VOLUNTEERS for INTERNATIONAL TECHNICAL ASSISTANCE, Inc.
COLLEGE CAMPUS, SCHENECTADY, NEW YORK 12308 • Tel. (518) 372-5696

Reference #19742US Lead Test

February 25, 1971

Lead Industries Association
292 Madison Avenue
New York, NY 10017

Gentlemen:

Do you have any simple non-laboratory (standard?) methods of checking paint from houses for the presence of lead? The enclosed method is being studied for opinions on its suitability.

Would it check lead for all types of lead paint (including lead chromate, or litharge) as well as white lead?

Very truly yours,

A. C. Titus

A. C. Titus
Volunteer Coordinator

enc:Memo w/enc

Lead Test

VOLUNTEERS for INTERNATIONAL TECHNICAL ASSISTANCE, Inc.
VITA-WASHINGTON, D.C.

915 EYE STREET
WASHINGTON, D.C. 20001

EDWIN A. BETHEA, Director
Phone (202) 393-3074

JAN 25 1971

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MEMORANDUM

TO: BEN, JOE, HARVEY, SAM, AND FRED
Director's in VITA

FROM: John McPhee, Deputy Director
VITA-D.C.

DATE: January 22, 1971

SUBJECT: NA_2S spot test for lead in paint chips

Here's a simple test I copied out of a journal that hasn't been publisized too much that I know of. I only left out some general remarks in the introduction and under the "discussion" section, so it's pretty much verbatim.

As with the dipstick method, this test is controversial, but you'll see that unlike the dipstick test, this method was compared to results from a spectrographic test. The latter is considered reliable enough to be used as a standard, so, theoretically, this test, if done as described, should be an excellent screening device.

I would appreciate any information you might have to the contrary or in support.

An evaluation of test,

aga

LIA-76847

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PEDIATRICS Vol. 46 No. 5
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American Academy of Pediatrics Evanston, Illinois 60204 (Page 783)

Spot test for Lead in Paint - J.W. Sayre, D. J. Wilson

(Introduction.....)

" A semiquantitative method suggested by Kaplan and Shaull (Kaplan, E. and Shaull, R.S. Determination of lead in paint scrapings. Amer. J. Public Health, 51:65, 1961.) while easier, still has the limitation of requiring technical ability, equipment and dangerous chemicals. The method of testing herein proposed is simple, inexpensive, and specific, and can be performed in the patient's home. It involves the precipitation of lead as an insoluble black sulfide through the following reaction: $Pb + NA_2S$ -- PbS

Method

A solution of sodium sulfide of about 5 to 8% is prepared. This solution must be kept tightly covered to prevent loss of potency through hydrolysis, which releases volatile H_2S. It is conveniently dispensed in 5 ml polyethylene squeeze dropper bottles. Sodium sulfide does not attack the surface of these bottles. A label, "Poison: Harmful to Eyes or if Swallowed" is affixed. In this concentration there is no skin irritation, but the characteristic odor of H_2S may persist on one's hands for a half-hour. While the total amount of sodium sulfide in this small bottle (250 to 400 mg) is of low potential toxicity, it should nonetheless be kept out of the reach of young children.

The paint can be tested either "in situ" or as a full-thickness chip of paint removed from the surface of the wood or plaster. If testing is done "in situ", it is exsential that all layers of paint be exposed down to the bare surface by making a diagonal cut with a sharp penknife. If the paint is tested as a chip, a similar diagonal cut is needed so that all layers of paint may be wetted by the sodium sulfide solution. This is essential since the deeper, older layers of paint and particularly the primer coat may be the only ones which contain lead. Paint which has been more recently applied is less likely to contain hazardous amounts of lead. All layers should be inspected carefully for a color change (Fig. 1).

Adequate lighting is most important for proper interpretation of the test, particularly when evaluating dark colored or soiled paints. At times a hand magnifying lense is very useful.

Sensitivity

This is a qualitative reaction and the intensity of the color change varies directly with the amount of lead present. Over the past two years in a lead paint screening program in Rochester, over 200 homes have been inspected. When the sodium sulfide testing method was introduced, chips were taken to the laboratory and examined with both sodium sulfide and spectroscopic methods. A black color developed in specimens proven to contain between 10 and 25% lead. However, quantitative determinations on specimens of paint composed of many layers may not yield an accurate comparison, since all layers of paint are not necessarily lead-containing. For this reason, a specimen of exterior white primer paint of known composition was obtained from a local paint manufactures. By calculation from the formula used in production, the paint contained approximately 22% lead in the wet state. A specimen was then dried and its lead content measured quantitatively. This resulted in a yield of 18% lead. Assuming the value to be approximately 20%, the paint was diluted with another sample of white paint known to contain less than 1% lead. Paint of successive dilutions was then applied to wood surfaces, dried, and tested with the sodium sulfide solution. Small wooden samples were pieced together and a comparator block made (fig.2). It can be seen that gradations of light grey through dark grey to black are obtained and that at the lowest dilution of 0.8% a faint grey color is present. Colors at the 15 to 20% range are dark enough to make it difficult to approximate lead concentrations over this amount.

Specificity

A host of other heavy metals can be found in paints. Those found in large quantity are zinc, titanium, and barium, none of which form black sulfides. Other metals are constituents of pigments and occur in amounts less than 1%: cadmium, chromium, cobalt, iron, manganese, magnesium, mercury, molybdenum, and nickel.[5] Of these, black sulfides are formed by iron, nickel, mercury, and molybdenum but the quantities present are small enough to cause no confusion.

pper also forms a black sulfide, but its only use in paint is for its anti-fouling properties. It would have no place in house hold paints. Black paint may be difficult to interpret, but is not ordinarily made with lead.[5] Care must be taken, however, in testing tal surfaces covered with paint such as pipes, or radiators since the iron or copper may precipitated.

Discussion

Surveys made in a number of U.S. cities have demonstrated the prevalence of lead painted household interiors to be as high as 50 to 70%.

his method, however, when used as described herein, puts testing within the reach of many people such as public health nurses, community aids, and volunteers. A comparator block such as shown in (fig.2) is easily made and could be used as a standard if extensive testing as planned.

There are a number of other advantages offered by the sodium sulfide spot test: 1) The method is simple, inexpensive and involves a minimum of chemicals and equipment. The small dropper bottle with its tightfitting cap is easily carried in one's pocket or the glove compartment of a car. The bottles can be obtained from most pharmacies. 2) Little training is needed in the interpretation of the color change. Care must be taken to test all layers of paint down to and including bare wood or plaster. 3) The testing can and should be done in the home, particularly in areas accessible to children. Attention should be paid to areas where children have been observed to pick at walls or windowsills. Loose chips of paint on the floor or on the ground outside should also be tested. 4) Testing may be done at the time surfaces are scraped and refinished. In several instances in Rochester the house painter was shown how to do this. 5) The simplicity of performance and ease of interpretation has proven this spot test an adjunct to screening campaigns to identify early cases of lead poisoning.

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Spectroscopic lead analysis were performed by Luville T. Steadman, Phd., Department Radiation Biology and Biophysics at the University of Rochester

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