ENVIRONMENT CANADA

CONSERVATION AND PROTECTION

ENVIRONMENTAL PROTECTION

PACIFIC AND YUKON REGION

WEST VANCOUVER, BRITISH COLUMBIA

PHOSPHORUS CONTROL REGULATIONS, INSPECTIONS AND ANALYSIS IN THE BRITISH COLUMBIA LOWER MAINLAND AREA

REGIONAL DATA REPORT 90-10

By

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ABSTRACT

Ten randomly chosen laundry detergents that are available in the Lower Mainland Region for institutional use were chosen for this annual inspection. This report contains the results of the phosphate levels in the laundry detergents and determines whether Canadian manufacturers and retailers are complying with the Canadian Environmental Protection Act regulations.

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CONCLUSIONS

Based on data collected from the phosphate sampling program of institutional laundry detergents available in the Lower Mainland Region, the following conclusions can be made.

1. All of the laundry detergent manufacturers and retailers in B.C. are following the 2.2 per cent elemental phosphorus limit regulations.

2. Out of ten laundry detergents sampled and analyzed only two have borderline phosphate levels.

RECOMMENDATIONS

1. It is recommended that one more sample of the two questionable laundry detergents be purchased and submitted for analysis.

1. DETERGENTS

A detergent is defined as a complete washing or cleansing product which among other ingredients contain an organic surface-active compound known as a surfactant that has soil removing characteristics (1). In addition to a surfactant, a laundry detergent is also made up of a builder, anti-redepostion agents, anticorrosin agents, minor bleaches, enzymes, optic brighteners, perfumes and fillers.

1.1 Builders

The problem that is of concern in laundry detergents is in the builder. The most commonly used builder is pentasodium tripolyphosphate (STP) and tetrasodium pyrophosphate. The latter of the two is used somewhat to a lesser degree. There are several other non-phosphate compounds used such as trisodium nitrilotriacetate (NTA) and tetrasodium ethylene-diamine tetraacetate (EDTA). The non-phosphate builders haven't proven to be quite as effective in the cleaning process as the phosphate builders.

The builder is very important in the cleaning process. It does not allow the polyvalent metal ions of the cleaning water to combine with the surfactant. If the ions were allowed to combine and react with the surfactant the cleaning ability of the surfactant would be less effective. Also the builder prevents the ions from combining with the soils that are on the surface of the textile being cleaned thus allowing the soils to be removed by the surfactant instead of being "glued" to the surface. In addition the builder buffers the wash solution, helps maintain sanitation and works alongside with the anti-redeposition agents that are also present in the laundry detergent.

1.1.1 Pentasodium tripolyphosphate.

Pentasodium tripolyphosphate (STP) is the most commonly used compound as a builder in laundry detergents. The advantages of using STP as a builder in laundry detergents are; it is easy and inexpensive to manufacture, it is a stable compound and is relatively non-toxic to mammals and aquatic life. The disadvantage in using STP as a builder and our primary concern is that the phosphate concentration levels increase in our sewer system increases which discharge directly to receiving waters. This increase of phosphorus concentrations causes an increase in eutrophication that leads to a decrease in oxygen supply and infestation by nuisance plants.

2. CANADIAN ENVIRONMENTAL PROTECTION ACT

Chapter 32 Part III Nutrients Section 49 of the CEPA defines a "cleaning agent" to mean a variety of cleaning compounds one of which is laundry detergents. Part III Section 49 goes on to prescribe phosphorus as a nutrient. Section 50 (1) prohibits the selling or manufacturing for use in Canada any cleaning agent (ie.laundry detergent) that has a certain nutrient (ie. phosphorus) that is in a concentration that exceeds the permissible concentration of that nutrient in that cleaning agent. Section 50 (2)(d)(ii) requires persons who manufacture for use or sell in Canada or import any cleaning agent to submit samples of that cleaning agent to the Minister.

2.1 Phosphorus Concentration Control Regulations

Regulations respecting the control of phosphorus in cleaning agents known as the Phosphorus Concentration Control Regulations under the Canada Water Act.These regulations are now included in CEPA. In Section 3 it states that the maximum concentration of prescribed nutrients in laundry detergents shall be five per cent by weight expressed as phosphorus pentoxide or 2.2 per cent by weight expressed as elemental phosphorus. The Phosphorus Concentration Control Regulations apply to detergents whose purpose is to launder domestic, commercial, and/or industrial textiles and other fabrics. Therefore CEPA allows the enforcement of this regulation of phosphorus concentration in laundry detergents, thus allowing the sampling program to be carried out.

3. LAB PROCEDURE

After collecting ten laundry detergents from randomly chosen companies they were submitted to the Environment Canada Chemistry lab for analysis. The samples were analyzed for total phosophate levels using the persulphate digestion method prescribed by Environment Canada and expressed as elemental phosphorus in the lab results.

4 LAB RESULTS

Out of ten samples only two samples were close to the 2.2 per cent limit as stated in Chapter 32 Part III Nutrients Section 49 in the Canadian Environmental Protection Act. The two detergents that were close to the limit were Penico Plus detergent at 2.09 per cent and HLD Laundry detergent at 2.14 per cent. The remaining eight laundry detergent samples were below the limit.

Table 1 Lab Results

Detergent	Total Elemental Phosphorus (%)
Penico Plus	2.09
Tide Detergent	1.8
Premiere Detergent	0.49
Blue Power Detergent	0.74
B.C. Special	1.58
Liberate Plus	1.52
Rendette Detergent	1.69
Sparkette Detergent	0.002
Cyclone 20/20	0.77
HLD Detergent	2.14

REFERENCES

1. Chemical Dictionary