Contribution ID : **7** Type : **not specified**

Short Talk 3, Viktoria Bågenholm - Two GH26 β-mannanases from Bacteroides ovatus: structure and role in galactomannan degradation

Wednesday, 9 October 2019 16:25 (20)

Galactomannans are hemicelluloses composed of a β-1,4-linked mannose backbone with α-1,6-galactose substitutions.
They are part of our diet as seed storage polysacchardies and food thickeners and are utilised by several human gut bacteria (1). One such bacteria, Bacteroides ovatus, contains a gene cluster encoding two glycoside hydrolase family 26 β-mannanases, BoMan26A and BoMan26B (2). BoMan26B generates a range of product lengths upon mannan hydrolysis, prefers longer substrates and is less restricted by galactose side-groups than BoMan26A, which mainly generates mannobiose (3,4). The results suggest that BoMan26B performs the initial attack on galactomannan, generating oligosaccharides that are further hydrolysed by BoMan26A. Crystal structures of these two enzymes reveal the structural basis for their biochemical differences. BoMan26B, with galactosyl-mannotetraose bound in subsites −5 to −2, has an open and long active site cleft with W112 in subsite −5 concluded to be involved in mannosyl interaction (4). Moreover, K149 in the −4 subsite
interacted with the galactosyl side-group of the ligand, which may indicate a preference in for substituted manno-oligosaccharides (4). BoMan26A instead revealed a narrow active site cleft that is restricted in one end by a loop, explaining its preference for generating shorter products (6).

1. Kulcinskaja, E., A. Rosengren, R. Ibrahim, K. Kolenova and H. Stalbrand Appl Environ Microbiol (2013). 79: 133-140
2. Martens, E. C., E. C. Lowe, H. Chiang, N. A. Pudlo, M. Wu, N. P. McNulty, D. W. Abbott, B. Henrissat, H. J. Gilbert, D. N. Bolam and J. I. Gordon PLoS Biol (2011). 9: e1001221
3. Bågenholm, V., S. K. Reddy, H. Bouraoui, J. Morrill, E. Kulcinskaja, C. M., Bahr, O. Aurelius, T. Rogers, Y.Xiao, D. T. Logan, E. C. Martens, N. M. Koropatkin and H. Stålbrand J Biol Chem (2017). 292: 229-243
4. Bågenholm, V., M. Wiemann, S. K. Reddy, A. Bhattacharya, A. Rosengren, D. T. Logan and H. Stålbrand J Biol Chem (2019). 294: 9100-9117

Presenter(s) : BÅGENHOLM, Viktoria (Lund University)

Session Classification : Keynotes and Short talks 2