Bacterial potential for maize roots colonization and phytopathogens biocontrol

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Maize is one of the most important cereals in the world's agricultural setting, in order to ensure its high production is necessary spending with fertilizes and pesticides. The use of microorganisms able to colonize plants and promote plant growth has being investigated with the aim to develop bioinoculants. Therefore, is necessary use bacterial isolates that show potential to root colonize, release nutrients for the plants, produce phytohormones and antagonize pathogens. Thus, we performed several *in vitro* tests to evaluate maize endophytic and rhizosphere bacteria as the capacity of root colonization, production of tensoactive molecules and antagonistic activity against maize pathogens. For evaluate ability to colonize maize roots, the bacteria were inoculated in germinated grains deposited on the modified NBRIP-agar medium and incubated at 28 °C. At 2, 24 and 48 h periods, the bacteria density (UFC/g) adhered to roots was performed. 1-*Klebsiella*, 30-*Enterobacter* sp., 85-*Serratia marcescens*, 50-*Bacillus megaterium*, 52-*Bacillus* sp. and 2111-*Bacillus* sp. showed the higher values, around 5 x 10^{10} UFC/g of root. The tensoactive production potential was expressed by capacity of surface tension reduction (Tensiometer Kruss) and emulsifying activity (E_{24}) after bacterial growth in mineral medium added glucose (5 %). Values of E_{24} up to 75 % using toluene as organic phase were founded for 1-*Klebsiella*. The isolate 81-*Pseudomonas putida* reduced the medium surface tension of 66.3 mN/m to 27 mN/m. Furthermore, production of tensoactive molecules precipitated by ethanol (2 volumes) ranged from 0.16 to 1.57 g/L. The activity against the phytopathogens fungi was realized by the direct confrontation test; 50-*B. Megaterium*, 52-*Bacillus* sp, 2111-*Bacillus* sp and 7-*Pantoea* sp antagonize the growth of *Fusarium verticillioides*, while 50-*B. megaterium* and 2111-*Bacillus* sp also antagonized the growth of *Stenocarpella macrospora*. In the tests of antagonism against *P. ananatis* using overlay method, the 4-*Erwinia* sp., 18-*Enterobacter* sp. and 47-*Bacillus* sp. showed antagonistic activities. These results suggest that bacteria highlighted in this work are candidates to test in field condition for validation of their potential for plant growth promotion.

Keywords: biocontrol, root colonization, maize, bacteria

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