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PARAQUAT: ABSORPTION THROUGH
WELLINGTON AND TROOPER BOOT FROM
GRAMOXONE

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PARAQUAT: ABSORPTION THROUGH WELLINGTON AND TROOPER BOOT FROM GRAMOXONE

1. INTRODUCTION

To provide information for hazard assessments, the permeation of paraquat through TROOPER boot and wellington boot was measured from a GRAMOXONE formulation (ex-Malaysia).

The steady state rate of absorption and the break through time, ie, the first time of detection of paraquat in the receptor fluid, were determined.

2. METHOD

The TROOPER boot and wellington boot materials were mounted as horizontal membranes (1.8cm diameter) in glass diffusion cells. The cells were left at room temperature (approximately 22°C) for 24 hours to equilibrate. The GRAMOXONE formulation was applied to the donor chambers, as the neat formulation (20% w/v) and a 1:40 v/v aqueous spray dilution, (0.5% w/v) at a volume of 400 μ l cm⁻². The receptor chamber was filled with a recorded volume of 0.9% saline. At recorded time intervals 0.1ml samples were taken from the receptor chamber for analysis by HPLC. Each sample was replaced with 0.1ml of fresh saline to maintain the volume in the receptor chamber. Results of the assay were expressed as a concentration of paraquat and plotted as 'total amount of paraquat absorbed per cm² versus time'. The slope of the linear region of this plot gave the rate of absorption (μ g cm⁻² hr⁻¹). The GRAMOXONE formulation was left in contact with the membranes for 7 hours.

3. RESULTS

A break through time of less than quarter of an hour was seen for both applications to the TROOPER boot material. The calculated mean steady state rates of absorption for the TROOPER boot material were:

Neat Formulation $155\mu\text{g cm}^{-2}\text{ hr}^{-1}$ (SEM ± 36.5 ; n=6) (0.25-7 hours)

1:40 Spray Dilution $0.40\mu\text{g cm}^{-2}\text{ hr}^{-1}$ (SEM ± 0.17 ; n=4) (0.25-7 hours)

No paraquat was detected in the receptor solutions of the cells with wellington boot material.

4. CONCLUSION

No paraquat was detected to have penetrated through the wellington boot material during 7 hours continuous contact.

However, paraquat penetrated the Trooper boot material within 0.25 hour. The subsequent steady state absorption rates were not proportional to the applied concentration. It is possible that the neat formulation altered the structure of the TROOPER boot material enhancing the rate of paraquat penetration.

R C Scott

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.....23rd November 1987.