

Novozymes is the biotech-based world leader in enzymes and microorganisms. Using nature's own technologies, we continuously expand the frontiers of biological solutions to improve industrial performance everywhere.

Ceremix® Plus helps to cut costs without cutting quality	3
More than just technical service	4
Maximising juice yield and press capacity in a highly competitive environment	6
Plectasin, a potential new weapon against antimicrobial resistance	8
Novozymes helps shrimp farmers improve profits	10
Apliena has the power to change flour	12



6

JOIN THE INDUSTRIAL EVOLUTION

Enzymes slowly but surely replacing malt

The sixth in a series of short articles about how biological solutions have driven the evolution of industry forwards.

The choice of raw material for distilled alcoholic drinks differs around the world, but whether it is maize (corn), potatoes, wheat or rice, starch is the basic substrate. Starch has to be broken down by enzymes into fermentable sugars that yeast can transform into alcohol.

In most countries, malt has been totally displaced from distilling operations by industrial enzymes.

The advantages of using enzymes instead of malt are straightforward: it is more cost-efficient. A few litres of enzyme preparation can replace 100 kg of malt, making enzymes much easier to handle and store. Enzymes are supplied with a uniform, standardised activity, so distilling is more predictable and there is a better chance of obtaining high yields from every fermentation.

Unlike industrial enzymes, the quality of malt can vary from year to year and batch to batch. Finally, industrial enzymes perform better than some of the corresponding enzymes found naturally in malt due to their specificity and heat stability.

Given these advantages, it is hardly surprising that commercial enzymes have

replaced malt in all but the most conservative parts of the distilling industry.

A similar change is slowly taking place in the brewing industry, where malt has a more central role. After all, malt has been described as "the soul of the beer". Enzymes are used to replace a portion of the malt. By using enzymes, it is possible to change the mix of raw materials from 70% malt and 30% adjuncts (e.g. corn grits or rice) to 50% malt, 20% unmalted barley and 30% adjuncts, giving considerable economic savings. The article on the opposite page provides more information. In the near future, brewing enzymes could make it possible to replace even higher proportions of malt while still producing a high-quality premium beer. ●

Published by Novozymes A/S

Customer Communications

BioTimes® is distributed four times annually (in March, June, September and December) in English, Spanish, Portuguese and Chinese.

Vol. XXI, No. 1, 2006. Total circulation: 9,800

Address

Customer Communications, Novozymes A/S,
Krogshøjvej 36, 2880 Bagsvaerd, Denmark
Tel.: +45 8824 9999
Fax: +45 8824 9998
E-mail: biotimes@novozymes.com
Internet: www.novozymes.com/biotimes

Editor

Susanne Strand

Co-editors

Peter Goddard, Andrea Morgan and Brian Parsons

Copyright

Reproduction of articles from this magazine is permitted with acknowledgement of source. © Novozymes A/S. March 2006

Translation and proofreading

Borella projects

Design and graphic production

Datagraf Auning AS

Next issue

June 2006

Photos

Willi Hansen, Piotr & Co., Ray Strawbridge and Novozymes

Paper

MultiArt Silk, a totally chlorine-free (TCF) paper that is made partly from hardwood pulp processed with Novozymes enzymes.

Novozymes A/S accepts no responsibility for any errors or omissions in *BioTimes* or any consequences of such. Opinions expressed in this magazine are not necessarily shared by the publishers.



Subscriptions: Free subscription is available for customers and business associates. Please register via Internet at www.biotimes.com or write to the address on the left, stating the language version you wish to receive.