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Consumer Evaluation of Laundry Detergents*

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Summary

Laundry detergents with no phosphate had the same record of safety to health as did high phosphate (8.7% P) detergents according to a November 1972 survey by the Rochester Committee for Scientific Information. Skin rashes or itching were reported by 4% of users of both high-phosphate detergents and non-phosphate detergents in Monroe County. In this County, as in all of New York State, high phosphate detergent formulations contain 8.7% phosphorus, which means that approximately 1/3 of the product (by weight) is a polyphosphate salt. The no-phosphate detergents use other water softeners.

The most popular high-phosphate brands as well as the most popular non-phosphate brands had some dissatisfied and some enthusiastic users among the 468 respondents. The two most used high-phosphate brands as well as the two most used non-phosphate brands in our poll had some users complaining of health effects. The score for users who reported being completely satisfied with a product was 88% among users of all phosphate-containing detergents, 79% among users of non-phosphate detergents and 77% among users of soaps. Statistics on numbers using each kind of detergent are given in the text.

Background

1. Control of Phosphate by State Law

A law regulating the phosphate content in household cleaning products was enacted in 1971 by the state legislature (1). The feasibility, advisability, and time schedule for enforcement of a total ban on detergents containing added phosphates will shortly be considered by the state legislature. This survey was conducted to assist the Commissioner of Environmental Conservation in his recommendations to the legislature concerning this law.

The aim of the law is to control eutrophication of lakes in New York State by regulation of phosphorus input. Five dates were specified concerning regulation of phosphates in detergents. In chronological order these dates are:

(1) After June 25, 1971 no subdivision of the State may make a local law regulating the amount of phosphate in household cleaning products.

(2) After December 31, 1971 no household cleaning products with more than 8.7% phosphorus may be offered for sale in New York State.

(3) During 1972 the Commissioner of Environmental Conservation (Mr. Henry Diamond) shall ask the detergent manufacturers for their estimates of the progress made in research and development of new formulations of detergents.

(4) By February 1, 1973 Mr. Diamond must report to the legislature on the progress made in the development of safe and effective substitutes for phosphates in household cleaning products. This report is to be the basis for consideration of possible legislative action modifying the 1971 law. The legislature may choose not to amend the law, or may either extend the time or abolish the requirement for removal of phosphates in detergents.

(5) After June 1, 1973 no detergent may be offered for sale in the state that has any phosphate added (commonly called the zero-phosphate or phosphate-free clause).

2. Possible Benefits and Hazards of Curtailing Phosphate

The law is intended to restore the quality of public waters in the State of New York where the water has been degraded by pollution and by resulting eutrophication. Previous R.C.S.I. bulletins (#118, #120) documented the evidence for the control of phosphorus as a way of curtailing the growth of algae and water weeds. A forthcoming R.C.S.I. bulletin, #151, will present evidence from Monroe County and from a nearby county - Erie County, New York - where a total ban on phosphate is in force. Improvements in water quality have been documented in connection with the decrease in the use of phosphate in detergents. There is, consequently, reason for expecting the New York law to undo some of the damages done by water pollution.

On the other hand, the law is forcing the manufacturers of detergents to stop making products that were greatly preferred by the general public, and to replace them with formulae that are either old fashioned or not yet tested by general use. Claims have been made, that such formulae will bring unnecessary troubles to the wash, and the washing machine, and hazards to the health of the users. The latter is a serious accusation, and it has been answered by those who claim that either phosphate or non-phosphate laundry products may be damaging to health depending upon what besides phosphate is in the package. One result of all the accusations has been great confusion in the mind of the housewife.

The causes of this confusion, the misinterpretations, the clarifications and the role of the Federal Government in the controversy, have been discussed in the Ninth Report by the Committee of Government Operations entitled "Phosphates and Phosphate Substitutes in Detergents; Government Action and Public Confusion" (2). Part of the conclusion of that report reads: "...the government's handling of the detergent problem since 1970 particularly the joint press release* and conference of September 15, 1971, has resulted in confusion for consumers and detergent manufacturers alike...". The summary goes on to say that: "...some detergents - both those with and those without phosphates - have been found to be hazardous to human health...". In fact, the title of Subsection III is "The Safety Myth" and of III A is "General Statements by Government and Industry Officials that High Phosphate Detergent Products are 'Safe' while Those Low in Phosphate or Containing Phosphate Substitutes are 'Hazardous' are Substantially Unfounded and Misleading". The hearings are long and slow to read, and we were unable to find any actual user survey on the safety and efficacy of household laundering products; consequently we did our own.

* The Rochester Times-Union of September 16, 1971 reported that conference with a headline that reads: "Use Phosphates, U. S. Says".

R.C.S.I. SURVEY OF THE USE OF LAUNDRY DETERGENTS

1. Summary of the Results

Questionnaires were sent to R.C.S.I., League of Women Voters, and Sierra Club members in November, 1972, requesting reports of health effects and evaluation of washing efficacy for products currently being used. Of 1355 questionnaires sent, 468 replies were received covering 510 usages of laundry detergents.

Of the usages reported, 35% were for detergents containing the maximum phosphate permitted by law (8.7% phosphorus), 12% were for "low phosphate" (3-7% phosphorus) detergents, 42% were for non-phosphate detergents, and 11% were for soaps. The percentages of users who reported being completely satisfied were 86% for phosphate-containing detergents, 79% for non-phosphate detergents, and 77% for soaps. No product that had more than 15 users was reported completely satisfactory by all of its users.

The following percentages of users felt that cleaning efficacy was unsatisfactory in some aspects: Phosphate-containing detergents, 11%; non-phosphate detergents 21%; and soaps, 23%. Of the non-phosphate detergent users, 2% were sufficiently dissatisfied with the product they were using to switch to a phosphate-containing detergent. A number of users of both phosphate and non-phosphate detergents reported that unsatisfactory cleaning performance could be compensated for by the use of spot stain removers, bleaches, or additional water softening agents, such as washing soda.

Skin rashes or itching were reported by 4% of the 8.7%-phosphate detergent users and 4% of the non-phosphate detergent users; no adverse health effects were reported by users of low-phosphate detergents or soaps. Because of the small number of users of low phosphate detergents or soaps, the absence of reported health effects is not highly significant. It is concluded that reported health effects are not related to the phosphate content of detergents and hence may be related to constituents present in both types of detergents, or are from causes not related to detergent usage.

2. Design of Survey and Detailed Results

The questions asked were:

1. Brand name of the laundry detergent which you are using now.
2. How much phosphorus does it contain? The number should be on the label. If no phosphate was added the box will say so.
3. Health effects! Within the last three months has anyone developed skin rashes, eye problems or other reactions attributable to the detergent? (We are limiting this question to the last 3 months only because detergent formulations change so often.) Please say "no complaints" if applicable, or describe the complaints in a few words.
4. Do you have any complaints about the way it washes? Please say "satisfactory" if applicable or describe reason for dissatisfaction in a few words.

Tables 1 and 2. Results of the R.C.S.I. poll of November 1972 on washing performance and adverse health reactions of laundry detergents.

Table 1. Results expressed as numerical amounts.

Class of laundry product	Number of users	Number of users completely satisfied	Number of complaints of health side effects	Number of complaints about washing performance	
				mild complaint	severe enough to change detergent
8.7% P detergent	174	153	7	14	0
3%-7%P detergent	63	56	0	7	0
non-P detergent	216	171	9	41	3
non-P soap	57	44	0	13	0

Table 2. Results expressed as percentages.

Class of laundry product	Percent of users among all respondents	Percent of completely satisfied users in the group	Percent of complaints of health side effects	Percent of complaints about washing performance	
				Mild complaint	severe enough to change detergent
8.7% P detergent	35%	88%	4%	8%	0%
3%-7%P detergent	12%	90%	0%	11%	0%
non-P detergent	42%	79%	4%	19%	2%
non-P soap	11%	77%	0%	23%	0%

Of the responses received, only one reported using a detergent with more than 8.7% phosphorus, the maximum permitted by law. A survey of a number of stores in the Rochester area indicated that no laundry detergent was currently being offered for sale which contained more than 8.7% phosphorus, so the detergent containing 12.3% phosphorus was presumably purchased before regulations limiting phosphate in detergents became effective (December 31, 1971).

In our sample 53% of the people were users of phosphate-free laundry products. An additional 12% used a detergent with less than 7% phosphorus (a low phosphate detergent). The number might have been even higher except for consumer confusion brought about by certain manufacturer's claims. Several manufacturers indicate that a detergent is limited or low in phosphorus when in fact it is the maximum permitted by law. Specifically, Amway SA-8 is marketed in a nonphosphate formulation and in a formulation containing 8.7% phosphorus. The formulation containing 8.7% phosphorus is labelled "limited phosphate", and several users stressed that it was of "limited phosphorus" content, apparently unaware that no product containing more than this may be offered for sale. Furthermore, Lever Brothers distributes a number of formulations for All, including one with 8.7% phosphorus, another with 4.6% phosphorus and one which has no added phosphorus. Unfortunately the one with the highest phosphorus content is marked "Low Phosphate" on the box in large letters; a number of users implied they chose this product in the belief that it contained less phosphorus than other products being offered for sale.

In our sample then, 2/3 of the people reporting used a zero or low phosphate product. We deliberately sampled an ecology-minded group because we wanted a large number of evaluations of the phosphate free products. It is not likely that there would be a similar distribution of users in the Rochester public at large.

3. Possible Adverse Reactions to Detergents

People complained primarily about rashes on hands or thighs, itching of skin, burning of hands when detergents were touched, and in one case crusting of eyelids. As was pointed out by a number of respondees, unless carefully controlled experiments have been performed there is no way of knowing whether a specific rash is caused by the detergent being used. Although the causes of such complaints could not be authenticated, we wished to check whether the complaints about rashes, verified or not, would come mostly from users of phosphate-free detergents. In fact, there was the same fraction of complaints from people using detergents with 8.7% phosphorus as from people using phosphate-free detergents. No complaints were received from users of low phosphate detergents or soaps, and several respondents with health complaints said that the use of soap was the best way to avoid such problems. However, the number of users in these two categories was so low, that the differences between them and the users of high-phosphate and zero-phosphate products are not interpreted as statistically significant.

It is concluded that rashes and skin irritations were not related to the phosphate content of laundry products. Where health problems were found, they were either caused by agents present in both the phosphate and the non-phosphate detergents, or were not related to detergent use.

This conclusion is confirmed by the statistics on complaints about individual laundry products (Table 3). Complaints of adverse health reactions were registered against a quarter of the high-phosphate (8.7% P) detergents, and against practically the same fraction of non-phosphate detergents. Again, no health complaints were registered against low-phosphate products and soaps, but the number of products was too small to say that the group was more trouble-free than the others.

Products were divided into a high-use and a low-use group so that each group had roughly one half of the users. The high-use group which contained six products, each with more than 30 users, accounted for 48% of the responses. The group included two high phosphate and two low phosphate detergents. All four had some complaints about health (Table 3).

Table 3. Distribution of responses to individual laundry products.

Response group	Product group			
	high(8.7%)P detergent	lower P detergent	non-P detergent	non-P soap
Total number of products named in the replies	16	5	26	4
Fraction of all products with some health complaints	25%	0%	23%	0%
Fraction of all products with some complaint about washing	37%	60%	50%	75%
Number of products named in <u>more than 30 replies</u>	2	1	2	1
Of those: number with no health complaints	0	1	0	1
number with no complaints about washing	0	0	0	0
Number of products named in <u>30 or fewer replies</u>	14	4	24	3
Of those: number with no health complaints	11	4	20	3
number with no complaints about washing	10	2	12	1
number with no recorded dissatisfaction	8	2	12	1

4. Washing Performance of Laundry Products

There were complaints about the washing performance in each of the groups of products. We found that the kinds of washing complaints were about the same for the high phosphate (8.7% P) as for the non-phosphate products as shown in Table 4.

Table 4. Analysis of complaints about washing ability of detergents.

Replies	Percent of phosphorus in the product		
	0%	3% to 7%	8.7%
<u>total replies in the sample</u>	<u>210</u>	<u>60</u>	<u>150</u>
total number of complaints	45	7	15
number of each kind of complaints:			
-gray	20	6	9
-bleach needed	7	1	1
-spots stay in	11		3
-scum in machine	1		
-doesn't rinse out	4		3
-drifts up when poured	1		
-hard to measure	1		

The percent of users with complaints about wash (Table 2) was highest for soap, intermediate for non-phosphate detergents (approximately one complaint in five replies), and least for detergents with most phosphate. Even the high phosphate products, however, had some 8% of complaints. If replies about a product came from many users there were always some who were not completely satisfied with the washing ability (Table 3). By the same token, if the replies came from many people some of them also praised the washing ability of the product as excellent or outstanding.

Among users of non-phosphate products, 3 were very strongly dissatisfied and switched back to a phosphate-containing detergent. Other users compensated for washing deficiencies by using spot remover, bleach, washing soda or a water softener additive. They probably did not realize that the water softener was a polyphosphate.

It is concluded, that the majority of respondents were satisfied with the washing performance of the brand they used, regardless of phosphate content. There were differences in the number of complaints about the wash (19% for non-phosphate detergents as compared with 8%-11% for detergents with phosphate), but no brand performed so well as to have a large number of users and no complaints.

References

- (1) Article 35 of the New York State Environmental Conservation Law. Detergents and other Household Cleaning Products. 1972.
- (2) Phosphate and Phosphate Substitutes in Detergents. Government Action and Public Confusion. Ninth Report by the Committee on Government Operations. House Report Number 92-918. Union Calendar Number 461. U.S. Government Printing Office, Washington. March 15, 1972. Price \$0.55 See particularly Section III Safety Myth, Appendix, and Conclusion pg 4.
- (3) R.C.S.I. Bulletin #118. Water Pollution Abatement Through Regulation of Content and Use of Detergents. Herman Forest
- (4) R.C.S.I. Bulletin #120. Labeling of Detergents as a Means of Regulating Phosphate Pollution. Herman Forest