Role of Thylakoid Protein Phosphorylation in Energy-Dependent Quenching of Chlorophyll Fluorescence in Rice Plants

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# Supplementary Tables S1~S6 for Figures 1~6

**Supplementary Table S1 for Figure 1**

| | WT | | | PsbS-KO | | |
|---|---|---|---|---|---|---|
| **Bands** | **Dark** | **HL 10 min** | **HL 1 h** | **Dark** | **HL 10 min** | **HL 1 h** |
| **P-CP47** | 0 | 0 | 0 | 0 | 1485±76 | 1621±92 |
| **P-CP43** | 5446±354 | 8516±452** | 8716±481** | 4141±203 | 9474±468** | 10618±595** |
| **P-D1/D2** | 2788±182 | 5895±313** | 7549±425** | 1640±85 | 5680±274** | 9802±541** |
| **P-LHCII** | 0 | 6614±351 | 2727±155** | 0 | 5130±256 | 5320±294 |

**Supplementary Table S2a for Figure 2a**

| | WT | | | PsbS-KO | | |
|---|---|---|---|---|---|---|
| **Bands** | **Dark** | **HL 10 min** | **HL 1 h** | **Dark** | **HL 10 min** | **HL 1 h** |
| **MC** | 2017±163 | 2424±191* | 2105±158 | 2352±162 | 1852±143* | 2630±203* |
| **$C_2S_2M_2$** | 1958±159 | 1877±148 | 2205±165* | 1918±132 | 1847±142 | 1092±84** |
| **$C_2S_2M$** | 2887±234 | 2357±186* | 1750±131** | 2110±146 | 2308±178* | 914±70* |
| **$C_2S_2$** | 2879±233 | 2508±198* | 1517±114** | 2472±171 | 2410±186 | 1935±149** |
| **$C_2S$** | 3167±257 | 3441±272* | 2273±170** | 2833±195 | 2574±198* | 1571±121** |
| **PSI/PSII** | 9955±806 | 11223±887* | 10929±820 | 9940±686 | 9412±725 | 8522±656* |
| **PSII** | 4305±349 | 3406±269* | 2566±192** | 2717±187 | 2572±198* | 1620±125** |
| | 0 | 0 | 0 | 0 | 0 | 0 |
| **CP24-CP29** | 5320±431 | 8382±662** | 8278±621** | 6214±429 | 5436±419* | 7693±592* |
| **LHCII trimer** | 11225±909 | 10783±852 | 9883±741 | 10511±725 | 10522±810 | 10554±813 |
| **LHCII monomer** | 122995±885 | 13172±948 | 13952±1005 | 13755±990 | 15265±1099 | 16215±1161 |

MC – Megacomplexes; PSI/PSII – PSI-LHCI/PSII core dimer; PSII – PSII core monomer/$Cytb_6f$; CP24-CP29 – PSII-CP24-CP29.

**Supplementary Table S2b for Figure 2b**

| | WT | | | PsbS-KO | | |
|---|---|---|---|---|---|---|
| **Bands** | **Dark** | **HL 10 min** | **HL 1 h** | **Dark** | **HL 10 min** | **HL 1 h** |
| **MC** | 8828±758 | 2760±351** | 6171±666* | | 3293±353* | 5309±596* |
| **$C_2S_2M_2$** | | | | | | |
| **$C_2S_2M$** | | 1957±188* | 3415±114* | | 2278±197* | 4364±499* |
| **$C_2S_2$** | | 2514±234 | 3495±322 | | 2759±299* | 3761±394* |
| **$C_2S$** | 2663±255 | 3067±375 | 4168±386** | | 4426±468* | 5513±488* |
| **PSI/PSII** | | 2793±272 | 3619±334 | | 2285±267* | 4681±519* |
| **PSII** | | 3289±383* | | 2115±270 | | |
| | | 6687±656* | 10665±933* | 2643±255 | 4560±433** | 9274±822* |
| **CP24-CP29** | 6513±586 | | 2871±294* | | | 2783±285* |
| **LHCII trimer** | 2423±264 | | | | | 1595±114* |
| **LHCII monomer** | | | | | | |

MC – Megacomplexes; PSI/PSII – PSI-LHCI/PSII core dimer; PSII – PSII core monomer/$Cytb_6f$; CP24-CP29 – PSII-CP24-CP29.

**Supplementary Table S3 for Figure 3**

| | WT | | | PsbS-KO | | |
|---|---|---|---|---|---|---|
| **Bands** | **Dark** | **HL 10 min** | **HL 1 h** | **Dark** | **HL 10 min** | **HL 1 h** |
| **P-Lhcb1** | 5318±511 | 8581±824** | 1812±174** | 2868±275 | 9776±938** | 6900±662** |
| **P-Lhcb2** | 3829±369 | 9477±912** | 6039±580** | 547±33 | 9264±889** | 8289±796* |

**Supplementary Table S4a for Figure 4a**

| | WT | | | PsbS-KO | | |
|---|---|---|---|---|---|---|
| **Bands** | **Dark** | **LL 10 min** | **LL 1 h** | **Dark** | **LL 10 min** | **LL 1 h** |
| **$C_2S_2M_2$** | 469±31 | 737±49* | 849±56* | 595±39 | 603±40 | 793±52* |
| **$C_2S_2M$** | 780±51 | 1133±95** | 1553±102** | 976±64 | 909±93 | 1610±108** |
| **$C_2S_2$** | 839±55 | 1337±51** | 1575±114** | 1237±82 | 1079±97* | 1805±119** |
| **$C_2S$** | 969±64 | 1088±73 | 1222±81* | 1248±82 | 1179±78 | 1420±94* |
| **PSI/PSII** | 3868±255 | 3381±223 | 3829±253 | 4080±269 | 3616±239* | 3912±258 |
| **PSII** | 1731±114 | 1512±113* | 1127±74** | 1327±88 | 1043±69* | 813±54** |
| | 3560±235 | 3810±251* | 3623±239 | 3993±264 | 3736±267* | 4361±288** |
| **CP24-CP29** | 530±35 | 522±34 | 505±33 | 521±34 | 514±36 | 509±37 |
| **LHCII trimer** | 6804±449 | 5609±370 | 5814±384 | 6045±399 | 6239±412 | 6366±474 |
| **LHCII monomer** | 24905±1644 | 18456±1218* | 22103±1459 | 22179±1464 | 21025±1388 | 24162±1595 |

PSI/PSII – PSI-LHCI/PSII core dimer; PSII – PSII core monomer/$Cytb_6f$; CP24-CP29 – PSII-CP24-CP29.

**Supplementary Table S4b for Figure 4b**

| | WT | | | PsbS-KO | | |
|---|---|---|---|---|---|---|
| **Bands** | **Dark** | **LL 10 min** | **LL 1 h** | **Dark** | **LL 10 min** | **LL 1 h** |
| **$C_2S_2M_2$** | 0 | 0 | 0 | 0 | 0 | 0 |
| **$C_2S_2M$** | 0 | 0 | 0 | 0 | 0 | 494±39 |
| **$C_2S_2$** | 0 | 0 | 1287±102 | 1047±83 | 342±27** | 3065±242** |
| **$C_2S$** | 0 | 0 | 4749±375 | 1326±105 | 980±77* | 6404±506** |
| **PSI/PSII** | 0 | 0 | 0 | 0 | 0 | 0 |
| **PSII** | 0 | 0 | 0 | 0 | 0 | 0 |
| | 12392±979 | 14629±1156 | 15170±1198* | 14463±1143 | 16432±1298 | 17781±1405* |
| **CP24-CP29** | 0 | 1665±132 | 1116±88* | 921±73 | 1846±146* | 4171±330** |
| **LHCII trimer** | 0 | 0 | 0 | 0 | 0 | |
| | 939±74 | 506±40* | 860±68 | 873±69 | 1540±122* | 2052±162* |
| **LHCII monomer** | 0 | 0 | 2477±196 | 1343±106 | 2342±185* | 9595±758** |

PSI/PSII – PSI-LHCI/PSII core dimer; PSII – PSII core monomer/$Cytb_6f$; CP24-CP29 – PSII-CP24-CP29.

**Supplementary Table S5a for Figure 5a**

| | WT | | | PsbS-KO | | |
|---|---|---|---|---|---|---|
| **Bands** | **Dark** | **LL 10 min** | **LL 1 h** | **Dark** | **LL 10 min** | **LL 1 h** |
| **MC** | 2243±132 | 1941±111 | 2111±152 | 2163±149 | 19700±156 | 2406±166* |
| **$C_2S_2M_2$** | 1267±75 | 743±42* | 1280±92 | 1448±100 | 1195±94* | 1179±81* |
| **$C_2S_2M$** | 1317±78 | 899±51* | 1249±90 | 1483±102 | 1228±97 | 1305±90 |
| **$C_2S_2$** | 1087±64 | 578±33* | 982±71 | 1077±74 | 956±76 | 923±64 |
| **$C_2S$** | 844±50 | 798±45 | 678±49 | 738±51 | 737±58 | 612±42 |
| **PSI/PSII** | 152±9 | 162±9 | 138±10 | 177±12 | 191±15 | 311±21* |
| **PSII** | 3219±190 | 2170±124* | 2432±175* | 2885±199 | 3142±248* | 3067±212 |
| | 493±29 | 166±9* | 238±17* | 255±18 | 271±21 | 198±14 |
| **CP24-CP29** | 2469±146 | 2582±147 | 3266±235* | 3239±223 | 3364±266 | 3968±274* |
| **LHCII trimer** | 3557±210 | 3614±206 | 3790±273* | 3959±273 | 3696±292 | 3878±261 |
| **LHCII monomer** | 19278±1137 | 21147±1205 | 19435±1399 | 22094±1524 | 20157±1592 | 20607±1422 |

MC – Megacomplexes; PSI/PSII – PSI-LHCI/PSII core dimer; PSII – PSII core monomer/$Cytb_6f$; CP24-CP29 – PSII-CP24-CP29.

**Supplementary Table S5b for Figure 5b**

| | WT | | | PsbS-KO | | |
|---|---|---|---|---|---|---|
| **Bands** | **Dark** | **LL 10 min** | **LL 1 h** | **Dark** | **LL 10 min** | **LL 1 h** |
| **MC** | 1380±95 | 1801±135* | 7660±544** | 2050±139 | 3272±226* | 8926±696** |
| **$C_2S_2M_2$** | 0 | 0 | 4734±341 | 0 | 0 | oversaturated |
| **$C_2S_2M$** | 2124±147 | 2048±154 | 4729±340** | 3545±241 | 5530±382** | oversaturated |
| **$C_2S_2$** | 4490±310 | 3660±275 | 4840±348 | 3810±259 | 6273±433** | oversaturated |
| **$C_2S$** | 3996±276 | 3408±323 | 5132±370* | 2872±195 | 4991±344* | oversaturated |
| **PSI/PSII** | 124±9 | 166±12 | 1606±116** | 0 | 0 | 0 |
| **PSII** | 0 | 767±58 | 3523±254** | 0 | 1029±71 | 3415±266** |
| | 0 | 0 | 0 | 0 | 0 | 8270±645 |
| **CP24-CP29** | 5738±396 | 8106±608** | 9922±714** | 3842±261 | 7089±489** | 2385±186* |
| **LHCII trimer** | 0 | 0 | 1048±75 | 606±41 | 979±68* | 18251±1424** |
| **LHCII monomer** | 0 | 0 | 0 | 0 | 0 | 2776±217 |

MC – Megacomplexes; PSI/PSII – PSI-LHCI/PSII core dimer; PSII – PSII core monomer/Cytb$_6$f; CP24-CP29 – PSII-CP24-CP29.

**Supplementary Table S6a for Figure 6a**

| | WT | | | PsbS-KO | | |
|---|---|---|---|---|---|---|
| **Bands** | **Dark** | **LL 10 min** | **LL 1 h** | **Dark** | **LL 10 min** | **LL 1 h** |
| **MC** | 680±40 | 778±51 | 956±66* | 622±39 | 930±63* | 1156±84* |
| **$C_2S_2M_2$** | 594±35 | 480±31 | 1080±75** | 546±34 | 653±44 | 593±43 |
| **$C_2S_2M$** | 724±43 | 940±52* | 1303±90** | 467±29 | 1302±89** | 1309±96** |
| **$C_2S_2$** | 1022±60 | 804±351* | 1072±74 | 577±36 | 1148±78** | 1022±75** |
| **$C_2S$** | 648±38 | 623±40 | 725±50* | 588±36 | 776±53* | 546±40 |
| **PSI/PSII** | 292±17 | 169±11 | 261±18 | 580±36 | 457±31 | 397±29 |
| **PSII** | 2684±158 | 2109±137* | 3035±209* | 2343±145 | 3154±214* | 3018±220* |
| | 265±16 | 339±2*2 | 291±20 | 389±24 | 565±38* | 328±24 |
| **CP24-CP29** | 2950±174 | 2757±179 | 2714±187 | 3189±198 | 3325±226 | 3524±257* |
| **LHCII trimer** | 360±21 | 461±30 | 999±69* | 656±41 | 761±52 | 829±61* |
| **LHCII monomer** | 3352±198 | 2636±171* | 3179±219 | 2667±165 | 3169±215* | 2677±195 |
| **MC** | 19652±1159 | 17217±1119 | 15305±1056 | 20001±1240 | 16264±1106 | 16598±1212 |

MC – Megacomplexes; PSI/PSII – PSI-LHCI/PSII core dimer; PSII – PSII core monomer/Cytb$_6$f; CP24-CP29 – PSII-CP24-CP29.

**Supplementary Table S6b for Figure 6b**

| | WT | | | PsbS-KO | | |
|---|---|---|---|---|---|---|
| **Bands** | **Dark** | **LL 10 min** | **LL 1 h** | **Dark** | **LL 10 min** | **LL 1 h** |
| **MC** | 0 | 0 | 0 | 0 | 0 | |
| **$C_2S_2M_2$** | 3247±237 | 3086±235 | 2987±242 | 4176±276 | 4996±345 | 3077±228* |
| **$C_2S_2M$** | | | | | | |
| **$C_2S_2$** | 7643±558 | 6689±508 | 8641±700 | 7494±495 | 6196±428* | 6778±502 |
| **$C_2S$** | 4207±307 | 3882±295 | 3701±300* | 6677±441 | 3891±268* | 4038±299* |
| **PSI/PSII** | 555±41 | 738±56* | 948±7*7 | 781±52 | 957±66 | 423±31* |
| **PSII** | | | | | | |
| | | | 518±42 | | | |
| **CP24-CP29** | | | | | 290±20 | 290±21 |
| **LHCII trimer** | | | | | | |
| **LHCII monomer** | 14175±1035 | 16358±1243 | 19414±1573* | 14433±953 | 15806±1091 | `16662±1233* |
| | 414±30 | 752±57* | 991±80* | 339±22 | 1201±83** | 292±22 |

MC – Megacomplexes; PSI/PSII – PSI-LHCI/PSII core dimer; PSII – PSII core monomer/Cytb$_6$f; CP24-CP29 – PSII-CP24-CP29.