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Evaluation of *Bacillus subtilis* metabolites as plant growth promoters in *Solanum lycopersicum*

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Soil microorganisms called plant growth-promoting rhizobacteria (PGPR) have beneficial effect in plants since they are able to produce plant hormones such as auxins, gibberellin, cytokinins, antibiotics and other compounds. *Bacillus subtilis* is categorized as a PGPR has antifungal activity and is auxin and siderophore producer. In the present research were evaluated fermentation broths of *Bacillus subtilis* by colorimetric and chromatographic techniques to determinate the production of plant growth-promoting metabolites and was evaluated the effect of the broths in *Solanum lycopersicum* plants and seeds. Results showed that fermentation broths of *Bacillus subtilis* presented auxin precursors, AIA, siderophores and jasmonic acid and they have effect in the germination time of seeds, plants length, root length and other agronomic parameters evaluated. BS8 broth presented the biggest concentration of 3-indolilacetonitrile and jasmonic acid (352.64 ± 19.37 and $54.48 \mu\text{g per mL}$), BS14 broth the highest concentration of AIA ($147.80 \pm 3.03 \mu\text{g/mL}$) and BSN broth of triptamine ($605.54 \pm 39.60 \mu\text{g/mL}$). All broths were positives for siderophores production. BS8 broth increases the germination rate of seeds. In plants length the best treatment was BS8 broth, then BS14 broth and finally BSN broth. Since every *Bacillus subtilis* has different concentration of the metabolites evaluated, the effect of each broth was different in the plants and seeds; this way is concluded that the effect of metabolites depends of the concentration and also of the combination with other plant growth-promoting metabolites.

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Biological activities of lanthanide (III) nitrate complexes with N-(2-hydroxynaphthalen-1-yl) methylene) nicotinohydrazide Schiff base

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The field of coordination chemistry has registered a phenomenal growth during last few decades. It is well known that precious metals have been used for medicinal purposes for at least 3500 years. At that time, precious metals were believed to benefit health because of their rarity but research has now well established the link between medicinal properties of inorganic drugs and specific biological properties. The current study was designed to explain the synthesis and characterization of the lanthanide (III) nitrate complexes with N-(2-hydroxynaphthalen-1-yl) methylene) nicotinohydrazide Schiff base and to evaluate the antibacterial and the antioxidant activities of the Schiff base and its lanthanide ion complexes. Antimicrobial activity of the lanthanide (III) nitrate complexes with N-(2-hydroxynaphthalen-1-yl) methylene) nicotinohydrazide Schiff base was estimated by minimum inhibitory concentration (MIC, $\mu\text{g/mL}$) using a micro-broth dilution method for different clinical isolates such as *Escherichia coli* and *Enterococcus faecalis*. Our present study has shown that moderate antimicrobial activity exists against both ligand and its complexes. There was no significant difference between Gram-positive and Gram-negative bacteria towards the tested ligand and its complexes. The results obtained herein indicate that the ligand and its complexes have a considerable antibacterial activity.

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