

# The detergent that lets consumers save as they wash

Four enzymes from Novozymes help a new low-temperature detergent give the same performance as conventional detergents at normal temperatures. Wash temperatures can be cut in half.



The new detergent that Henrik Jørgensen has developed at Danlind is like nothing else sold in Europe.

According to DONG Energy, a major Danish electricity producer, Care Coldwash (*Care Koldtvasdvask* in Danish) is a detergent that can really make a difference to energy consumption in the home. Their research shows that this new powder detergent, launched in Denmark in January 2007, allows consumers to wash their laundry at half the normal temperature while obtaining a satisfactory cleaning performance. Electricity consumption is reduced by 60%, which saves roughly DKK 1 per wash (about EUR 0.13 or USD 0.18).

Not only do consumers save money, but they also contribute to reducing the release of greenhouse gases when fossil fuels are burnt to produce energy. DONG Energy has estimated that if all Danish households switched to Care Coldwash and lowered their normal wash temperatures by half, the reduction in the release of greenhouse gases would be equivalent to approximately 1% of the amount Denmark is committed to save under the Kyoto agreement. So the potential environmental impact of low-

temperature washing is substantial. The normal wash temperatures in Denmark and most other parts of Europe are 60°C (140°F) and 40°C (104°F).

"This product has attracted a lot of interest, both in Denmark and abroad, because it has been launched at the right time, when everyone is becoming conscious of global warming and energy prices are high," says Henrik Jørgensen, Laboratory Manager at Danlind and the brains behind the new product. Danlind is a Danish detergent producer based in Holstebro, where its main products are private-label detergents for laundry and dishwashing. Care products are made on behalf of Dansk Supermarked and sold in large Danish supermarket chains representing around a third of the Danish market.

Market research has shown that 70% of Danish consumers are willing to switch to a cold-water laundry detergent if it washes just as clean as an ordinary detergent.

Danlind produces about 30,000 tons of detergent a year, mainly for export. This makes it a small player in the European detergent market. As Henrik Jørgensen puts it: "Our research and development department consists of me and a part-time lab technician." He himself began as a lab technician with a background in biotechnology rather than chemistry. He has learnt about detergents on short courses and through practical work.

## Total reformulation

Given Danlind's limited R&D resources, this innovative detergent is all the more remarkable.

"Henrik Jørgensen has rethought the European detergent completely. This new detergent just doesn't compare to anything else on the market and has a completely different formulation to conventional European detergents," comments Niels Henrik Sørensen of Novozymes, a Customer Solutions Manager covering, among other areas, Scandinavia. He has worked with Danlind over the last two years and advised on the choice of enzymes for the new detergent, which contains four Novozymes detergent enzymes.

So just how did Henrik Jørgensen conduct this innovative development work almost single-handed from a small lab?

In 2002 Henrik Jørgensen went to a conference on detergents where he heard a talk by Ciba about one of its mild bleach catalysts suitable for low temperatures. This planted a seed in his head, and in 2005 he began testing samples of Ciba's product called ActinOx<sup>®</sup>, which he eventually incorporated into Care Coldwash. Around the same time, in 2004 Novozymes launched Stainzyme<sup>®</sup>, a new detergent amylase more suited than Termamyl<sup>®</sup> to low-temperature washes. He also began testing Stainzyme. In 2005 Novozymes also launched a low-temperature protease called Polarzyme<sup>®</sup>. The parts of the puzzle were beginning to fall into place for Danlind.

"To make a low-temperature detergent, you have to make four components work together: bleach, builders, enzymes and surfactants,"



Sold by Dansk Supermarked with their own label. Manufactured by Danlind with a unique formulation.

danlind

Henrik Jørgensen explains. "Finding the builder was the tricky part. We had to develop a new builder system for this detergent to work."

He succeeded in doing this in cooperation with the German company Bayer, and now has a unique system. There was a bonus, too, because this system was less aggressive than normal builders and the enzymatic performance improved.

Care Coldwash contains four different enzymes from Novozymes: Stainzyme 12 T, Polarzyme 12 T, Lipex® 100 T, and Celluzyme® 0.7 T. The actual dosage of this blend of enzymes is 3% by weight, which is twice as much compared to the other two conventional Care detergents designed for white and coloured laundry. Novozymes helped to find the optimum dose of commercial enzymes for his particular detergent formulation. Enzymes undoubtedly have a big part to play in the performance of the detergent at low temperatures, but the combination with the other components is a vital factor.

The last part of the puzzle was the choice of surfactants. To find out more, Henrik Jørgensen looked at the Japanese market to see how they formulate their low-temperature detergents. In Japan, cold washes are the norm, and Polarzyme was actually developed with the Asian low-temperature market in mind. Henrik Jørgensen is secretive about his final choice of surfactants for Care Coldwash, only revealing that it contains a blend of three surfactants, both anionic and non-ionic.

#### Wash results

Another smart idea was to apply for funding

for a research project through Danish Energy, the association of Danish energy companies. Københavns Energi (now DONG Energy) was the project leader, while the National Consumer Agency's test laboratory, which was taken over by the Technical Institute during the project, performed the wash trials.

The project started in 2005, and the aim was to carry out an unbiased study of Danlind's newly developed detergent to see how it performed at different wash temperatures. During wash trials at 20°C (68°F) and 30°C (86°F), the low-temperature detergent achieved an average level of cleanliness that was fully satisfactory in comparison to a reference powder. Since the tests, Care Coldwash has been improved a number of times, so its performance is even better today.

#### 60% electricity savings

The study also documented how much electricity can be saved by lowering the wash temperature. Savings of approximately 60% can be achieved by reducing the wash temperature from 60°C (140°F) to 30°C (86°F) and from 40°C (104°F) to 20°C (68°F). The project group estimates that an average four-person Danish family washes approximately 600 kg of clothes a year in approximately 270 washes. Changing 60°C (140°F) and 40°C (104°F) washes to 30°C (86°F) and 20°C (68°F) washes respectively gives an annual electricity consumption of 130 kWh with a saving of 95 kWh.

This project was one of four nominated for the 2007 ELFORSK annual prize for Danish energy conservation projects.

#### Sales up seven-fold

DONG Energy has given the product a helping hand by sponsoring a folder on display in stores explaining that Care Coldwash is a good choice for saving energy. DONG Energy has also sent out information folders about low-temperature detergents to all its customers.

The biggest boost to sales came in April after the product was featured on *Rabatten*, a popular Danish television programme for consumers. In a home test on clothes, Care Coldwash performed very well at 30°C (86°F). The day after the programme, sales of Care Coldwash detergents increased seven-fold!

Danlind has new customers lined up for its low-temperature detergent in the UK and Germany, and is in discussions with other potential customers in Europe. This is a premium product, and Henrik Jørgensen at Danlind is now investigating how to make a similar product at a lower price for the lower end of the market.

In Denmark, a 900 g pack of Care Coldwash retails at around DKK 28 (about EUR 3.76 or USD 5.05) and is enough for 12 washes. If a consumer can save around DKK 1 per wash in electricity, the savings amount to DKK 12 (about EUR 1.61 or USD 2.16) per pack, and that makes this premium product extremely good value for money. ●

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