IDENTITIFICATION OF 3-HYDROXYMETHYL SULFENTRAZONE IN RATS' URINE

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ABSTRACT

Sulfentrazone is converted in soil of temperate regions, to HMS and has a high leaching potential. Given the importance of knowing the environmental behavior of this herbicide in soils of tropical regions, and considered the commercial unavailability of the HMS, this compound was isolated from rat's urine after administration of the herbicide. The proposed metabolic pathway is the conversion of the parent compound mainly to 3-HMS (88-95%), which is excreted in the urine. To check this hypothesis, male Wistar rats were exposed to 100 mg sulfentrazone kg^{-1} of body weight. The HMS was purified by preparative HPLC and identified by mass spectrometry. HMS metabolite isolation from rats' urine was possible under low doses. It is necessary to determine in a next step the highest amount possible to be obtained in a dose that not cause damage to the rats.

INTRODUCTION

Sulfentrazone is often used in both conventional and no-till systems, applied alone or in combination with other herbicides. It is converted in soil of temperate regions, to 3-hydroxymethyl sulfentrazone (HMS) and has a high leaching potential both vertically and horizontally.

However, the fate of this compound in tropical regions where it is also one of the most often used herbicides, is not known. So, it is important to establish the environmental behavior of this herbicide. However, the commercial unavailability of the HMS for risk studies is challenging the researchers of tropical areas.

Very little is known about the mammalian toxicity of this compound. Sulfentrazone was readily absorbed and up to 84% of the administered dose was excreted in urine and feces within 72 hours. Considering that the proposed mammalian metabolic pathway is the conversion of the parent compound mainly to 3-HMS (88-95%) in the urine and its low acute oral toxicity (LD50>2855 $mg.kg^{-1}$); this compound was isolated from rat's urine after administration of the herbicide.

RESULTS

Identification:
1. HMS metabolite - peak showing a mean retention time of 12.52 min and 2. sulfentrazone in 23.8 min.

METHODS

Animals - Male Wistar rats (230 ± 15 g bw) were maintained in a controlled environment and housed individually given *ad libitum* access to food (Purina Lab Chow) and tap water.

Dosing - The number of animals in each group were divided equally. They were exposed to 100 mg sulfentrazone kg^{-1} of body weight diluted in olive oil. The control group was exposed only to the oil.

Sampling - The animals were kept in metabolic cages and the urine was collected in dry ice during 48 h.

Chromatography analysis - The HMS was purified by preparative HPLC and identified by mass spectrometry. The chromatograms of the experimental and control animals were compared with those obtained from fortified urine with 0,7 µg mL^{-1} of sulfentrazone.

DISCUSSION AND CONCLUSION

For establish sulfentrazone risk, it is also necessary to study the herbicide molecular effects in order to better predict its biological consequences.

Since the HMS metabolite isolation from rats' urine was possible under low doses, it is necessary to determine in a next step the highest amount possible to be obtained in a dose that not cause damage to the rats.

This purified metabolite will be applied in biodegradation analysis to better study the environmental risk of this product.

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