Detergents: Side Effects of the Washday Miracles

Ever since the legendary Roman ladies, washing their clothes in the Tiber, found that the river's waters, polluted by lye and animal fat, had remarkable cleaning power, soap has been linked with pollution.

Detergents, which came on the market in the 1930's and proved more effective than soap, clogged sewage systems and streams with foam. That pollution problem was surmounted in 1965 when the detergent makers, hastened by angry consumers and congressmen, including Representative Henry Reuss (D–Wis.), switched the chemical composition of their products from alkyl benzene sulfonate to linear alkylate sulfonate, which was more easily broken down by bacteria. Biodegradable detergents are now the only sort one can buy.

Detergents, however, continue to be blamed for pollution; lately, they are known to play a contributory role in eutrophication of waters by phosphate pollution. Phosphates in lakes and streams may stimulate plant life which takes oxygen out of the water, thereby speeding up the natural aging processes by which lakes develop into swamps and then into dry land. Sodium tripolyphosphate makes up 40 percent of most detergents.

Reuss's committee, the Conservation and Natural Resources Subcommittee of the Government Operations Committee, recently concluded hearings on phosphate pollution. Reuss quoted the International Water Pollution boards as recommending complete replacement of phosphorus in detergents not later than 1972. He regarded this as a conservative deadline, and argued that partial replacement of phosphorus is possible now, because it is being done in Sweden.

Carl Klein, Assistant Secretary of the Interior, told at the hearings of a $100,000 study under way for phosphates substitutes. He and David Dominick, commissioner of the Federal Water Pollution Control Agency, emphasized that any replacements' effects must not be worse than the phosphates themselves. Dominick gave 1972 as a practical date for testing the amount of phosphorus pollution in waters, and as a target for replacement of phosphates in detergents. Klein said he gave top priority to construction of more advanced waste treatment plants.

Dr. Charles Bueltman, vice president and technical director of the Soap and Detergent Association said no substitute builders were available as yet, and elimination of phosphates without any substitute builder would be equivalent to "setting back health, cleanliness, and sanitation standards many years."

A more direct threat to the safety of consumers than environmental pollution may be posed by the newest detergent innovation, enzymes.

Enzyme products are being investigated for their effect on the health of housewives and workers by the Federal Trade Commission, the Food and Drug Administration, and the Public Health Service.

The enzymes are products of *Bacillus subtilis*, which produces them as part of the digestive process. Theoretically, the enzymes attack protein stains which other detergents are not able to remove: blood, urine, meat juices, chocolate, and so on.

The flourlike dust of the enzymes in the air in manufacturing plants also eats away at the skin of workers' hands and sensitizes their lungs, producing an allergic reaction with hayfever- or asthma-like symptoms.

The enzymes are considered an industrial hazard by government agencies and by the detergent makers, but there is no such unanimity at present on the enzymes' hazards to housewives. An FDA official explained that enzymes in the finished products are not considered hazardous to housewives, because the detergents and presoaks contain such small amounts of the substance—about 0.3 to 1 percent. Tests conducted by the FDA last spring and summer showed no adverse effects to housewives. The FTC, however, recently announced that it is not convinced, and the agency plans to launch its own investigation soon.

Tests are currently under way by the Public Health Service to determine at what level most lungs and skin become sensitized to the enzymes, how long the process takes, what sorts of reactions occur, and other related problems. Preliminary tests should be finished soon.

The results of the tests will be published and given to the Threshold Limits Value of Airborne Contaminants committee, composed of government and university toxicologists, which will set a safe level of enzyme dust for plants. Workers develop both dermatitis and lung ailments at high levels (for example, 100 micrograms of enzyme dust per cubic meter of air); at lower levels, workers develop only lung problems. The Occupational Health Program (PHS) has tentatively recommended a level of 5 micrograms.

Although enzymes have only been in use here for a year, they have been used much longer in Europe and have caused similar problems there. *Lancet*, a respected British medical journal, raised questions about workers' safety in its 14 June issue. In July a committee from industry and government began to study enzymes.

The soap and detergent makers have taken action to cut down the level of dust after an initial denial of *Lancet*'s report. Representatives from the industry have approached the TLV committee to set an interim level; plants have begun medical tests; most plants have installed equipment to lower the dust level; and industry is cooperating with government officials in setting safe levels.

Ironically the effectiveness of the detergents and presoaks is questioned by consumer groups and a government agency, according to the *Wall Street Journal*. The FTC has begun an investigation to see if the enzyme products fulfill advertising claims.

Consumer Reports, reviewing the products last January, and the British Consumer Association, a nonprofit consumer group, have said that enzymes are not notably more effective than nonenzyme products.

The enzymes, although beset with problems of safety and effectiveness, are doing well on one front, however: they are packed into more than half of the $810 million of heavy laundry detergents sold here annually, and they have created a new $70 to $80 million market a year in presoaks.—NANCY GRUCHOW