

TITLE: EVALUATION OF THE HERBICIDAL ACTIVITY OF PHYTOPATHOGENIC FUNGI ISOLATED FROM DISEASED PLANTS OF THE RIO DOCE STATE PARK

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ABSTRACT:

With the increase of the world population and consequently the increase in the demand for food the agricultural productions have been overloaded worldwide. Weeds cause 60% of crop losses, making agriculture dependent on chemical controls. However, with the indiscriminate, repetitive and continuous use of herbicides, the number of resistant crops has increased. Currently, there are several types of herbicides on the market, however, they all have similar mode of action as those launched 30 years ago, which justifies this acquired resistance and leads farmers to increase the application rate, causing in risk to human health and the environment. Recent research shows that fungi have the potential to become a source of new generation herbicides, as they produce secondary metabolites that exhibit bioactivity at low concentrations, besides these natural products are considered safer than synthetic ones. This study aims to isolate phytopathogenic fungi present in foliar lesions of plants collected in Rio Doce State Park, Minas Gerais state, to evaluate their herbicidal activity and to identify the bioactive ones. Leaves of 27 plants with characteristic signs of fungal infection were collected and underwent surface disinfestations being the injured parts cutted, plated in *Potato Dextrose Agar* and incubated at 26 °C for 5 days. A total of 308 fungi were isolated, which were cultivated for 15 days in PDA at 26 °C and then lyophilized to obtain the crude extracts. The extracts were tested at 1 mg/mL in the assays for herbicidal activity being used *Allium schoenoprasum* and *Lactuca sativa* seeds as model and the herbicide glyphosate as a positive control. The result was calculated by making a qualitative estimate by assigning a scale of 0 (all seeds germinated) to 5 (no seed germinated). Until now, of the 186 extracts tested, 42 displayed activity inhibiting the germination of *L. sativa* seeds and 7 inhibiting the germination of *A. schoenoprasum*. The isolate UFMGCB17649 *Xylariaceae* sp. was the most promising result, as it inhibited the germination of the five seeds of both models, thus showing a strong herbicidal potential. Our results showed the phytopathogenic fungi are able to produce bioactive metabolites that may be useful sources for the development of novel herbicides. Therefore the extracts that inhibited seeds growth at the same efficiency as glyphosate should undergo a chemical characterization to identify the activity compounds.

Keywords: herbicide, natural products, phytopathogenic fungi

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