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EFFECTIVENESS OF A SEED COATING FORMULATION FOR THE SURVIVAL OF *BRADYRHIZOBIUM JAPONICUM* ON SOYBEAN (*GLYCINE MAX*) SEEDS IN STORAGE

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Seed coating technology can be used as a potential delivery method for biofertilizers. However, maintenance of the viability of microorganisms in coated seeds is challenging during storage. The current study aimed to develop a potential seed coating mixture and evaluate its effectiveness in maintaining the viability of *Bradyrhizobium japonicum* on soybean (*Glycine max*) seeds in storage. The coating mixture was formulated using xanthan gum as the binder and biochar as the filler. Based on the applicability of the coating mixture on the seed, the xanthan gum to biochar ratio was selected as 80:20 (w/w g). This ratio was modified with different concentrations of xanthan gum mixtures (0.25, 0.50 and 1.00%) and each mixture with and without sucrose (1% W/V) and primed with *Bradyrhizobium japonicum* (3×10^8 CFU ml^{-1}). The viability of the coated seeds and the survivability of the inoculum in the seed coat were tested after 15 days of storage (4 ℃ and 30 ℃). The study revealed that the germinability of coated and non-coated seeds stored at 4 ℃ was significantly higher ($p < 0.05$) compared to coated and non-coated seeds stored at 30 ℃. However, the germinability of non-coated seeds was higher than the coated seeds at both temperatures. The viability of the inoculum was around 1×10^7 CFU ml^{-1} on day 1 after the coating application but drastically decreased after day 3 in both temperatures. Inoculum viability on the seed coat was over 0.7×10^6 CFU ml^{-1} after 15 days of storage under 4 ℃. The seed coating formulation used in this study can hold the viability of *Bradyrhizobium japonicum* only for short-term storage at lower temperatures.

Keywords: Biochar, Biofertilizers, Seed coat, Seed germination, Xanthan gum