

**Herbicidal activity of secondary metabolites from *Colletotrichum* spp. on *Sorghum bicolor* and *Phaseolus vulgaris* development as indicator species in preemergence and their potential as a sustainable alternative in weed control.**

Marco Antonio Tucuch Pérez<sup>1</sup>, Janeth Ramos Aguirre<sup>1</sup>, Roberto Arredondo Valdés<sup>1</sup>, Francisco Daniel Hernández Castillo<sup>2</sup>, Jesús Ramírez Méndez<sup>2</sup>

<sup>1</sup>Faculty of Chemical Sciences, Autonomous University of Coahuila, Department of Nano Biosciences. Saltillo, Coahuila, México.

<sup>2</sup>Antonio Narro Agrarian Autonomous University, Department of Agricultural Parasitology. Saltillo, Coahuila, México.

**ABSTRACT**

Weeds are a problem in agriculture because they compete with the crops for resources, causing losses in food production. Due to the recent necessity to change the paradigm to sustainable agriculture, it is necessary development alternatives to chemical herbicides. One alternative is bioherbicides based on microorganisms and their compounds. This study evaluated the herbicidal activity in preemergence of metabolites from *Colletotrichum* spp. on the indicator species *Sorghum bicolor* as narrow-leaf weed and *Phaseolus vulgaris* as broad-leaf weed. Furthermore, were identified the compounds present in metabolites. The Mycology and Biotechnology Laboratory of Universidad Autonoma Agraria Antonio Narro provided the fungal strains. The metabolites were produced by liquid fermentation filtered with filters of 0.22 µm. The herbicidal activity was evaluated by placing the seeds in Petri dishes on filter paper previously soaked with the treatments. The treatments were concentrations of 6.2 to 100% of metabolites and an absolute witness; three replicates for each treatment were used in this bioassay. The metabolite compounds were characterized for analytical HPLC-ESI-MS, detection of auxins, and the enzymatic activity of celluloses. The metabolites presented herbicidal activity with an inhibition rate of the hypocotyl and radicle of 50 % and 67 % respectively at a concentration of 6.2 % on *S. bicolor*. In comparison, in *P. vulgaris* the inhibition rate of hypocotyl and radicle overcame 50 % at a concentration of 50 %. Regarding the germination rate, the metabolites were more efficient in *S. bicolor*. This study demonstrates the herbicidal effect in preemergence of the metabolites from *Colletotrichum* spp. and their possible application as a preemergence bioherbicide.