

TITLE: MICROBIAL METABOLISM IN SUGARCANE SOIL WITH FERTIGATION AND HERBICIDE

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ABSTRACT: Although agrochemicals have a beneficial effect on agricultural productivity, consideration should be given to potential risk of these chemicals in environment. Their adverse effects such as toxicity to non-target species and generation of intermediate compounds more toxic than initial molecule have alerted to environmental risk of pesticides. Another important factor is the effect of environmental changes and its relation to pesticides behavior in nature. In this context, it is fertigation technique with vinasse used in sugarcane crops. Thus, the knowledge of tebuthiuron environmental behavior associated with vinasse is necessary to minimize contamination risks on soil and to propose an ecologically viable alternative of remediation. Therefore, this work proposed to evaluate microbial metabolism in degradation of different doses of tebuthiuron herbicide associated or not to vinasse in soil cultivated with sugarcane. Experimental was based on completely randomized design in 3x4 factorial scheme, which was defined by recommended dose of tebuthiuron (RD) and by vinasse volume (VV) generally used in sugarcane crops. The respirometric method was based on CETESB Technical Standard L6.350 and ABNT NBR 14283 by respirometric flasks. Results evidenced the formation of four treatment groups by CO₂ evolution in respirometers based on vinasse volume applied. The treatments that did not have vinasse addition had the lowest respiratory rate. Those with 0.5*VV were in the intermediate range followed by treatments with vinasse concentration commonly used in crop (1.0*VV). Finally, treatments with higher vinasse volume (2.0*VV) generated greater amount of CO₂. Furthermore, it was statistically verified that tebuthiuron doses did not have significant difference with their respective vinasse volumes in treatments. On the other hand, there was an increase in CO₂ production when vinasse was used, which suggested higher microbial activity in biodegradation. This fact may be related to the higher level of organic matter, i.e., a compound to be degraded by microorganisms. Moreover, nutrients presence in vinasse such as potassium, calcium, magnesium and sodium may favor respiratory rates. However, despite the higher biodegradation rates found in some treatments, ecotoxicological tests is necessary in soil samples to prove the efficient bioremediation process.

Keywords: biodegradation, pesticide, respirometry, tebuthiuron, vinasse.

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