

Identification of quinoa seed bacterial endophytes and selection of strains for biofertilization of quinoa crops[†]

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Abstract: Quinoa, quínoa or quinua (from the quechua kinwa or kinuwa), whose scientific name is *Chenopodium quinoa* Willdenow, is a plant of the family Amaranthaceae, subfamily Chenopodiaceae native to the Andean region of South America. Its seeds, which do not contain gluten, have higher nutritional value than cereals because of its high protein content and its balanced content among proteins, carbohydrates and fats. Coming from America, in recent years its consumption has become popular in European countries, where its cultivation has been recently introduced. In Spain, quinoa is mainly produced in “Andalucía”, but its cultivation is beginning to be tested in other regions such as “Castilla y León”. So far there are no studies about quinoa endophytic bacteria and their potential as biofertilizers for this plant. For this reason in this study we have isolated and identify the endophytic bacteria of seeds from quinoa obtained after the cultivation of this plant in a soil from “Castilla y León”. The isolated strains were classified into the genera *Bacillus*, *Staphylococcus* and *Pantoea* after MALDI-TOF MS and 16S rRNA gene sequence analyses. After the analysis of several *in vitro* plant growth promotion mechanisms, two strains belonging to the genus *Bacillus* were selected for inoculation of quinoa plants in microcosms assays, which were carried up to seed production in greenhouse using two soils collected in Salamanca province (“Castilla y León”) as substrate. The results showed that despite the dry weight per plant was lower in the inoculation treatments with respect to the fertilized control, the weight of the collected seeds was similar or even higher in the two inoculation treatments. These results suggest that the biofertilization could be a reliable alternative to the chemical fertilization for quinoa crops.

Keywords: quinoa; endophytes; biofertilization; PGPBs; crops production

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