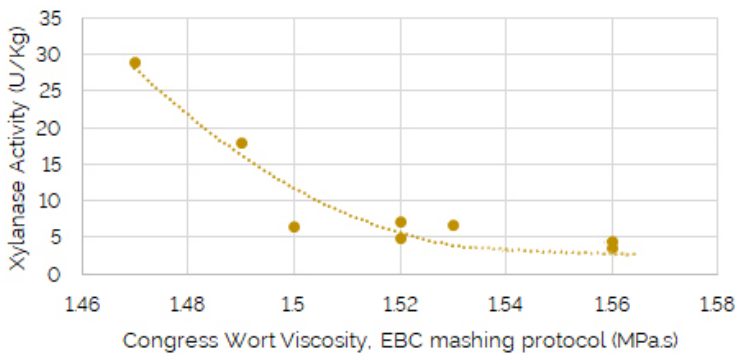


XYLANASE ACTIVITY: UNLOCKING WORT PERFORMANCE IN BEER PRODUCTION

In a new study published in the *Journal of Cereal Science* ([Mangan et al, 2018](#)), Megazyme collaborated with esteemed brewing scientist, Dr Evan Evans, to analyse xylanase activity across a range of malt samples, revealing an impressive degree of negative correlation between xylanase activity and wort viscosity.

Relationship between Congress Wort Viscosity and Xylanase Activity



Many parameters play a significant role in wort and beer viscosity, e.g. β -glucan content and β -glucanase activity.

However, results highlighted in this study indicate that the measurement of **xylanase activity** is a functional test that can provide a **meaningful insight into wort/beer viscosity and filterability**.

Most brewers and maltsters do not routinely measure xylanase activity. However, convenient automatable assays are available commercially for breweries of any size.

This study measured xylanase using Megazyme's **XyLX6** method, which employs a user-friendly colourimetric substrate exclusive to Megazyme. See overleaf for further details.

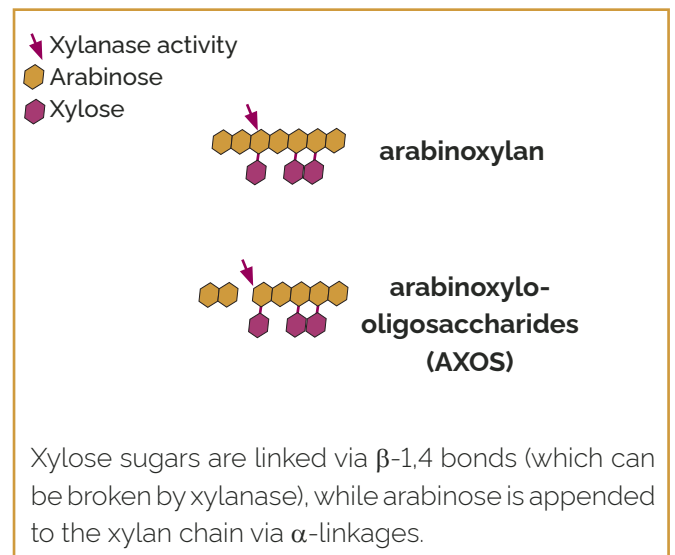
How xylanase affects wort

During malting, barley releases **xylanase**, an enzyme that breaks down arabinoxylan. After β -glucan, **arabinoxylan** is the second most abundant polysaccharide in barley endosperm cell walls. Wheat - often used as an adjunct in beer-making - has an even higher arabinoxylan content.

In brewing, xylanase has an important role to play in ensuring that as little arabinoxylan as possible remains in the finished beer so that starch-hydrolysing enzymes can access and break down starch. The presence of arabinoxylan is associated with:

- high wort viscosity
- poor wort filterability, and
- formation of undesirable hazes.

However, xylanase is found at very **low concentrations** in malts and becomes even scarcer by the time malts reach the mashing tun: xylanase exhibits **poor thermostability**, with a portion becoming deactivated during kilning.



MEASURING XYLANASE ACTIVITY IN BREWING: HOW TO USE THE RESULTS

Using the results of xylanase activity analysis

By measuring xylanase activity during the manufacturing process, brewers may:

1. Identify a need for **exogenous enzyme preparations** where activity is low. Where xylanase activity is already high, xylanase measurement prevents waste of exogenous enzymes that might otherwise have been added 'blindly'.
2. Recognise likelihood of filterability issues, allowing brewers to **predict throughput** more accurately and **adapt filtration processes** to suit a more viscous wort.
3. Gain an insight into the content of their malts e.g. discrepancies between expected and actual malt characteristics. This may influence their **future choice of malt variety** as they seek to optimise and standardise their product.

Thus, by understanding xylanase activity in their worts, brewers can make real-time adjustments that maximise process efficiency and guarantee the flavour and characteristics of the final product .

Measuring malt enzyme activities with Megazyme

Megazyme offers a full suite of assay kits for the analysis of six malt enzymes, employing an optimised 'one extraction for all' preparation method.







Our kits measure starch-degrading enzymes α -amylase (**K-CERA**), β -amylase (**K-Beta3**), and limit-dextrinase (**K-PullG6**) as well as cell wall enzymes β -glucanase (**K-MBG4**), cellulase (**K-CellG5**) and xylanase (see table below).

XylX6: The most advanced and accurate method for measurement of xylanase

Available in our **K-XylX6 Assay Kit**, our novel XylX6 reagent for the measurement of xylanase (i.e. *endo*-1,4- β -xylanase) contains two components: xylanase substrate and β -xylosidase.





Incubation of the XylX6 substrate with a malt xylanase generates a colourimetric oligosaccharide that is rapidly hydrolysed by β -xylosidase to release 4-nitrophenol in solution. This means **total convenience for the analyst** as the rate of formation of 4-nitrophenol (a coloured species that can be detected using a UV spectrophotometer) is directly related to the malt xylanase activity present.



Product Code	Assay for Enzyme Activity	Assays per Kit	Price per Assay	Kit Price
Assay Kits and Reagents				
K-XylX6 C P	<i>endo</i> -Xylanase Assay Kit (XylX6 method) - Completely specific for <i>endo</i> -xylanase - Stable reagents (> 4 years) - Well suited to automation - Standard included	 100	€ 2.04	€ 204
		 200	€ 1.02	
		 200	€ 1.53	€ 306
		 400	€ 0.77	
Colourimetric Substrate Tablet Tests				
T-XAX C P	Xylazyme AX (60 mg) - Convenient tablet test formulation - Not suited to automation	 200	€ 1.26	€ 252
		 1000	€0.99	€ 988

Key to Icons

Assay Format

-  manual spectrophotometer
-  auto-analyser

Extract Purity

-  suitable for crude extract
-  suitable for purified extract

Discover the full range at www.megazyme.com >>