

CHROM. 11.403

Note

Thin-layer chromatography and spot test of Paraquat-contaminated marihuana

N. H. CHOULIS

School of Pharmacy, W.Va. University, Morgantown, W.Va. 26506 (U.S.A.)

(Received August 24th, 1978)

The weed killing herbicide, 1,1'-dimethyl-4,4'-bipyridinium dichloride (Paraquat), has been used extensively to eliminate marihuana illicitly cultivated in the fields. However, this operation has produced some serious side effects, particularly on the cannabis-smoking population, due to the high toxicity of this herbicide. According to the U.S. Federal Government, excessive or even regular smoking of marihuana contaminated with Paraquat can cause permanent lung damage. Moreover, 20% of the marihuana utilized in the U.S.A. is tainted with Paraquat.

A number of thin-layer chromatographic (TLC) methods for the identification of tetrahydrocannabinol (THC) are available¹. We have developed in our laboratory a TLC method for the isolation and identification of marihuana in the presence of other hallucinogenic compounds².

In the present study, the same technique was employed for the separation and identification of Paraquat from herbicide-sprayed marihuana. Small quantities of dry marihuana leaves were washed, in approximately 5 ml of methanol, shaken well for about 20 min and filtered; microquantities of the filtrates were applied on silica gel G-coated plates (250 nm thick, according to Stahl³) and developed in chloroform-dioxane-ethyl acetate-conc. ammonium hydroxide (25:60:10:5). The plates were removed, air dried, and the compounds were detected in a tank containing iodine fumes. R_F values for marihuana were 0.17 and 0.95, for THC and cannabidiol, respectively, while Paraquat remained at the baseline ($R_F = 0.02$). When chloroform-acetone (9:1) was used as developing system, Paraquat again gave the same R_F value while THC was detected at $R_F = 0.30$.

The herbicide was easily detected on the second chromatogram by spraying aqueous solution of sodium carbonate (1%), followed by an equal strength solution of sodium hydrosulfite. Paraquat reacted to give a strong blue color. Presumably, the strong basic consistency of the first developing system inhibits the reaction between Paraquat and sodium hydrosulfite.

Further studies indicated that the later reagent could be used successfully for a spot-test method for the herbicide. In this case, the marihuana-washed filtrates were tested by adding sodium carbonate and sodium hydrosulfite solutions. Quantities of up to 0.001% of Paraquat in water were easily detectable by the appearance of a distinctive blue color: sodium carbonate and sodium hydrosulfite could be used also as dry powders instead of solution.

REFERENCES

- 1 N. H. Choulis (Editor), *Identification Procedures of Drugs of Abuse*, European Press, Gent, 1977.
- 2 N. H. Choulis, *J. Pharm. Sci.*, 62 (1973) 112.
- 3 E. Stahl, *Thin Layer Chromatography*, Springer, Berlin, 1965.