



Lead Industries Association, Inc.

222 Madison Avenue • New York, N. Y. 10017 • Telephone: 212 675-6000

July 3, 1973

SUBJECT: LEAD IN TOOTHPASTE

TO THE OFFICIAL MEMBERS OF THE LEAD INDUSTRIES ASSOCIATION, INC.

Enclosed is an article which will, I think, be of more than passing interest. It states that certain brands of toothpaste--particularly the highly acid, fluoride-type toothpastes--have been found to dissolve significant amounts of lead.

In addition, the paint or lacquer outer decoration on the lead tubes has been found to contain from 1 to 5% lead. Dr. Cole, our Director of Environmental Health, has informed me that there have been cases of both elevated blood leads and lead poisoning allegedly attributed to children chewing on such tubes as well as eating the leaded toothpaste.

Because of this, and the likelihood of further publicity of a highly derogatory nature in the popular press, Dr. Cole has been informed by Procter & Gamble, manufacturers of Crest, the most popular fluoride-type paste, that they will discontinue use of lead tubes.

If you have suggestions as to either how we might assist Procter & Gamble and the other lead toothpaste tube users in blocking lead migration into the paste, or how the tubes themselves might be rendered less toxic--for example by perfecting a tube with tin layers both inside and out, we would appreciate hearing from you.

Sincerely,

Jerome F. Smith
Secretary & Manager

JFS:lm
Enclosures

Special Note

Is That Toothpaste Safe?

Elmer Berman, Ph.D., and Karen McKel, M.S., Chicago

Eighteen brands of toothpaste were analyzed for lead content in the tube and the outer coating, as well as in the paste itself. Three brands were found to contain potentially hazardous amounts of lead.

THOUGH there is widespread concern over hazardous pollutants in the environment, fallout, pesticide residues, and leaded gasoline, we do tend to take the common assurances for granted. The safety of toothpaste, especially those deliciously flavored popular brands, has not been a subject of concern.

Like most individuals present during a casual conversation at the Oct 21, 1971, conference of the American Academy of Clinical Toxicology, when one of the participants mentioned that he had heard that the outer coating on a tube of Crest toothpaste had been implicated as the cause of lead poisoning in a child, we were doubtful. Specific information concerning possible hazards potential in the container, or the toothpaste itself, was not available. Nor was there any documentation about other brands.

After adapting an atomic absorption spectrometry technique for analysis of lead in biological materials,¹ eighteen brands of toothpaste were examined for presence of lead in the outer coating, the container, and the toothpaste. Findings are summarized in Table 1.

Dangerous lead levels (above 5%) were found in the outer coatings of tubes of Crest, Fresh Breath, MacLean's, Craig Martin, and Worthmore. Brands marketed in leaded containers include Crest, Fresh Breath, and Worthmore. Potentially hazardous amounts

of lead in the paste itself were found in Crest, Fresh Breath, and Worthmore brands.

While the outer coating on Pepsodent and Wrigley's Spearmint Fluoride tubes contains about 1% lead, the containers and respective pastes contain mere, insignificant trace amounts of lead.

Brands which contain insignificant quantities of lead in the outer coating, tube, and paste include: Close-Up, Colgate, Glaxo II, Lident, Plus White, Remolysa, Smoker's Ultra Brite, and Vola. Only two brands tested, Biorac and Thermodont, proved to be negative for lead in all aspects.

Table 2 summarizes the quantitative results obtained from analyses of significantly leaded toothpastes. Lead levels ranged up to 0.125 mg/gm. An average brushing uses 2 gm. Brushing one's teeth, three times daily, with a few of the specimens analyzed could result in ingestion of 0.3 to .75 mg of lead.

Comment

It is possible that the toothpaste brands Crest, Fresh Breath, and Worthmore are potentially hazardous to children who may chew on the tube repeatedly. Furthermore, there is the possibility that the toothpaste in these containers can become sufficiently leaded to add to even an adult's lead burden. One of the children in a white middle class suburb recently surveyed for evidence of overt lead exposure had a blood lead level of 67 µg/100 ml. She had a history of eating Crest toothpaste. A normal blood lead level is considered to be less than 20 µg/100 ml.

Perhaps age of the toothpaste in the leaded containers may be a factor that affects its lead content. We note that six of the 28 Crest tubes tested did not contain lead in the paste itself. Tubes containing 0.1 to 0.25 mg/gm of paste were known to be three to eight months old.

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From the Toxicology Laboratory, Department of Biochemistry, Cook County Hospital, Chicago.
Reprint requests to 1627 W. Harrison St., Chicago 60612 (Dr. Berman).

TOOTHPASTES—BERMAN & McKEL

Table 1.—Summary of Brands Tested for Lead

Brand	Outer Coating Loaded	Tube Loaded	Paste Loaded	pH of Paste
Bonac	0	0	0	5.5
Close-Up	Trace < 1%	Trace	Trace	4.0
Colgate	Trace < 1%	Trace	0	4.5
Craig Martin	+++ > 1%	+++	0	6.0
Crest (Mint)	+++ > 1%	+++	+++	3.0
Crest (Regular)	+++ > 1%	+++	+++	3.0
Fresh Breath	+++ > 1%	+++	+++	5.0
Gleam II	+ < 1%	Trace	Trace	5.5
Indent	0	Trace	Trace	5.5
MacLean's	+++ > 1%	Trace	Trace	5.5
Pepodent	+ < 1%	Trace	Trace	5.5
Plus White	+ < 1%	0	0	5.5
Sensodyne	+ < 1%	Trace	Trace	5.5
Smoker's	+ < 1%	0	0	5.5
Thermodent	0	0	0	5.5
Ultra Bright	Trace	Trace	Trace	5.5
Vote	0	0	Trace	6.2
Walgreen, Shelf	+++ > 1%	0	0	5.5
Worthmore	+++ > 1%	+++	+++	5.0

Table 2.—Lead Contents of Toothpastes

Brand	Lead Content		
	Milligrams per Gram	Milligrams per Brushing	Milligrams per Day
Crest	0.0125	0.250	0.750
Fresh Breath	0.0074	0.0148	0.044
Worthmore	0.015-0.041	0.037-0.087	0.096-0.173
Bonac	0	0	0
Close-Up	0.0002	0.0004	0.0012
Colgate	0	0	0
Craig Martin	0	0	0
Gleam II	0.0001	0.0002	0.0006
Indent 2	0.0002	0.0004	0.0012
MacLean's	0.0002	0.0004	0.0012
Pepodent	0	0	0
Plus White	0	0	0
Sensodyne	0.0004	0.0008	0.0024
Smoker's	0	0	0
Thermodent	0	0	0
Ultra Bright	0	0	0
Vote	0.001	0.002	0.006
Walgreen Shelf	0	0	0

Crest has a pH of 3, both Worthmore and Fresh Breath have a pH of 5. Metallic lead is more readily soluble at an acid pH. True, the leaded Crest container is lined with a plastic material; however, analyses revealed the plastic lining to be heavily leaded also.

Of the other brands tested, Craig Martin, MacLean's, Pepodent, and Walgreen's Shelf Fluoride contain significant amounts of lead in the painted coating only. The

containers and the toothpaste are safe.

The remaining brands, Close-Up, Colgate, Gleam II, Indent, Plus White, Sensodyne, Smoker's, Thermodent, Ultra Bright, and Vote are safe in every respect.

References

1. Berman E. Application of atomic absorption spectrometry to trace metal analysis of toxicological materials. *Prog Chem Toxicol* 4:189, 1962.

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Crest Toothpaste Lead Content Termed Potentially Hazardous

Brand Is 1 of 3 Named in Study:
Procter & Gamble Says It Is
Changing to a No-Lead Tube

By DAVID BRUNS
Special to THE WALL STREET JOURNAL

Two researchers at Cook County Hospital in Chicago in a published report that they've found Crest toothpaste, the nation's largest selling brand, to be "potentially hazardous" as a result of the lead content in the tube, the tube coating and in the toothpaste itself.

In a report published in the July edition of the *Annals of Environmental Health*, a publication of the American Medical Association, the researchers say they found a high lead content in three brands of toothpaste out of 13 brands tested. They are Crest, made by Procter & Gamble Co., and two otherwise unidentified brands called Fresh Breath and Waltham. An American Dental Association spokesman said he had no record of these two brands and said they were "probably private label products."

In Channahon, Procter & Gamble issued a prepared statement after a reporter's inquiry. The company said that "during the last year" the company has been "changing over" to a new Crest toothpaste tube that doesn't contain lead. "In 14 years of marketing Crest we know of no instance in which Crest toothpaste itself has been associated with a lead ingestion problem," the company said. And the company noted that "from the description in the article it appears as though the research was conducted with the old tube, which is no longer being produced."

The researchers, Eleanor Berman and Karen H. Lee, who work in the Chicago hospital's laboratory, say the tubes they tested containing the three brands are "potentially hazardous to children who may chew on the tube repeatedly." Also, they say, "there is the possibility that the toothpaste in these containers can become sufficiently loaded to add to even an adult's lead burden."

Among young children in urban areas lead poisoning is a major source of brain damage, mental deficiency and serious behavior problems.

The Chicago researchers say they found "dangerous lead levels" (above 5%) in the outer coatings of tubes of Crest, Fresh Breath, Maclean's, Craig Martin and Waltham. They say that Crest, Waltham and Fresh Breath were the only three brands they found marketed in "lead-containing." And the

other three brands were the only ones marketed in "lead-free" toothpaste. Berman said, a subsidiary of Maclean's Group Ltd. of England, when visited Maclean's, said it be reached for comment.

The researchers say they had tested 13 Crest toothpaste tubes and found that the lead content ranged up to 4.1% milligrams per gram, an average of 1.1%. They also found that the lead content in the tube coating was 1.1% and in the toothpaste itself was 0.1%.

A 10-year study of the University of Chicago has shown that the normal daily dietary intake of lead in adults averages about 0.5 milligrams.

Miss Berman said in an interview that the highest lead content was found in a tube of Crest toothpaste that was supplied by a pediatrician at Cook County Hospital. In all, she said, 10 tubes of Crest were obtained for testing from several areas of Illinois and one from Indianapolis.

However, the researchers tested only two tubes each of the 11 other brands. Miss Berman explained they had been told by another researcher that he had found no trace of lead in Crest toothpaste. "Frankly we had to keep buying tubes of Crest until we could find tubes that didn't contain lead in the paste," she told a reporter. The researchers say in their report that the Crest tubes didn't contain lead.

They also said that the tubes containing 0.1 to 0.5 milligrams of lead per gram of toothpaste "were known to be Crest in eight months old." Although the Crest tube is lined with a plastic material, they say, "analysis revealed the plastic lining to be heavily loaded also."

Miss Berman told a reporter that a recent State of Illinois Health Department survey of the effects of lead exposure led to the discovery of a child "in a white middle-class suburb" of Chicago with a blood lead level more than three times what is accepted as normal. According to Miss Berman, the child's father said his daughter had a history of using Crest toothpaste.

Procter & Gamble, in its statement saying that Crest itself had never been linked with lead poisoning, acknowledged an incident last fall "in which two children became temporarily ill from lead ingestion." Investigation of the case—which may have been the one in the Chicago suburb—showed, however, that when the children "were permitted to chew on Crest tubes they were also exposed to large concentrations of leaded paint and lead toys in their homes," the company said.

The company described its old tube as "a lead alloy tube with a special lining to act as a barrier between the tube and the product." However, the company said, "for over 10 years we have been aware that this tube shows a tendency to develop leaks during home usage." The company thus decided to develop the new, unleaded tube.

It is estimated that Crest has 45% of the U.S. toothpaste market. U.S. sales of Crest are estimated to be more than \$150 million annually.