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COMMUNICATIONS

A field test for hallucinogens: further improvements

An improved field test for hallucinogens was reported by Alliston, Bartlett & others (1971). The reagent used was subsequently applied as a chromogen in a novel thin-layer chromatographic system for lysergide (LSD) (Alliston, de Faubert Maunder & Phillips, 1971). The reagent was stable for several months and 50 ng of LSD was detectable with the field test and 4 ng by chromatography, an increase in sensitivity of approximately ten times over the Ehrlich variants then in use. A detection limit of 1 μg is stated by Kaistha (1972) in this review of other field tests. Dal Cortivo, Broich & others (1966) detected 50 ng of LSD, Brown, Shapazian & Griffin (1972) and van Welsum (1973, are more typical inthe use of 1μg for chromatographic estimation by conventional chromogens.

Practical disadvantages of the reagent for the field test were encountered. Because of its corrosive nature the caps of the dropper bottles then available were rendered useless in less than 3 months (polythene stoppers solved this problem). A more serious fault was the effect of the vapours of concentrated hydrochloric acid. Filter papers in a composite kit absorbed sufficient acid to inhibit colour development in the cannabis field test (de Faubert Maunder, 1969). Although the inhibition could be overcome by rendering the second cannabis reagent alkaline, this did not cure the long-term storage problems of the hallucinogen reagent in the kit. The acid vapours eventually destroyed paper printed instructions and the reagent gradually lost efficiency as it darkened in colour.

A non-volatile acid replacement for HCl was sought which did not destroy a test paper showing positive indications during storage over 3 months. Only the oxyacids of phosphorus proved suitable and, of those readily available, orthophosphoric acid was the most convenient giving a syrupy reagent with three advantages: (i) the viscous liquid was only applicable in single drops, aiding sensitivity by avoiding excessive dilution; (ii) the retarded evaporation slowed the initial colour development, but the final response was stronger; (iii) the colour, once developed, was more stable. If the used test paper was then stored in an airtight container, such as a polythene bag, the colour was visible up to the final disintegration of the test paper, about 3 months later. This stability is attributed to residual acid in a liquid phase being adsorbed on the fibres. Look (1967) noted this when he regenerated colours with fresh hydrochloric acid.

Batches of reagent were manufactured and stored in clear glass bottles in full daylight for long-term storage trials. The results are listed in Table 1.

The detection limit of less than 10 ng of LSD was comparable with both reagents A and B when used as a t.l.c. chromogen. Comparable relative sensitivities were noted with these reagents when tested against the other drugs (containing an indole nucleus) listed previously by Alliston & others (1971).

The requirements for a field test are different from those for a chromogen spray for which purpose the field test reagent containing phosphoric acid was found to have too high a viscosity for most spray guns. Reduction of the acid concentration to 25% in methanol improved the spraying characteristics. In each case, 5% of DMBA is required in the final solution for maximum sensitivity and speed. 10 to 25% w/v of phosphorous acid or polyphosphoric acid may be used instead, the response speeds and sensitivities being comparable. With each of the acids, the test has sufficient

Table 1. *Comparison of effectiveness of reagents in the field test for LSD.*

Reagent	Age	LSD detected "(ng)"	Comment
A	Fresh	40	—
	1 year	50	Near limiting age
B	Fresh	10	Almost colourless background
	2 years	10	Background darkens after 10 min.
C	Fresh	1000	Nearest equivalent test in 1971

Notes
A: 5% 4-dimethylaminobenzaldehyde (DMBA) in concentrated hydrochloric acid: methanol (1:1);
B: 5% DMBA in syrupy phosphoric acid (s.g. 1·45): methanol (1:1);
C: Soak filter paper in 2% DMBA in ethanol and dry. To this add one drop LSD extract in methanol and dry. Add one drop concentrated hydrochloric acid (Look, 1967, 1968).

sensitivity to detect the residues left on a test paper by merely rubbing a typical LSD tablet across it. Metaphosphoric acid was ineffective.

Alternative aldehyde reagents were compared for LSD sensitivity. 4-Diethylaminobenzaldehyde was less sensitive and gave a greyer colour, less obvious against the background. 4-Dimethylaminocinnamaldehyde, also widely used as a general reagent, was found to be more sensitive to indoles than the Ehrlich reagent (Harley-Mason & Archer, 1958), but for LSD detection it is inferior to either benzaldehyde derivative. The colour developed is weaker and difficult to see against the pink background of the reagent solution and fades completely after 30 min.

The colours developed with common drugs were examined. Relatively few drugs without an indole nucleus responded. Most were tranquillizers or local anaesthetics which developed a colour other than violet. These "incorrect" colours were utilized to eliminate the drugs from further testing in a logical tree test scheme (de Faubert Maunder & Phillips, 1972; BDH, 1973).

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