

clean and deodorise long after they have been applied. Unlike standard chemical cleaning products, where the cleaning effect is rapid and short-lived, the microbes



contained in biological products slowly but continuously secrete enzymes to eliminate soils all the while that organic matter and moisture remain. Most biological cleaning products feature the best of both worlds, combin-

ing safe chemicals for rapid action with microbial cultures for sustained deep cleaning and freshness.

The residual action of biological cleaning products is particularly useful for eliminating the often inaccessible underlying causes of slow drain lines. Over time, domestic and institutional drains can become clogged with natural waste, grease and fat, resulting in a build-up of decaying organic material that can produce an unpleasant odour. Biological cleaning products degrade the deposits clogging the pipe, thus eliminating the problem at its source. Regular use of biological cleaners helps to prevent slow drains from becoming costly emergencies.

Safety first, naturally

Novozymes uses only the safest microorganisms for its biological technology. All of Novozymes' microbial strains are subjected to extensive safety testing.

The use of microbes circumvents the need for many of the hazardous chemicals contained in traditional cleaning products. This not only simplifies the storage and transport of cleaning products, but provides greater protection for the domestic and institutional end-user, both in general use and in the event of accidental spillages. And because the microbes contained in these cleaning products will only degrade organic waste, powerful biological cleaning products can be used without fear of damage to fixtures, fittings and fabrics. ●

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New protease beats egg

Sticky, egg-containing food residues are one of the toughest tests for automatic dishwashing detergents (ADDs). Scientists at Novozymes have developed a protease that can eliminate all trace of egg soils to deliver sparkling-clean tableware with every wash.



Egg residue presents a unique challenge to ADD manufacturers: egg contains a selection of proteins (ovoinhibitors) that inactivate traditional detergent proteases in the washing cycle, diminishing their power to remove protein-containing food soils. Novozymes has recently cracked this problem with the development of a new protease, Ovozyme® 48 T, specifically engineered to resist the ovoinhibitors contained in eggs. Ovozyme 48 T offers unique benefits, including:

- Spotless, shiny tableware every time
- Exceptional performance on egg-containing soils
- High performance, providing more space in the tablet for other ingredients

Overcoming the ovoinhibitors

In nature, the ovoinhibitors contained in egg yolk and white protect the growing chick against attack from proteases released by invading bacteria. The problem is that,

because almost all detergent proteases are derived from bacterial species, these ovoinhibitors are similarly effective in inactivating the proteases contained in dishwashing detergents. And this results in reduced cleaning performance not just on the egg residue, but on every protein-containing soil present in the same dishwasher load.

Niels Henrik Sørensen, a research scientist at Novozymes, explained to *BioTimes* that "Ovozyme 48 T is a novel engineered variant of Savinase®, one of our most successful proteases. In creating Ovozyme 48 T, we altered the protein sequence to make it resistant to inactivation by the ovoinhibitors contained in eggs. In short, we have created a very powerful protease for automatic dishwashing."

Putting it to the test

Egg soils have long been a favourite of the independent test institutes due to their stubbornness. Here, commercial ADD

soils



At independent test institutes, commercial ADD formulations are commonly put to the test on tough egg soils such as egg and milk, egg yolk and minced meat.



Samples of ADD with Ovozyme® 48 T are available from Novozymes for demonstration purposes.

formulations are commonly put to the test on tough egg soils such as egg and milk, egg yolk and minced meat. It is precisely on this soil spectrum that traditional proteases fall short of yielding the best results.

Ovozyme 48 T provides a solution. It matches the cleaning performance of conventional proteases in cycles where no egg soiling is present. But in the presence of egg residue, Ovozyme 48 T excels where traditional proteases fail - by delivering a perfectly clean and shiny result every time.

Emmanuel Petiot, Novozymes' regional European marketing manager, told *BioTimes*: "High performance results from independent test institutes are recognised as a great tool for success in the automatic dishwashing market, especially if the institutes are used by consumer associations. The key benefits of Ovozyme 48 T translate very nicely into important performance-related consumer claims, most notably the ability to deliver shiny tableware whatever the soil load."

Optimised cost performance

Until now, many ADD tablet manufacturers have been unable to take full advantage of the extraordinary cleaning power provided by enzyme ingredients. The problem is that ADD tablet formulations must fit into the small detergent dispenser to ensure that they are only released when the main washing cycle begins. Modern three-in-one ADD tablet formulations already contain pre-dosed detergent, salt and rinse aid, limiting the capacity available for the addition of enzyme ingredients. What is more, there is a growing trend for these tablets to be smaller and smaller.

Emmanuel Petiot told *BioTimes*: "Multiple traditional proteases or very high concentrations of a single traditional protease are required to overcome the ovoinhibitors present in egg-containing soil loads. It would be impossible to accommodate this quantity of enzyme in most ADD tablet formulations.

Our newest protease, Ovozyme 48 T, has an exceptionally high performance even when present in small quantities in ever smaller tablets. This not only makes it remarkably cost-effective, but will also enable our ADD tablet manufacturer customers to pack more cleaning power into their tablet formulations within the all-important size constraints." ●

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