

Effect of Heat and pH Stress in the Growth of Chickpea Mesorhizobia

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Abstract The development of rhizobial inoculants requires the selection of isolates that are symbiotically efficient as well as adapted to the local environmental conditions. Our aim was to find indigenous chickpea rhizobia tolerant to adverse environmental conditions, such as temperature and pH. Thirteen isolates of chickpea mesorhizobia from southern Portugal were examined. Tolerance to stress temperatures and pH was evaluated by quantification of bacterial growth at 20–37°C and pH 5–9, respectively. Tolerance to heat shocks was studied by submitting isolates to 46°C and 60°C. Sodium dodecyl sulfate–polyacrylamide gel electrophoresis protein analysis revealed qualitative and quantitative differences when isolates were submitted to temperature stress. A 60-kDa protein was overproduced by all isolates under heat stress. Almost all isolates revealed to be more tolerant to 20°C than to 37°C. A positive correlation was found between the maximum growth pH and the isolate origin soil pH. Generally, isolates more tolerant to temperature stress showed a lower symbiotic efficiency.



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