
Enzymes in Brewing

From Novozymes

 **Univar**Solutions

Enzymes in Brewing

Enzymes are natural catalysts that speed up critical steps in the brewing process. Enzymes have been a natural part of brewing for thousands of years. Today, innovative brewers are using enzymes to develop their business beyond traditional beer boundaries. With enzymes, brewers can create new tastes and claims, maintain consistent production and premiumize their offerings to meet new consumer expectations.



Benefits

FOCUS AREAS	NOVOZYMES CONCEPTS	BREWERY BENEFITS
Improve total production capacity and efficiency	Faster throughput and increased extract Faster maturation and fermentation Cost-efficient cereal cooking	<ul style="list-style-type: none"> Ensured process predictability - More brews/week Increased brewery efficiency and productivity Reduced maturation time Optimal starch extraction and shorter mashing time
Cost reduction and/or cost leadership	Raw material cost savings Cost-efficient cereal cooking Faster maturation and fermentation	<ul style="list-style-type: none"> Reliable process using any malt and adjuncts - Lowest raw material costs through maximal use of adjunct Simple and reliable process using adjuncts Reduced fixed costs
Ensure consistent beer quality	Faster throughput and increased extract Raw material cost savings Faster maturation and fermentation Improved attenuation control	<ul style="list-style-type: none"> Ensure predictable malt behavior Ensure consistent processes and yields Elimination of diacetyl off-flavors Ability to achieve a specific attenuation goal
Keep pace with consumer trends	Improved attenuation control	<ul style="list-style-type: none"> Extend product branding to "low-carbohydrate" beers Extend product branding to "light" beers Production of special beers

Enzyme Solutions for Brewing

COST-EFFECTIVE CEREAL COOKING		
RECOMMENDED PRODUCTS	BENEFITS	MAIN ENZYME ACTIVITIES
Termamyl® SC 4X	<ul style="list-style-type: none"> Faster and more consistent liquefaction Lower mash viscosity, resulting in easier wort production 	α-amylase
Termamyl® SC DS	<ul style="list-style-type: none"> No risk of resistant or retrograded starch formations, or insufficient saccharification 	
Termamyl® BrewQ	<ul style="list-style-type: none"> Reduced processing costs through more efficient liquefaction Improved flexibility in the use of various cereal grain adjuncts 	
Termamyl® Classic	<ul style="list-style-type: none"> Reduced energy consumption due to lower temperatures when handling decoction mashes 	

EFFICIENT WORT SEPARATION AND BEER FILTRATION

RECOMMENDED PRODUCTS	BENEFITS	MAIN ENZYME ACTIVITIES
Ultraflo® Max	<ul style="list-style-type: none"> Minimal fluctuation in the brewing process Consistently fast wort separation Higher brewhouse yield and efficiency Longer filtration cycles and lower filtration costs Allows brewing at higher gravity 	β-glucanase
Ultraflo® XL		Cellulase
Ultraflo® Core		Xylanase

ATTENUATION CONTROL AND LIGHT BEER PRODUCTION

RECOMMENDED PRODUCTS	BENEFITS	MAIN ENZYME ACTIVITIES
Attenuzyme® Pro	<ul style="list-style-type: none"> Consistent attenuation control regardless of raw material variability or process fluctuation Produces wort that enables highly attenuated beers Potential for shorter mashing times and lower enzyme dosage 	Glucoamylase
Attenuzyme® Core		Pullulanase
Attenuzyme® Clip		α-amylase
Fungamyl® BrewQ		
AMG® 300 L BrewQ		

RAW MATERIAL OPTIMIZATION

RECOMMENDED PRODUCTS	BENEFITS	MAIN ENZYME ACTIVITIES
Ceremix® Flex	<ul style="list-style-type: none"> Enables the use of adjuncts in different ratios and allows the sourcing of locally grown raw materials with varying qualities 	Selected combination of different enzymes
Ceremix® Core Sorghum		
Ondea® Pro		
Ceremix® Plus MG		
Ceremix® 2XL		
Ceremix® 6X MG		

FERMENTATION CONTROL WITH FAN OPTIMIZATION

RECOMMENDED PRODUCTS	BENEFITS	MAIN ENZYME ACTIVITIES
FAN Boost	<ul style="list-style-type: none"> FAN control for consistent yeast growth and optimal fermentation FAN optimization in high barley/adjunct brewing Improvement of mash lautering/filtration Yield improvement 	Protease
Neutrase® 0.8L BrewQ		

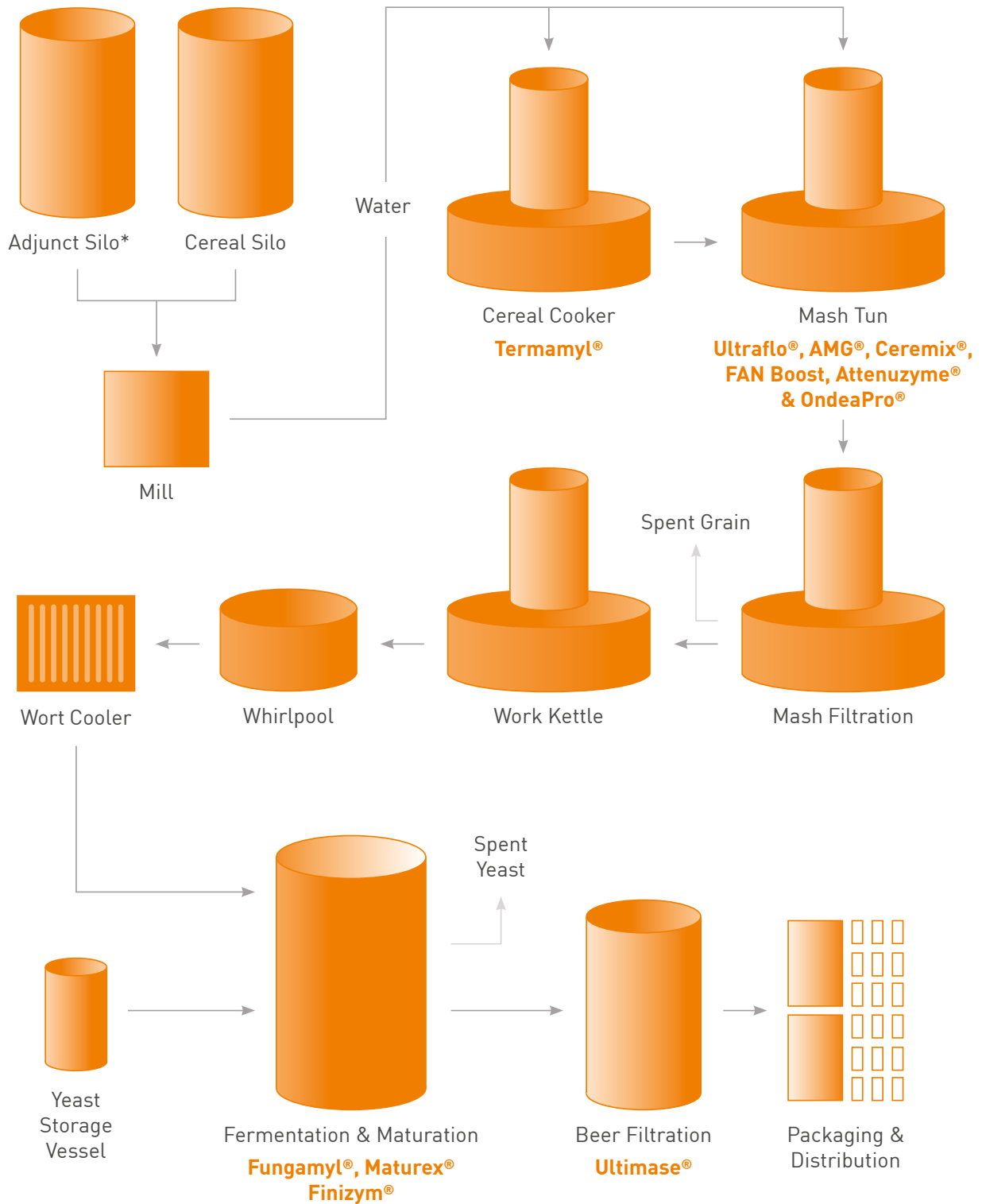
DIACETYL CONTROL

RECOMMENDED PRODUCTS	BENEFITS	MAIN ENZYME ACTIVITIES
Maturex® Pro	<ul style="list-style-type: none"> Consistently low levels of diacetyl in the final beer Shorter maturation time leading to higher capacity utilization Compensates for seasonal fluctuations in sales Lower energy consumption Leaner process conditions for low alcohol beers 	α-acetolactate - decarboxylase

MEMBRANE CLEANING

RECOMMENDED PRODUCTS	BENEFITS	MAIN ENZYME ACTIVITIES
Ultimase® MFC	<ul style="list-style-type: none"> Reduced operational costs Increased lifespan of membrane cartridges Regeneration step easily integrated into CIP automation programs 	β-glucanase Cellulase

BREWING PROCESS



* Adjunct Silo – unmalted cereals (Barley, Wheat, Maize (Corn), Rice etc.)



Contact:

For more information
call us on +1 800.531.7106
or visit UnivarSolutions.com/Food

© 2021 Univar Solutions Inc. All rights reserved. Univar, the collaboration insignia, and other identified trademarks are the property of Univar Solutions Inc. or affiliated companies. All other trademarks not owned by Univar Solutions Inc. or affiliated companies that appear in this material are the property of their respective owners. The information contained herein cannot be changed without notice and you should contact the distributor to confirm. Read and follow the Product Label & Safety Data Sheet ("SDS") for your health. All information is based on data obtained from the manufacturer or other recognized technical sources. Univar Solutions Inc. and its affiliates ("Univar") provides this information "as is" and makes no representation or warranty, express, or implied, concerning the accuracy or sufficiency of the information and disclaims all implied warranties. Univar is not liable for any damages resulting from the use or non-use of the information and each Univar affiliate is responsible for its own actions. The Customer is responsible for determining whether products and the information in this document are appropriate for Customer's use and for the adherence to the legal and regulatory environment and constraints within which the Customer operates in. Any information provided by Univar cannot be construed as a permission to use any product or process in breach of existing patents. All transactions involving this Product(s) are subject to Univar's standard Terms and Conditions, available at www.univarsolutions.com or upon request. 000012790 - Q1 2021. PC-NAM-FI-0043V-0321