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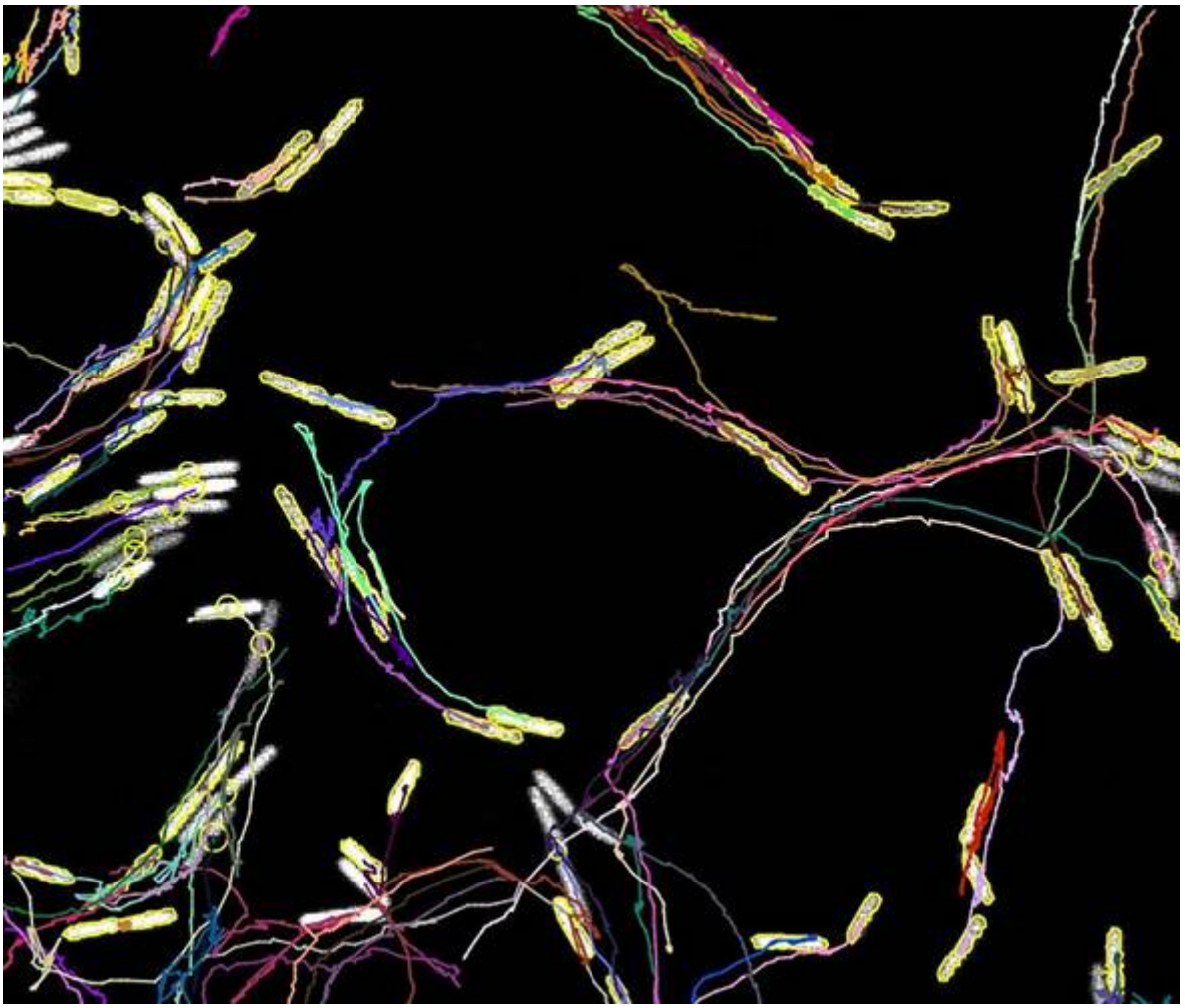

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ANALYSIS OF HERBICIDE BIODEGRADATION BY NATIVE BACTERIA ISOLATED FROM RICE CROP SOILS IN CHACO, ARGENTINA

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In Argentina, weed management in rice and other crops is often done with herbicides that persist in the soil for a long time. The incorrect and indiscriminate use of these agrochemicals has caused environmental problems, such as soil, groundwater and surface water contamination. Clomazone (CLM), an herbicide from the chemical group of oxazolidinones, is a selective pre- and post-emergence herbicide indicated for application in rice. Imazapyr and imazapic (IMR+IMC) are two herbicides that belong to the group of imidazolinones which interfere weed growth by inhibiting the action of the plant enzyme acetohydroxyacid synthase (AHAS). The objective of this work was to analyze the growth kinetics (GK) of bacterial strains isolated from rice crop soils with CLM and IMR+IMC as the only carbon source, and to analyze their biodegradation over time. To carry out the bacterial GK, initial cultures of the strains under study (H3, J1, G1) were prepared using minimal saline medium (M9) supplemented with glucose and incubated at 30°C and 300 rpm for 24 h. Once growth was confirmed, 5 ml were transferred to 50 ml of M9, this time using CMZ as the sole carbon source. Similarly, they were transferred to M9 with IMR+IMC, maintaining the same incubation conditions. The GK with CMZ as the sole C source was monitored by the viable cell count (VCC) method in nutrient medium, and the GK with IMR+IMC was carried out by monitoring the optical density (OD) at 600 nm. For VCC, samples were taken, and serial decimal dilutions were made, and then 10 µl drops were seeded in triplicates in Agar Plate Count (PCA). At the same time, the kinetics were analyzed with glucose as the only source of C, as a growth control. Growth curves were obtained for the 3 bacteria tested, observing that the results with glucose without the addition of agrochemicals showed higher division rates and shorter times, demonstrating the slowing of bacterial growth by contaminants. For the biodegradation analysis, samples were taken at various intervals along several days. CLM quantification was performed using high-

performance liquid chromatography (HPLC) with a Shimadzu CBM 20A system equipped with an SPD 20A UV detector set at 210 nm, and a C18 reversed-phase column, maintained at 40°C, with a flow rate of 1 mL/min. The mobile phase consisted of acetonitrile-water (60:40). HPLC results indicated that strain J1 did not degrade the pesticide after 480 h, strain H3 degraded a 32% at 240 h, and strain G1 achieved 15% degradation at 120 h. Thus, strains G1 and H3 demonstrated potential for degrading CLM as a sole carbon source. Further studies will be focused on the maximum removal capacity determination, since over extended periods are needed, including for IMR+IMC biodegradation.

Palabras clave: clomazone-imazapic-imazpir-biodegradation