão". The seeds were placed in various solutions with different concentrations of sodium selenate (0, 75, 150, 750 and 7500 µM) for 15 h and washed in distilled water and germinated in Petri dishes (with moist filter

paper) at 25 °C in the dark for 48 h. Then the percentage of germination (number of seed germinated, number of roots and root length) were evaluated and the seedlings were placed in vials for hydroponic experiments with different concentrations of sodium selenate (0, 6, 12 and 50 µM) in the Hoagland solution. The "Jordão" plants are kept for 4 weeks in a growth chamber, and the hydroponic solution was replaced weekly. At the end of experiment, leaf gas exchange and chlorophyll fluorescence were determined and the plants were harvested for growth analysis, relative water content (RWC) and electrolyte leakage measurements. All data were processed using the software IBM SPSS statistics (ANOVA and Tukey HSD test). In general, all treatments had a germination rate higher than 97% when evaluating the different concentrations, showing that wheat seeds can adapt and germinate in high concentrations of Se. Among the various parameters analyzed, leaf fresh and dry weights, and leaf number, tiller number and leaf area showed significant differences ($P < 0.05$) for all treatments. The measurements of gas exchange and chlorophyll fluorescence showed significant differences ($P < 0.05$) for all parameters. In contrast, the analysis of RWC and electrolyte leakage showed no significant differences ($P > 0.05$) among the Se treatments. The stability of the membranes was not affected by higher Se concentrations, which reveals that the concentrations applied for a few hours did not cause stress to the balance intake of solutes. Overall, our results showed that "Jordão" wheat seems to tolerate high concentrations of Se priming and this approach is important to plant development, contributing to fortification of the plant and yield increase.

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