Simple chromatography of cannabis constituents

For some years thin-layer chromatography of cannabis has relied upon reversed-phase systems for effective resolution of tetrahydrocannabinol (THC) from other natural constituents (Korte & Sieper, 1964; Betts & Holloway, 1967; Caddy & Fish, 1967). Two alternatives involve multi-component solvent systems (Aramaki, Tomiyasu & others, 1968; Parker, Wright & others, 1969). The advantages of a mono-solvent system are self-evident and such a system has been discovered which resolves 5 main components of cannabis in a running time of under 10 min.

Any of the 3 common aromatic hydrocarbons, toluene, xylene or benzene, resolve cannabidiol (CBD), cannabinol (CBN) and THC on Eastman Chromagram Sheet 6061 (silica gel) as 3 distinct spots in a running time of 20–30 min, and as a triple banded streak in 5–10 min (Table 1). Toluene and xylene give similar results, and with their low volatility, complete equilibration of the tank is of little consequence. A completely open tank has been frequently found more convenient, and provided it is at least twice as high as its width, and reasonably narrow, any vessel may be used; a straight-sided-tall-form drinking tumbler was the easiest "tank" to obtain. Benzene is not so suitable because of its high volatility, and variable Rf values were obtained across the same sheet. The high volatility of many solvents in common use may be a cause of the lack of resolution on silica gel.

The sample was prepared as a light petroleum (boiling range 40–60°) solution (1 vol resin or herb to 1 vol solvent), and spotted-on in a maximum volume of 0·5μl, keeping the spot diameter below 2 mm. Failure to comply with these conditions may result in some loss of resolution. The solvent runs approximately 5 cm in 10 min, allowing 5 cm^2 pieces of sheet to be used for quick monitoring, or 8–9 cm in 30 min for complete identification and determination of the relative proportions of 5 main cannabinoid components. For precise work, xylene in an equilibrated tank runs 16–17 cm in 1½ h, and gives 0·5 cm gaps between the 3 main spots. The spots were visualized by spraying with a fresh 0·1% aqueous methanol solution (1 :3) of Fast Blue B salt, and allowed to dry naturally.

The Chromagram sheets were not activated before use and it is obvious that the grade of silica gel used by the manufacturers is of some importance. Some silica gel plates prepared conventionally may not resolve all the components, and Whatman silica gel-loaded paper yields only 4 spots; THC and CBN run together. Aramaki, with his benzene system on silica gel plates, found that CBN ran ahead of THC, and it was not until a basic component was added that he obtained the same sequence as I have obtained. Parker and his co-workers do not mention CBD, and in view of the similarity of their solvent systems to that of Aramaki, they may have the same

Table 1. *Typical Rf values for aromatic solvents on Chromogram 6061 sheets*

Colour		Unknown 1 orange	Unknown 2 violet	CBN violet	Δ^9-THC scarlet	CBD orange	
Benzene	A	56	59	70	74	81	
	B	79	83	91	96	98 (tight bands)	
	C	46	50	57	64	69	
Toluene	A	50	52	62	70	80	
	B	53	60	69	78	86	
	C	42	46	53	61	67	
Xylene	A	40	43	52	58	68	
	B	44	47	57	67	74	
	C	28	39	46	54	64	Δ^8 = 57

Rf values are measured from the leading edge as a more reliable parameter.
System A—open tank, 10 min solvent run. B—open tank, 30 min solvent run. C—equilibrated tank, 16·5 cm solvent run. Benzene time 105 min; toluene 95 min; xylene 90 min.

experience in which CBD runs with one of the other two main components. On Chromagram sheets, CBD runs with THC in Parker's solvent I (n-hexane–1,4-dioxan, 9:1), and this can be clearly illustrated using this system as the second solvent in 2-dimensional chromatography, with xylene as first solvent.

Chromagram sheets may not be the only material available giving such good resolution, but their practical convenience of use for small samples and subsequent ease of storage, have proved overriding considerations against other systems examined.

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Ministry of Technology,
Laboratory of the Government Chemist,
Cornwall House, Stamford Street,
London, S.E.1, England.
M. J. DE FAUBERT MAUNDER

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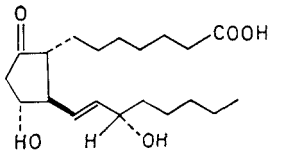
Inhibition of gastric acid secretion in the rat by synthetic prostaglandins

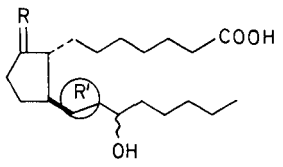
The prostaglandins (PGs) are a group of naturally occurring, long-chain, unsaturated oxygenated fatty acids with potent pharmacological activities (Bergström, Carlson & Weeks, 1968). I have examined the effects of four synthetic PGs (AY–20,524, AY–16,809, AY–21,669, AY–21,670) on gastric acid secretion in the rat.

Basal gastric acid secretory activity was measured (Shay, Sun & Gruenstein, 1954) in Charles River female albino rats (Canadian Breeding Laboratories; 150–170 g) caged individually and from which food had been withheld 48 h before pyloric ligation and drug administration. After the first 24 h of food deprivation the animals were given access to 8% sucrose in 0·2% sodium chloride for 8 h. Water was permitted *ad libitum* except during the 8 h access to sucrose. Four h after pyloric ligation the animals were killed with ether and the amount of acid in the stomach determined (6–9 animals for each treatment) by titration against 0·1N NaOH in a direct reading pH meter to pH 7·0.

The PGs were dissolved as follows: for each mg, 0·1 ml 95% ethanol was added



PGE$_1$



	R	R′		R	R′
AY-20,524	O	—CH=CH—	AY-21,669	H, OH	—CH_2—CH_2—
AY-16,809	H, OH	—CH=CH—	AY-21,670	OH, H	—CH_2—CH_2—