

## Powder Laundry Detergents

### *What did we test?*

*Lanfax Laboratories* purchased laundry detergents powders from supermarkets in Armidale, NSW (during late 2008) and a few samples were supplied, without charge, by various individuals to total 71 powders.

Samples of each of these products were mixed at two rates: one specifically for front loading washing machines (25 L); and one for top loading washing machines (60 L) to simulate the wash cycle of a normal wash program.

The rates of detergent were calculated from weighed samples of a known volume from a freshly opened packet and mixed at the manufacturer's recommended dose for a normal wash.

The samples were mixed with rainwater at the chosen dose and agitated for 30 minutes to replicate washing action. Samples were tested within one hour for pH and salinity. Other tests followed normal good laboratory practice.

### *Why carry out the tests?*

The quality of greywater from domestic dwellings is a cocktail from the numerous chemicals used in the home for personal and general cleaning. Perhaps the greatest use of chemicals is in the laundry where modern detergents are used at rates from a teaspoonful per wash to 1½ cups per wash. Manufacturers have their formulations and marketing strategies that mostly fail to address the problem of potentially hazardous chemicals. The impacts of pH, salinity, sodium, phosphorus and sulphur are not addressed in advertising. Most product labels don't state the ingredients, so astute purchasers can never be sure what is actually in the product. More importantly, very few even let you know how many washes in a packet. This research set out to address some of those shortcomings.

These data are not an endorsement of any product. *Lanfax Labs* has a policy of not endorsing or degrading any product.

No "safe in septic" standards or acceptable guidelines exist, and no laundry product can be "environmentally friendly".

The term "biodegradability" can only apply to the organic components of a powder detergent. When the detergent has a positive reading for Electrical Conductivity, you know immediately that inorganic components are included so the product cannot be "100% biodegradable".

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*Commercial and Research Laboratories  
with special expertise in analysis for:*

Domestic On-site Sewage Treatment

Laundry product testing

Greywater reuse

Effluent irrigation

Wastewater treatment

Environmental Monitoring

Soil and Landscape Assessments

Environmental Engineering

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NOTE: Product formulations may have changed since this research was undertaken. Lanfax Labs has no way of knowing which products may have changed and manufacturers have no requirement to advertise formulation changes to the public.

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## *Laundry Detergents*



*Research Results - 2009*

*Front Loading & Top Loading  
Powders*

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## How to interpret the results

The graphs shown on these pages are examples of the numerous graphs available on the website.

### Greywater pH

pH is a measure of the acid or alkaline status of the liquid. Acids have a pH <7, while alkaline solutions have a pH>7. Natural systems prefer pH between 6 and 8.

High pH causes soil to disperse and where greywater is used for landscaping, a high pH may be detrimental to both the plants, soil microbes and the soil structural stability.

### Phosphorus (symbol P)

Phosphorus is an essential biological element and a non-renewable resource. It is an excellent component of modern detergents, but detrimental when discharged into waterways as it encourages growth of algae and bacteria (“blue-green algae”). When greywater is used for landscaping, plants can uptake the P and so reduce the need for P from other fertilisers. On sandy soils P may leach into groundwater. With care on heavy clay soils much of the P may be locked up in the soil and not be an environmental problem.

If your greywater system may impinge on a sensitive environment, you need to choose a product with a very low P. The “P” symbol on the packet is not a good indicator as some products marked “P” have relatively high levels of P. The “NP” symbol is a good indicator of extremely low (almost absent) P. See Figure F1 and T1 for P ratings.

### Sulphur (symbol S)

Sodium sulphate is often used as a “manufacturing” agent, in other words a “filler”. Detergents high in sulphur are more likely to have ingredients that may not be essential to a clean wash. Usually there is no indication on the packet to suggest high proportions of “filler” other than a big bulky box. Choose a concentrate and one with a small dose.

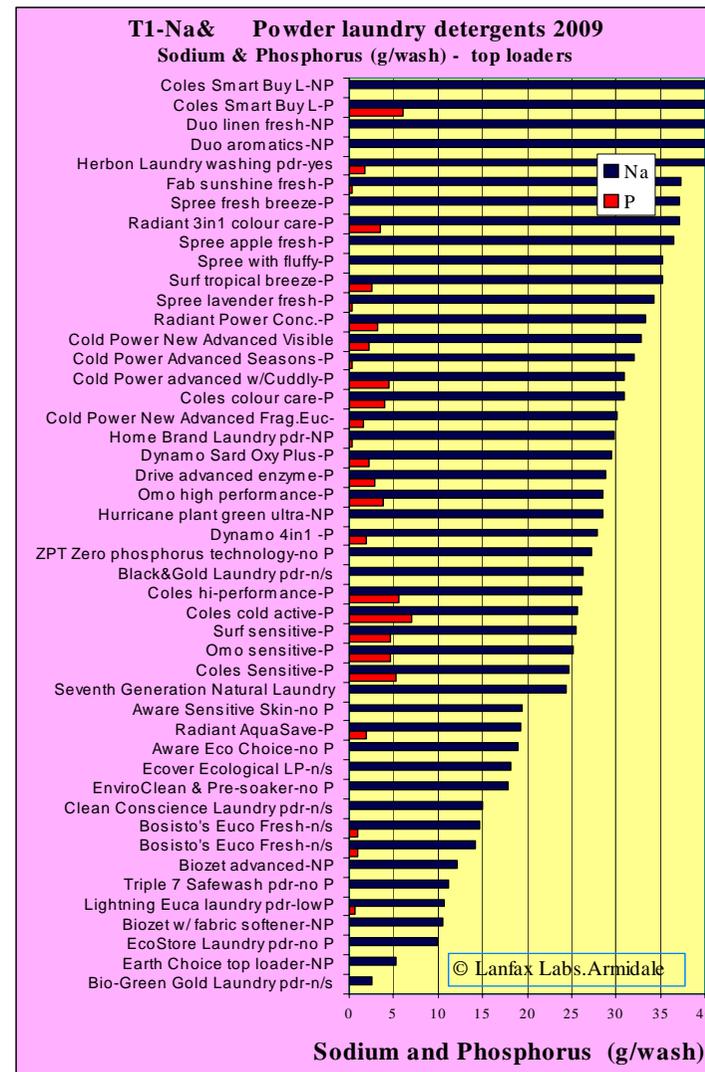
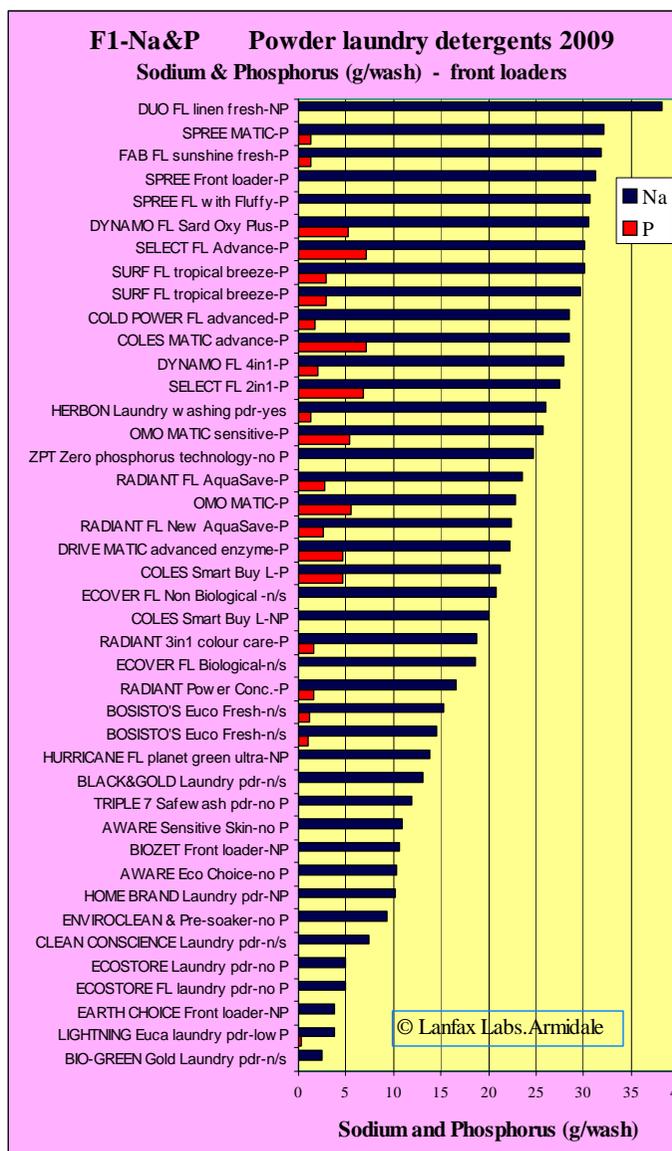
### How much detergent to use.

The “builder” in detergents (often sodium tripolyphosphate, or zeolite as a replacement) has to immobilise the “hardness” in water. Hardness is caused by calcium and magnesium in the water. Rainwater has almost none of these two elements and is “soft” water. Use less detergent than recommended in “soft” water. You may need to use more detergent in “very hard” water. How do you know if water is soft or hard? Hard water leaves a scum with soap.

## Sodium (symbol Na)

Sodium is an element essential for all life, however, in elevated concentrations leads to serious plant water stress and potential soil structural instability. Laundry detergents that contain more than 20 g sodium per wash may be detrimental to plants and soil structure. In the figures F1 and T1, the lower the sodium the better. Take care with products over 20 g Na/wash by spreading greywater over a larger area, or dilute with the rinse water.

When in doubt, choose low sodium and no phosphorus.



## WASH and RINSE efficiency

Whether you have a front loader or a top loader, the efficiency of the wash and rinse cycles are more important than the quantity of water used. Some powders are slow to fully dissolve so the particles will be difficult to wash from the clothes. Always try your own experiment and see how much detergent you need to a wash to your satisfaction. Be aware of great cleaning claims. Remember, the performance of your wash will depend upon the washing machine action, the hardness of your water, the temperature of the wash, and the quality of the detergent. They all go together for a clean wash.