Supplementary Material

Peroxidases bound to the growing lignin polymer produce natural like extracellular lignin in a cell culture of Norway spruce

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PaPx16 1 MAQIKHSFLGLQFSLVITGLALMLWITVDQASCNGLSHLFFYYKSCPKQAIAIKSVVE 60
PaPx17 1 MAQIKHSFLGLQFSLVITGLALMLWITVDQASCNGLSHLFFYYKSCPKQAIAIKSVVE 60
PaPx18 1 -------------------------------MVFTVCS-ITHTANQLSSTFFAYAQSCPALSVKAAVR 37
CpAPX 1 ----------------------------------------------MALFLFALFGASYAQTLTEYFDCTPLRNVFQEVK 39
PaPx4 1 ------------------------MRMLCIVLCLCISSS---INNAHAGLSTSTYVKLCPALSVKAAVN 46
PaPx5 1 -------------------------------MMRRTLVCIGMVALLCSCININAVQLSSTFYAKPVQSVSKTKV 49

PaPx16 61 DAVRKEAGMAASSLLRLHDFCQVKGCDGSILLDDTSSTREKANPSRNSVRFVGVQVDQI 120
PaPx17 61 DAVRKEAGMAASSLLRLHDFCQVKGCDGSILLDDTSSTREKANPSRNSVRFVGVQVDQI 120
PaPx18 38 QAVANEKRGASSLLRLHDFCQVNGCDGSLVLDSTITGKETKANPSRNSVRFVGVQVDQI 97
CpAPX 40 PAIETDIRAGKLRLHDFQVQGNGCDGSLLEDAPGIDSLNVGLNGLQGLEIVDAI 98
PaPx4 47 KAVNEKRGGASSSLHLDFCQVNGCDGSLIDNSFTETKANPSRNSVRFVGVQVDQI 106
PaPx5 50 QAVANEKRGASLRLHDFCQVNGCDGSLIDNSFTETKANPSRNSVRFVGVQVDQI 109

PaPx16 121 KCELEKCAVGVSADILAVAARDSVGFSGGEVKNLLGRRDNSRSASKGANGDIPFAGNS 180
PaPx17 121 KCELEKCAVGVSADILAVAARDSVGFSGGEVKNLLGRRDNSRSASKGANGDIPFAGNS 180
PaPx18 98 KSNVEKACGVSADILAIARSDVVELGPGSWTVMLGRRDNSRSASKGANGDIPFAGNS 157
CpAPX 99 KAAVESECVPVSADILAVALLASVSGQGDSWTVMLGRRDNSRSASKGANGDIPFAGNS 157
PaPx4 107 KTQVEAACSAGVSADILAIARSDVVELGPGSWTVMLGRRDNSRSASKGANGDIPFAGNS 166
PaPx5 110 KTQVEAACSAGVSADILAIARSDVVELGPGSWTVMLGRRDNSRSASKGANGDIPFAGNS 169

PaPx16 181 THQULETKFRQGLNNVDMVLSGAGHIGLARCSFQKARLQNTVNGKPDPTLDYYLKH 240
PaPx17 181 THQULETKFRQGLNNVDMVLSGAGHIGLARCSFQKARLQNTVNGKPDPTLDYYLKH 240
PaPx18 158 SLSNLISLFQAOGLSTKEMVALLSAGHIGQCARVPNRAHYN---------------NIDSTSTS 210
CpAPX 158 TLEPLKQKFAEGLDSTDLVAGPSAGHIGSRCCMFSGRFVSNFQPDPLPAEYRQE 217
PaPx4 167 NLSALLISFSFTAHGLSTKDLVSAHGHIGQCARCTTFARJYNES---------------NIDSTSFAT 219
PaPx5 170 SLSNLISFSQNHLSTKDLVSAHGHIGQSCAFFRTRYYNES---------------NINAATFAT 222

PaPx16 241 LRAVCQPQG-TDDQTILPLVPTPVPFRINIDYNYDVAGKLLASDIEYLSTGKSRVGLV 299
PaPx17 241 LRAVCQPQG-TDDQTILPLVPTPVPFRINIDYNYDVAGKLLASDIEYLSTGKSRVGLV 299
PaPx18 211 LQSKCPSGAAGSDSNLPSLDYVPTAFDKNSYSLKSKGLNLSDQELFNG--GSTDQV 268
CpAPX 218 LREACTDG----------EVTRVFDPPTLTPTDKNYTNYLQAADDLTSQVLETQGQATIEV 272
PaPx4 220 VKSSCPQAS--GDNLSLPSDLATPTDFKNTSYTDLNRRGLLSDQQLFS----GTSNQV 275
PaPx5 223 VKNPCPSQAS--GDNLSLPSDLVPTDFKNTSYKSNLKQKGKLLSDQQLFS----GSTDQV 278
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Supplementary Figure 1. Sequence alignment of the cloned peroxidase sequences PapPx16 (AM293546.1), PaPx17 (AM293547.1) and PaPx18 (AM293548.1) with spruce peroxidases PaPx4 (AJ809339.1) and PaPx5 (AJ809340.1), and the anionic pectin-binding peroxidase CpAPX (Y17192.1) from zucchini. In the latter, the pectin-binding arginine residues are shown in bold. The sequenced peptides are indicated in colour.