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(57) Abstract :

The present invention relates to a bio-fertilizer composition comprising efficient Rhizobium strains selected from Rhizobium leguminosarum, Bradyrhizobium japonicum, Sinorhizobium meliloti, or combinations thereof, incorporated with carrier materials such as peat, lignite, vermiculite, or biochar to enhance bacterial stability. The composition may further include growth stimulators, bio-protectants, or stabilizing agents to improve shelf life and field performance. It is available in liquid, powder, or granular form and suitable for seed coating, soil application, or foliar spray. The formulation maintains viable cell counts of 10⁷–10⁹ CFU/g or mL for at least six months. A method for preparing the bio-fertilizer is also disclosed, including Rhizobium isolation, culture preparation, carrier sterilization, mixing, and drying. The invention enhances nitrogen fixation, improves crop yield, and supports eco-friendly farming practices.

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