Codexis Announces Next Generation CodeXyme® Cellulase Enzymes with Leading Performance

March 12, 2013

Compared to prior generations, CodeXyme® 4 and CodeXyme® 4X significantly reduce the cost of cellulosic sugar production for biofuels and bio-based chemicals

REDWOOD CITY, Calif. -- (Revised Version May 1, 2013; Original Version March 12, 2013) -- Codexis, Inc. (NASDAQ: CDXS), a developer of engineered enzymes for pharmaceutical, biofuel and chemical production, announced today the launch of CodeXyme® 4 and CodeXyme® 4X cellulase enzyme packages for use in producing cellulosic sugar for production of biofuels and bio-based chemicals.

Codexis' latest generation of advanced cellulase enzymes, CodeXyme® 4 for dilute acid pretreatments and CodeXyme® 4X for hydrothermal pretreatments, exhibits excellent performance, converting up to 85% of available fermentable sugars at high biomass and low enzyme loads. Combined with high strain productivity using the CodeXporter® enzyme production system, this allows for a cost-in-use that the company believes will be among the lowest available once in full-scale commercial production.

CodeXyme® 4 increases performance 10-20% over Codexis' last generation product, CodeXyme® 3, measured by the amount of glucan converted into C_6 fermentable sugar. For pre-treatments with unconverted xylan, CodeXyme® 4X maintains the same high C_6 sugar activity while having additional C_5 sugar conversion.

"After four years of development using our CodeEvolver® directed evolution technology platform, we are proud to announce that our high-performing CodeXyme® cellulases are broadly available for the first time," said John Nicols, Chief Executive Officer of Codexis. "CodeXyme® has been tested against other commercially-available cellulases and we have found the performance to be equal or better than alternative enzymes, across various feedstocks and pre-treatment types. We expect CodeXyme® cellulase to deliver significant cost savings and yield improvements for industrial-scale production of cellulosic sugars."

Leading Enzyme Performance

During the past several months, CodeXyme® cellulase has been tested on a variety of feedstocks and pre-treatments, including corn stover, corn cobs, sugarcane bagasse, cane straw, wheat straw and rice straw. In all cases, CodeXyme® 4 and 4X have been found to convert 75 – 85% of glucan and xylan into C6 and C5 sugars, at 10 – 15g enzyme per kg of glucan. With consistently high sugar conversion, customers are able to convert more sugar into high-value biofuels and bio-based chemicals.

In a Codexis-sponsored third-party test performed by Chemical Engineering Research Consultants in Toronto, Canada, CodeXyme® 4 cellulase performed comparably or better than other leading enzymes. The study compared the conversion of glucan to C6 sugars on dilute-acid pre-treated corn stover, using leading commercial enzyme products at their optimal pH and temperature. CodeXyme® 4 was found to convert the same or more glucan at the same or lower enzyme load as competing cellulase packages.

In addition, Codexis commissioned a 2012 U.S. Department of Energy's National Renewable Energy Laboratory (NREL) study of CodeXyme® 3, Codexis' prior generation cellulase package. In this study, NREL measured the ability of CodeXyme® 3 cellulase to convert cellulose into glucan at CodeXyme's optimal pH of 5.5 and temperature of 55°C, with dilute acid pretreated corn stover as the substrate. In a previously published NREL study (McMillan et al., Comparative Performance of Pre-commercial Cellulases Hydrolyzing Pretreated Corn Stover, *Biotechnology for Biofuels* 2011, 4:29), NREL measured the hydrolysis performance of 2009-10 enzyme packages from Novozymes, DuPont, DSM and Verenium on the same dilute-acid corn stover used in the 2012 CodeXyme® 3 study. The McMillan study was conducted at a pH of 5.0 and temperature of 50°C. Based on Codexis' comparison of the results of the 2012 NREL study of CodeXyme® 3 with the results of the McMillan study, Codexis concluded that CodeXyme® 3 performed equally or better than the enzyme packages described in the McMillan study.

Commercial and Manufacturing Plan

In September 2012, Codexis established a robust applications capability and has since sold CodeXyme® 4 and 4X to over a dozen potential partners and customers at lab and pilot scale. CodeXyme® cellulase has been used successfully to hydrolyze biomass pre-treated with both acid-based and hydrothermal methods, as well as in sequential and simultaneous hydrolysis and fermentation.

Codexis is scheduled to scale up its novel CodeXyme® 4X cellulase strain at commercial scale in the second quarter of this year. CodeXyme® 4X cellulase will also be used in pilot production of bio-based CodeXol™ detergent alcohols in collaboration with Chemtex in Rivalta, Italy by mid-year.

Upcoming Press Conference at the World Biofuels Conference in Rotterdam, The Netherlands

Dave Anton, Codexis' Senior Vice President, Bioindustrials, will discuss CodeXyme® cellulase today, March 12, 2013 at the World Biofuels Conference in Rotterdam, The Netherlands. The briefing will be held at 1pm (CET) in the Blue Room of the Beurs-World Trade Center.

Learn more about CodeXyme® cellulase at www.codexis.com/codexyme.

About Codexis, Inc.

Codexis, Inc. engineers enzymes for pharmaceutical, biofuel and chemical production. Codexis' proven technology enables scale-up and implementation of biocatalytic solutions to meet customer needs for rapid, cost-effective and sustainable process development – from research to manufacturing. For more information, see www.codexis.com.

CodeXyme®, CodeEvolver®, CodeXporter® and CodeXol™ are trademarks or registered trademarks of Codexis.

Forward-Looking Statements

This press release contains forward-looking statements relating to ability of Codexis' CodeXyme® cellulase enzymes to significantly improve yields and reduce the cost of cellulosic sugar production for biofuels and bio-based chemicals, the potential commercial scale-up of Codexis' CodeXyme® cellulase enzymes in the second quarter of 2013, the scheduled use of Codexis' CodeXyme® cellulase enzymes in our CodeXol™ detergent alcohol demonstration facility by mid-2013 and Codexis' expectation that CodeXyme's first full-scale commercial facility will result in CodeXyme® cellulase becoming the lowest cost-in-use enzyme package. You should not place undue reliance on these forward-looking statements because they involve known and unknown risks, uncertainties and other factors that are, in some cases, beyond our control and could materially affect actual results. Factors that could materially affect actual results include the success of Codexis' CodeXyme® cellulase enzymes program being heavily dependent on Codexis' ability to secure third-party funding; the feasibility of the commercialization of biofuels derived from cellulose; Codexis' ability to maintain license rights to a commercial scale expression system for enzymes that convert cellulosic biomass to sugars; fluctuations in the price of and demand for certain commodities may reduce demand for Codexis' technology; Codexis' biofuel business opportunities may be limited by the availability, cost or location of feedstocks; and changes to existing biofuel regulations and policies may present technical, regulatory and economic barriers to demand for Codexis' CodeXyme® cellulase enzymes. Additional factors that could materially affect actual results can be found in Codexis' Quarterly Report on Form 10-Q for the period ended September 30, 2012 filed with the Securities and Exchange Commission on November 7, 2012, including under the caption "Risk Factors." Codexis expressly disclaims any intent or obligations to update these forward-looking statements, except as required by law.

Source: Codexis, Inc.

For Codexis, Inc.
Media
Jemma Connor, +44 161 359 3255
jemma.connor@notchcommunications.co.uk
or
Investors
Paul Cox, 212-362-1200
ir@codexis.com