

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	MAQIKHSPGLTLQFLSVLITGLALMLWIQTVDQAQSCNGLSHHFYKSCPKAQAIKSVVE	60
PaPx17	1	MAQIKHSPGLTLQFLSVLITGLALMLWIQTVDQAQSCNGLSHHFYKSCPKAQAIKSVVE	60
PaPx18	1	-----MVFIVCS-IHTTANGQLSSTFYAQSCPTALSVVKA AVR	37
CpAPX	1	-----MALLFFLALLFGASYAQLTETFYDQTCPRLPNIVRQEVK	39
PaPx4	1	-----MKTLCIVLVCVLCISS-INNAAHGQLTSTFYNKLCPTALSIVKAAVN	46
PaPx5	1	-----MMMRTLVCIGVMAVLLCSININAVNGQLSSTFYAKSCPVRVQSIVKTVVK	49
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PaPx16	61	DAVRKEAGMAASLLRLHFHDCFVKGCDGSILLDDTSSFTREKTANPNRNSVRGFGVVDQI	120
PaPx17	61	DAVRKEARMAASLLRLHFHDCFVKGCDGSILLDDTSSFTGECTANPNRNSVRGFGVVDQI	120
PaPx18	38	QAVANEKRMGASLLRLHFHDCFVNGCDGSVLLDDSSITGECTANPNANSARGFDVIDTI	97
CpAPX	40	RAIETDIRAGAKLIRFHFHDCFVQCGDGSVLEDPAGIDSELNGLG-NLGIQGLEIVDAI	98
PaPx4	47	KAVNNEKRMGASLLRLHFHDCFVNGCDGSILLDDNSTFTGECTALPNANSVRGFDVIDTI	106
PaPx5	50	QAVAKEKRMGASLRLHFHDCFVNGCDGSILLDDNATFTGECTAGPNANSARGFDVIDTI	109
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PaPx16	121	KCELEKACPGVVSCADILAVAARDSVGFSGGPFWKVLLGRRDSRSASKSGANNDIPGPNS	180
PaPx17	121	KSELEKACPGVVSCADILAVAARDSVGFSGGPFWKVLLGRRDSRSASKSGANNDIPGPNS	180
PaPx18	98	KSNVEKACSGVVSCADILAI SARDSVVELGGPSWTVM LGRRDSTTASKNGANNIPPTS	157
CpAPX	99	KAAVESECPGVVSCADVLALAAKQSV DVQGGPSWRVLFGRDRSRTANRTGA-DELPSPFE	157
PaPx4	107	KTQVEAACSGVVSCADILAI VARDSV VQLGGPTWTVLLGRRDSTTASLSAANNIPSPAS	166
PaPx5	110	KTQVEAACSGVVSCADILTIAARDSIVELQGPWTWV MLGRRDSTTASLSAANNIPSPAS	169
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PaPx16	181	THQTLETKFQRQGLNVVDLVALSGAHTIGLARCSSFKARLYNQTVNGKPDPTLDTTYLKH	240
PaPx17	181	THQTLETKFQRQGLNVVDLVALSGAHTIGLARCSSFKARLYNQTVNGKSDPTLDTTYLKH	240
PaPx18	158	SLSNLI SLFQAQGLSTKEMVALSGGHTIGQARCVNFRAHIYNET-----NIDSTYSTS	210
CpAPX	158	TLEPLKQKFEALGLDSTDLVAPSGAHTFGRSR CMFFSGRFSNFNGTGQDPALDPAYRQE	217
PaPx4	167	NLSALISSFTAHLSTKDLVALSGGHTIGQARCTTFRARIYNES-----NIDTSFATS	219
PaPx5	170	SLSTLITSFQNHGLSTKDLVALSGAHTIGQSRCAFFRTRIYNES-----NINAAFATS	222
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PaPx16	241	LRAVCPQTG-TDDNQTTPLDPVTPIRFDINYYDNV VAGKGLLASDEILYSTKGSRTVGLV	299
PaPx17	241	LRAVCPQTG-TDDNQTTPLDPVTPIKFDIDYYDNV VAGKGLLASDQILYSTKGSRTVGLV	299
PaPx18	211	LQSKCPSTAGSDSNLSPLDYVTPPTAFDNKYYSNLKSKKGLLHSDQQLFNG--GSTDSQV	268
CpAPX	218	LERACTDG-----ETRVNFDPTTPTFDKNYYTNLQANRGLLTS DQVLFSTPGADTIEIV	272
PaPx4	220	VKSSCPSAG--GDNTLSPLDLATPTTFDKNYYTDLGNRGLLHSDQQLFSG--GSTNSQV	275
PaPx5	223	VKPNCPASAG--GDNTLSPLDVVTPPTTFDKNYYSNLKVQKGLLHSDQQLFNG--GSTDSQV	278
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PaPx16  300  ESYSTSTHAFFKQFAASMIKMGNIPLTGSHGEIRKNCRRMN----- 341
PaPx17  300  ESYSTSMHAFFKQFAASMIKMGNIPLTGSHGEIRKNCRRMN----- 341
PaPx18  269  TTYASNQNSFFSDFAAAMVKMGNIKPLTGTSGQIRKNCRKPN----- 310
CpAPX   273  NRLGSREGTFFRQFRVSMIKMGNIPLTPNQGEIRRNCRGVNELGGEAGHDVM 325
PaPx4   276  TTYSANQNTFFTFDFAAAMVKMGNISPLTGTSGQIRKNCRKAN----- 317
PaPx5   279  TTYSTNQNSFFTFDFAAAMVKMGNISPLTGTSGQIRKNCRKAN----- 320
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Supplementary Figure 1. Sequence alignment of the cloned peroxidase sequences PaPx16 (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.