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APPLICATION OF THIN LAYER CHROMATOGRAPHY TO THE IDENTIFICATION OF CHARRED MARIJUANA

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On occasion our laboratory is called upon to examine burnt or charred debris from pipe bowls, hookahs, or "roaches," to determine for police intelligence purposes if marijuana had been used. There is no question concerning the distinctive microscopy of marijuana,¹ however, the laboratory usually receives meager quantities of charred material which have no discernible microscopic characteristics.

The usual chemical test (Duquenois-Levine) fails to give a clear indication since the charred material will usually obscure the reaction and give inconclusive results. Consequently, this color test can be of relatively little value. Therefore, research was done on the application of T.L.C. as a means of identification of charred cannabis.

THIN LAYER CHROMATOGRAPHY PROCEDURE

Numerous thin layer chromatographic methods are reported in the literature.² The procedure of DeFaubert Maunder³ was used because of its simplicity and many other advantages, such as, a mono solvent system, commercially prepared chromatogram sheets, and fine separation.

¹ Betts, T. J. and Holloway, P. F., *Chromatographic Identification of Cannabis*, 19 J. PHARM. PHARMAC., 975 (1967).

² Karte, F., Sieper, H., and S. Tira, *New Results on Hashish—Specific Constituents*, 27 BULL. ON NARCOTICS 35-43 (1965); Aramaki, Tomiyasu, Yoshimura, and Tsukamoto, *Forensic Chemical Study on Marijuana*, 16 CHEM. PHARM. BULL. 822-826 (1968).

³ DeFaubert Maunder, *Simple Chromatography of Cannabis Constituents*, 21 J. PHARM. PHARMAC. 334 (1969).

Eastman chromogram sheets, silica gel (6061), were used without activation. The mobile solvent used in all chromatograms was toluene; however, benzene or xylene could probably be used with similar results. Visualization of spots was accomplished by using a .15% aqueous-methanol (1 to 3) Fast Blue B spray. Known tetrahydrocannabinol (THC) cannabidiol (CBD) and cannabinol (CBN)⁴ were chromatographed with control hashish. The descending order of the separated components was CBD (orange), THC (scarlet), and CBN (violet) (Figure 1). Samples were collected and consisted of:

1. Residue from pipe (36 mgm)
2. Residue from pipe (14 mgm)
3. Residue from hookah or water pipe (15 mgm)
4. Cinders from "roach" (14 mgm)
5. Paper from suspected "roach" (20 mgm)
6. Rosemary fragments (control) (15 mgm)
7. Specimen of charred tobacco (15 mgm).

All the residue samples were charred and failed to show any marijuana characteristics. The samples were extracted with .3 ml or approximately 6 drops of petroleum ether for a few minutes. The chromatogram sheets were cut into 3 cm wide strips and spotted with approximately 3 ul of the extract. The strips were then placed between glass plates, and the solvent was allowed to rise about 17 cm. Running time was 105 minutes at room temperature (22°C). The chromatograms were allowed to dry and then sprayed with Fast Blue B.

⁴ We thank J. Gunn, BNDD, for supply of known controls, THC, CBD, CBN.

RESULTS AND DISCUSSION

The following table shows the cannabinoids that were identified in the various samples.

Sample	CBD Rf .64	THC Rf .59	CBN Rf .49
1. Residue	-	++	++
2. Residue	-	+	+
3. Residue	+	++	+
4. Cinders	-	-	Trace
5. Paper	-	+++	++
6. Rosemary	-	-	-
7. Tobacco Residue	-	-	-

(Number of pluses indicate relative color intensity.)

It was noted that several additional spots appeared on some chromatograms. The more predominate ones appeared below CBN. The Rf values were .19 and .40.

It has been reported in the literature⁵ that CBD is not cyclized to THC during smoking. Our results indicate the general lack of CBD in charred residue; however, THC and CBN are usually present. The question now arises as to why THC and CBN remain while CBD is absent in the smoked or charred marijuana. Even in the "roach" paper, CBD was absent while the THC spot was the most intense of all the samples. Further pursuance in this area may prove of interest.

⁵ Farnsworth, N., *Pharmacognosy and Chemistry of Cannabis Sativa*, NS8 J. AMER. PHARM. ASS. 412, (Aug. 1969).

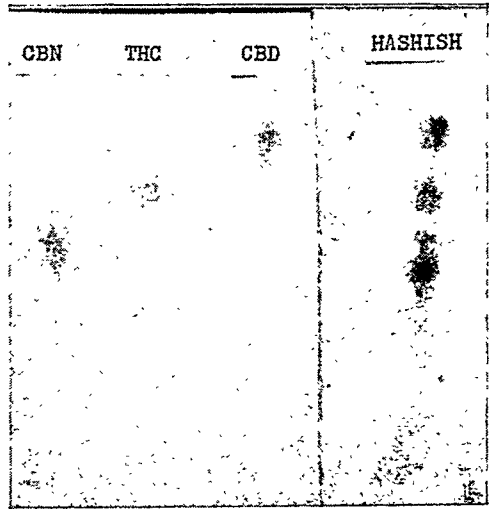


FIGURE 1.

SUMMARY

The simple chromatography system used by DeFaubert Maunder for effective resolution of marijuana or hashish has been proven to be accurate and sensitive for effective determination of charred cannabis constituents. This procedure can also be used to identify "roach" paper. Sensitivity, plus quickness of running time, along with accuracy, makes the procedure an invaluable tool for police intelligence purposes.

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