An improved field test for hallucinogens

Although the conditions of a forensic field test may be adjusted for optimum specificity (e.g. cannabis: de Faubert Maunder, 1969), the test is frequently a sorting procedure demonstrating the need for professional analysis or alternatively for avoiding the unnecessary detention of person or goods. A sorting test widely used by the police and drugs control officers relies on the blue fluorescence of substances such as lysergide (LSD) when illuminated with screened ultraviolet (365 nm) radiation. The test may be rendered more sensitive for psychotomimetic ingredients which have been dissolved – for instance – on a sugar cube, by leaching the object with water onto a filter paper and examining that in ultraviolet light (Government Chemist, 1969). However, many innocent substances will also give a blue fluorescence (e.g. caffeine, quinine and certain detergents) whereas a number of hallucinogens do not.

The van Urk (or Ehrlich) reagent 4-dimethylaminobenzaldehyde in strongly acid solution gives a suitable colour test with lysergic acid derivatives; it is used for erganes as a chromatographic spray (Clarke, 1967) and for photometric assay (B.P., 1968). Dechert (1968) described a field test based on this principle. Filter paper sheets are soaked in a solution of 4-dimethylaminobenzaldehyde (1g) in ethanol (B.P.) (10 ml) with 1 drop of acid-ferric chloride TS (U.S.P. XVII), dried, cut into 5 mm squares and stored in a dark place. A fragment of the suspect material is placed on one of these squares, the paper wetted with anhydrous methanol followed by a drop of sulphuric acid (1:1). A violet colour slowly develops with erganes. Alternative procedures employed in two commercial test kits require mixing two solutions, reagent and acid, with the suspect material on a porcelain tile (Narcodal Kit) or in a plastics tube (Narcotest).

All three tests lack sensitivity and may risk consuming the total sample. Admixed substances such as colouring matter often interfere. Reagents must be mixed at the time of the test and the extra apparatus must be washed or, with Narcotest, placed in a polythene bag and destroyed before the tube disintegrates within an hour.

Table 1. *Test response of various hallucinogens and related substances*

Immediate violet colour		*Lysergamide(§)
Tryptamine	†Dimethyltryptamine (DMT)	8β-Ergotamine
5-Methyltryptamine	†Diethyltryptamine (DET)	8α-Ergotamine
7-Methyltryptamine	*Psilocybin	Dihydroergotamine
‡α-Methyltryptamine	*Psilocin	8β-Ergocristine
5-Hydroxytryptamine	*Bufotenine	8α-Ergocristine
5-Methoxytryptamine	*5-Methoxydimethyltryptamine	Dihydroergocristine
‡*N*-Ethyltryptamine	*5-Benzyloxydimethyltryptamine	8β-Ergometrine
5-Hydroxy-*N*-methyltryptamine		8α-Ergometrine
		Methylergometrine
Slow violet colour	*No response*	
*8β-Lysergide (§)	*Mescaline	
‡1-Acetyl-lysergide	‡3,4-Methylenedioxyamphetamine (MDA)	
Methysergide	‡3-Methoxy-4,5-methylenedioxyamphetamine (MMDA)	
	†2,5-Dimethoxy-4-methylamphetamine (STP, DOM)	
5-Benzyloxygramine	‡Harmine	
5-Benzyloxytryptamine	‡Harmaline	
	‡Ibogaine	

Notes

*Indicates control under the Drugs (Prevention of Misuse) Act, 1964.

†Features in WHO proposals and specified in the 1970 Modification Order to the above act.

‡Other drugs reputedly psychotomimetic.

§When visualized on a TL plate, the response of the 8α-epimer is slightly faster than that of the 8β-epimer.

These disadvantages have been remedied. Although a solution of 5% 4-dimethylaminobenzaldehyde in hydrochloric acid: ethanol (1:1) turns from yellow to brown within a week, replacement of ethanol by methanol provides a solution which is stable for several months. The use of a porcelain tile or tube is avoided by placing a small amount of the suspect material on a filter paper and adding a drop of the reagent. Radial striations of colour develop from the centre of the spot. By chromatographic action the material responding to the reagent is carried away from the bulk of the sample, where dyestuffs and other materials interfere, and is concentrated into striations. It is possible to obtain a response with weak samples of lysergide which have failed to produce a fluorescence with an ultraviolet lamp. The Table summarizes the responses obtained using this technique for some known hallucinogens and structurally related substances.

Although similar colour reactions are observed with hallucinogens derived from lysergic acid and the tryptamines, as well as the natural ergot bases and dihydroergotamine, the test is convenient for non-scientific personnel and is much more restrictive than the observation of ultraviolet-induced fluorescence. When taken with adequate circumstantial evidence there is less likelihood of mistakingly seeking professional confirmation. The filter paper may be retained as a record of the test and can be signed and witnessed. A combination of the two techniques assists the examination of heterogeneous specimens.

Laboratory of the Government Chemist,
Stamford Street,
*London, S.E.*1, *U.K.*

GERALDINE V. ALLISTON
A. F. F. BARTLETT
M. J. de FAUBERT MAUNDER
G. F. PHILLIPS

November 3, 1970

REFERENCES

CLARKE, E. G. C. (1967). *J. forens. Sci. Soc.*, **7** (1), 46–50.
de FAUBERT MAUNDER, M. J. (1969). *Bull. Narcot.*, **21** (4), 37–43.
DECHERT D. D. (1968). *Microgram*, **1** (4), 16–17 (restricted circulation).
GOVERNMENT CHEMIST (1969). Report for 1968, p.47, London: HMSO.

In vitro release of aspirin from various wax-coated formulations

Wax-coating of pharmaceuticals has been reported amongst techniques used for controlling drug releases. We have studied the *in vitro* release of aspirin from various wax-coated formulations in an attempt to explain the differences in release profiles. The waxy materials used were spermaceti, stearic acid, a hydrogenated grade of cottonseed oil and a blend of equal parts of these waxes. Two methods were adopted in the preparation of the formulations; the congealing method (Robinson, Moorestown & Svedres, 1957) and the aqueous dispersion method (Robinson & Becker, 1968). All formulations were prepared to contain 1 part of aspirin and 5 parts of the wax. The release experiments were made using the 23/30 mesh fraction.

The release rates were determined at 37° ± 0·1° in a rotating bottle apparatus similar to that of Souder & Ellenbogen (1958). Acid pepsin and alkaline pancreatin solutions of the B.P. 1963 were used as the dissolution media. After specified time intervals the contents were filtered and an aliquot was assayed for aspirin by spectrophotometric measurement of the salicylic acid (in 0·1N HCl at 305 nm) produced after preliminary hydrolysis with 0·1N NaOH. Blank experiments were made using equivalent amounts of the waxes. Fig. 1 shows the release patterns in both dissolution media. In acid pepsin the release rate followed the sequence: spermaceti > stearic