EFFECT OF INDOLE ACETIC ACID PRODUCING *Bacillus* spp. ON THE GERMINATION OF *Capsicum chinense* Jacq.

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Introduction. Rhizobacteria promote plant growth by production of phytohormones, phosphate solubilization and protection from pathogens. *Bacillus* spp. show antagonistic activity against plant pathogens and produce phytohormones that promote plant growth (1). The goal of the present study was to evaluate native strains of *Bacillus* spp. on the production of indole acetic acid (IAA) and on the promotion of germination of *Capsicum chinense* Jacq.

Methods. We used three strains previously isolated in the Yucatan, México. The antagonistic activity was performed by dual confrontation against *Colletotrichum gloeosporoides* Penz. in PDA medium. The percentage of growth inhibition was evaluated 7 days after inoculation. For the production of IAA in nutrient broth supplemented with L-tryptophan (0.1 mg L^{-1}), bacteria were cultured in orbital shaker at 200 rpm, 30 °C for 48 h. AIA concentration was measured by spectrophotometry at 535 nm, using the reagent Salkowski. For *in vitro* germination test, seeds were inoculated by immersion in a bacterial suspension (1 x 10^8 CFU mL^{-1}), for 1 h at 120 rpm and 30 C°. For the *in vivo* germination, seeds were inoculated as previously mentioned and placed in styrofoam trays with sterile substrate (50% soil and 50% cosmopeat). The germination percentage was evaluated at 14 days after inoculation.

Results. All strains of *Bacillus* spp. caused 60.94 to 83.41% inhibition of colonial growth in *C. gloeosporoides* (Table 1). These data are similar to those reported by Orberá *et al.* (2009). All strains produced AIA, with values of 6.77 to 8.59 μg mL^{-1} of IAA. The strains CBRF12 and CBCC57 showed significantly higher values than those showed by the commercial strain (BSC) (Table 1). Wahyudi *et al*. (2011) reported strains of *Bacillus* sp. that produce IAA. Under *in vitro* conditions the CBRF12 induced the highest germination percentage in the shortest time, but no significant difference with the control and the commercial strain (Table 2). The strain CBRF5 induced the highest percentage of germination in the evaluated period, although no statistical difference was observed from percentage germination induced by CBCC57, CBRF12 and CBRF5 (Table 2).

Table 1. *Percentage of growth inhibition of C. gloeosporoides and production of AIA by Bacillus spp*

STRAIN	GROWTH INHIBITION (%)	IAA (μg mL^{-1})
CBCC57	60.94 ± 1.41	8.35 ± 1.07^{a}
CBRF12	83.41 ± 0.48	8.59 ± 0.15^{a}
CBRF5	77.89 ± 0.69	6.77 ± 0.17^{ab}
BSC	NE	5.57 ± 0.44^{b}

Means with the same letter within columns are not statistically different (Tukey, 0.05). (NE) Not evaluated. BSC: *Bacillus subtilis* of the product commercial Probac® BS.

Table 2. *Effect of Bacillus spp. in germination of Capsicum chinense Jac.*

STRAIN	*in vitro*		*in vivo*	
	G (%)	$\bar{t}$ (Days)	G (%)	$\bar{t}$ (Days)
CBCC57	67.0±4.7^{b}	7.2±0.2^{ab}	93.0±7.6^{ab}	5.8±0.3^{b}
CBRF12	96.5±1.3^{a}	5.9±0.1^{c}	88.0±5.4^{abc}	5.9±0.2^{b}
CBRF5	44±4.9^{c}	7.4±0.1^{a}	95.5±3.6^{a}	6.7±0.3^{a}
BSC	88±2.1^{a}	6.1±0.1^{c}	79.0±8.4^{c}	6.0±0.5^{ab}
CONTROL	93.5±2.6^{a}	6.5±0.3^{bc}	82.5±4.0^{bc}	5.6±0.3^{b}

Means with the same letter within columns are not statistically different (Tukey, 0.05). G: Germination. t: Mean germination time.

Conclusions. All native strains produced IAA, showed antifungal activity against *C. gloeosporoides* and promoted *in vitro* and *in vivo* germination. *Bacillus* spp. strains evaluated in the present work have potential to promote plant growth and to control of plant pathogens.

References.

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