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PATAGONIAN BACTERIA AS ALTERNATIVE FERTILIZERS FOR Cannabis Sativa L.: EVALUATING GROWTH-PROMOTING EFFECTS

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Cannabis sativa L. is a plant of significant medicinal value, used for treating conditions such as depression, neurological disorders, and Alzheimer's disease while alleviating symptoms associated with HIV and cancer. The cultivation of medicinal cannabis presents substantial potential for regional economic development. However, large-scale cultivation poses various challenges, particularly from an agronomic perspective, where effective fertilization is crucial for achieving high yields and suitable metabolic profiles. Nowadays, chemical fertilizers are commonly employed to enhance crop yield and quality, but their use increases production costs and environmental concerns related to air, water, and soil pollution. An alternative approach involves using of Plant Growth-Promoting Rhizobacteria (PGPR) to reduce or replace the use of agrochemicals. These bacteria positively impact crop productivity and ecosystem functioning through various growth-promoting mechanisms. In this framework, this study aimed to evaluate the PGPR potential of Patagonian bacterial strains to identify those with beneficial properties and assess their effectiveness in *C. sativa* cultivation. A total of sixty-nine bacterial strains isolated from Parque Nacional Los Alerces (Chubut, province) were screened for growth-promoting properties, including amylolytic activity (A), proteolytic activity (P), nitrogen fixation (NF), phosphorus solubilization (PS), indole acetic acid production (IAA), and siderophore production (SP). Two-way cluster analysis was conducted to categorize the strains based on their PGPR attributes, revealing eight different groups with varying growth-promoting properties. Bacteria from these groups were selected to be tested in *C. sativa* plants. Seeds were germinated in 250 ml pots with MG Grow commercial soil (N=4 per treatment). Fifteen days post-germination, seedlings were inoculated with 10 ml of each bacterial strain (1×10^9 ufc/ml), while control plants were irrigated with distilled water. Nondestructive measurements of plant height, coverage percentage and radicular system were recorded at days 21 and 48 post-germination. The results indicated that plants

inoculated with Patagonian bacterial strains that exhibited high levels of amylolytic activity, IAA production, and nitrogen fixation, enhanced vegetative growth and produced a more robust root system compared to controls. But the most notable was the increase in the number of leaves in plants inoculated with the M4C15 strain, registering 40% more than the control. In conclusion, Patagonian PGPR showed a positive effect on root biomass and plant size at the early stage of *C. sativa* plants. However, the effect of these strains on plant growth should be analyzed for the whole life plant cycle. Hence, additional studies are being carried out in cloning and over the entire life plant cycle to confirm if these results could benefit the production of *C. sativa* varieties.

Palabras clave: Plant growth promotion - rhizosphere bacteria - Bioinoculants - Bioactive compounds medicinal - Cannabis Sativa