GH62 arabinofuranosidases: Structure, function and applications

Motivated by industrial demands and ongoing scientific discoveries continuous efforts are made to identify and create improved biocatalysts dedicated to plant biomass conversion. α-1,2 and α-1,3 arabinofuranosyl specific α-l-arabinofuranosidases (EC 3.2.1.55) are debranching enzymes catalyzing hydrolytic release of α-l-arabinofuranosyl residues, which decorate xylan or arabinan backbones in lignocellulosic and pectin constituents of plant cell walls. The CAZY database classifies α-l-arabinofuranosidases in Glycoside Hydrolase (GH) families GH2, GH3, GH43, GH51, GH54 and GH62. Only GH62 contains exclusively α-l-arabinofuranosidases and these are of fungal and bacterial origin. Twenty-two GH62 enzymes out of 223 entries in the CAZY database have been characterized and very recently new knowledge was acquired with regard to crystal structures, substrate specificities, and phylogenetics, which overall provides novel insights into structure/function relationships of GH62. Overall GH62 α-l-arabinofuranosidases are believed to play important roles in nature by acting in synergy with several cell wall degrading enzymes and members of GH62 represent promising candidates for biotechnological improvements of biofuel production and in various biorefinery applications.