

Goodbye to gums with Mannaway®

The mannanase Mannaway is what detergent manufacturers have been waiting for. It is an innovative detergent enzyme that does what other enzymes cannot do: it removes stubborn stains containing gums.



“Every high-performance detergent should contain five enzymes,” says Tommy Lykke Husum, Customer Solutions Application Manager at Novozymes, who has conducted tests on Mannaway®, seen here with Kirsten Væver Jokumsen, Senior Launch Manager for Mannaway.

Some of the most common stains on clothes are also among the most difficult to remove. These stains often contain mannan, the general term for the group of carbohydrates called galactomannans but often simply referred to as gums.

Mannan is widely used as a thickener in everyday foods and personal care products such as shampoo and body lotions. It is very hard to keep clothing free from occasional stains caused by these products, and once the stains are there, they are difficult to remove. In fact, even if the stains appear to have been washed out, the mannan is still present and may even have been distributed to otherwise clean fabrics. These invisible mannan residues on the garment act as a kind of glue and attract particles of dirt that cause white fabrics to go grey.

These problems can be solved with Mannaway, the original mannanase from Novozymes with a well-documented effect when tested in detergents around the world. For example, Mannaway has been tested in commercial European detergents at the well known Hohenstein Institute in Germany using their standard range of mannan-based stains. On a number of these Hohenstein stains, Mannaway has a significant effect on stain removal even in detergents already containing a number of enzymes, irrespective of whether they are colour detergents or bleach-containing detergents.

“A basic requirement”

“Detergent manufacturers have been waiting with great interest for a mannanase because it is regarded by many as a basic enzyme requirement for their detergents. Mannaway is not only for the high-end brands which already contain a number of enzymes. It can work equally well in a detergent that simply contains a protease or amylase,” says Kirsten Væver Jokumsen, Senior Launch Manager for Mannaway at

Novozymes. Mannaway was launched in January 2007 as an enzyme granulate. A liquid product will be available a year later.

By integrating Mannaway into a detergent formulation, a customer can make some strong brand claims such as removal of common, tough stains, better whiteness by preventing soil redeposition on white fabrics, or in-depth cleaning by removing mannan that acts as a glue for soil. Mannaway can thus improve the positioning and competitiveness of a brand.

What is mannan?

Two of the most commonly used mannans are guar gum and locust bean gum. It is surprising just how many everyday foods and personal care products contain these additives, which are classified in Europe by the E-numbers E412 and E410.

Because enzymes are highly specific, other carbohydrases such as amylases and cellulases do not recognise the structure of mannan and cannot therefore remove mannan from fabrics. In contrast, mannanases are galactomannan-specific carbohydrases, so they are able to degrade the mannan.

Fig. 1. Chocolate ice cream stain removal

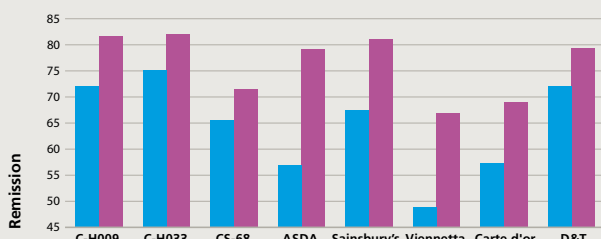
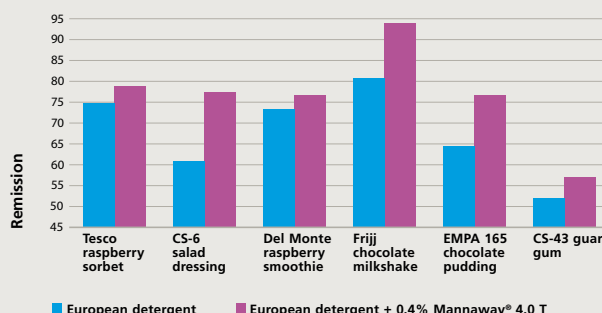


Fig. 2. Mannan stain removal

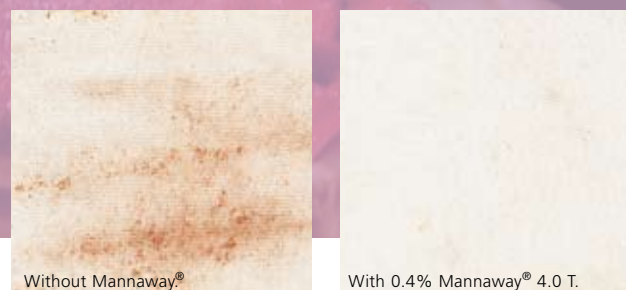


Figures 1 & 2. Mannaway® provides a significantly improved stain removal effect (high remission) in a commercial European colour powder detergent on a range of standard stains. (European washing machine, detergent dose 5 g/l, 40°C.)

■ European detergent ■ European detergent + 0.4% Mannaway® 4.0 T

Ice cream often contains guar gum and produces a troublesome stain. Not any more with Mannaway.®

FIG. 3. ANTI-REDEPOSITION EFFECT OF MANNAWAY® ON TENNIS COURT CLAY



Mannaway® prevents deposition of tennis court clay on 100% cotton fabric soaked in a mixture of commercial US detergent, 0.1% guar gum and 0.5 g tennis court clay. (300 ml detergent solution, 10 minutes, room temperature.)

Mannaway in particular has proven its ability to break down mannans. It is therefore very effective at removing stains containing guar gum or locust bean gum. In addition, it increases in-depth cleaning by removing the mannan that adheres to fabrics.

Improved stain removal

Mannaway efficiently removes stains containing mannan such as chocolate ice cream (see Figure 1), chocolate pudding, fruit sorbet, milkshake and salad dressing (see Figure 2).

The figures show the performance of Mannaway when tested in a commercially available European colour powder detergent. When dosed with 0.4% Mannaway 4.0 T, a far superior stain removal effect is clearly visible. Remission is a measure of stain removal. The higher the remission value, the cleaner the test swatch. As can be seen in Figures 1 and 2, the increases (delta) in the remission values before and after adding Mannaway are very high.

“We are not used to recording such high delta remissions in the range of 20-25. This means that there has been a significant change in the cleaning performance, and you can see this clearly with the naked eye,” says Tommy Lykke Husum, Customer Solutions Application Manager for the detergent industry at Novozymes, who has conducted tests with Mannaway.

Similar effects were observed with US detergents. Tests performed using commercial US detergents show that Mannaway can increase stain removal dramatically. In two different commercial powder detergents, a dose of as low as 0.2% Mannaway 4.0 T was able to give a far superior effect

on chocolate ice cream. When adding 0.4% Mannaway 4.0 T, an even higher level of stain removal was obtained.

Synergy with Stainzyme®

Amylases are very effective at removing stains containing starch, but by design they are ineffective at degrading mannan. Even the highly effective amylase Stainzyme from Novozymes is not able to remove chocolate ice cream containing guar gum. However, by combining Stainzyme with Mannaway, the stain-removing power of a detergent can be boosted on food stains containing both starch and mannan. When combining the two enzymes, synergy effects can be obtained. Mannaway releases the mannan, giving Stainzyme access to the starch and providing superior stain removal.

Deeper cleanness

Mannan binds strongly to the cellulose fibres in cotton fabrics due to the high affinity between the mannan and cellulose polymers. This can be demonstrated by comparing the removal effect on chocolate ice cream soiled on a cotton fabric and on a polyester fabric. Tests show that Mannaway is necessary for efficient stain removal on cotton fabric, whereas a Mannaway-free detergent can remove the ice cream stain from polyester because the mannan does not bind to it.

In addition to having a high attraction to cotton fabrics, mannan also has a gluing effect on particulate soils released during the wash cycle or subsequent wear. Mannaway removes the mannan, thus preventing soils from redepositing. Regardless of whether a colour or bleach-containing detergent is used, Mannaway makes a visible difference.

The whitening effect of Mannaway on cotton can be demonstrated with a number of different outdoor soils such as red tennis court clay.

To illustrate how Mannaway prevents soil redeposition on fabrics, swatches made of 100% cotton were treated with a commercial US detergent in the presence of guar gum and tennis court clay. After just ten minutes, it is very clear that with no Mannaway in the detergent solution, the cotton becomes heavily soiled with tennis court clay. When Mannaway is present, the guar gum is degraded, preventing the clay from gluing to the fabric. The fabric therefore remains white (see Figure 3).

“Mannaway definitely has a whitening effect. Without Mannaway white shirts tend to become more and more grey after every wash,” comments Tommy Lykke Husum. “Mannaway is truly special. You can’t match its performance with other enzymes and you can really see the difference. Every high-performance detergent should contain five enzymes.”

Proteases, amylases, cellulases and lipases are regarded as four fundamental types of enzyme with clear benefits for detergents. Now there is a fifth. ●

FOR MORE INFORMATION
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