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# The Coordinated Upregulated Expression of Genes Involved in MEP, Chlorophyll, Carotenoid and Tocopherol Pathways, Mirrored the Corresponding Metabolite Contents in Rice Leaves during De-Etiolation

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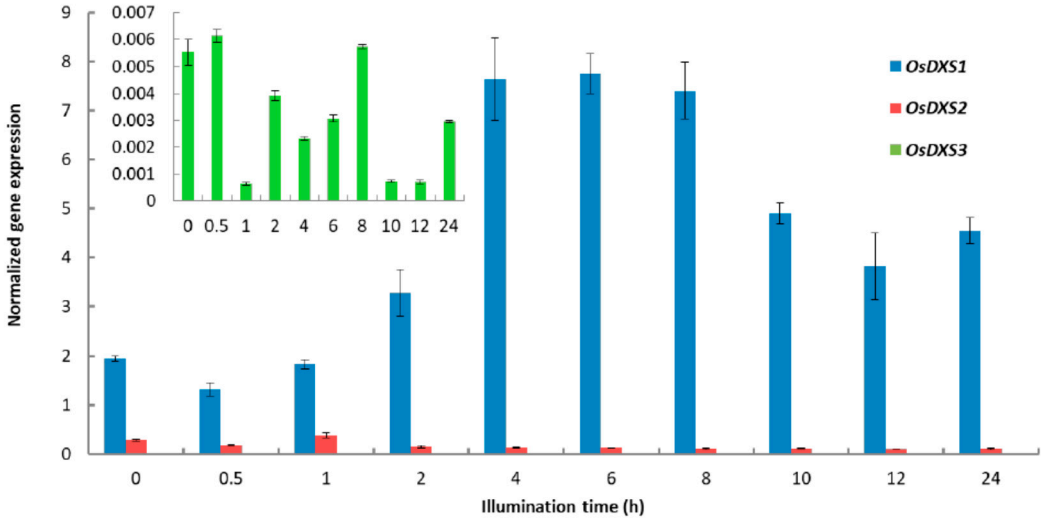


**Figure S1**. Expression of *OsDXS1*, *OsDXS2* and *OsDXS3* in etiolated rice (*Oryza sativa*, EYI105) leaves during de-etiolation at different times after the onset of irradiation with white light, with mRNA levels normalized against *OsActin* mRNA. Three biological replicates and three technical replicates were tested. Bars indicate±SD.

**Table S1.** List of primers used for the qRT-PCR.

| Gene | Forward primer (5′- 3′) | Reverse primer (5′- 3′) |
|---|---|---|
| ***OsActin*** | GACTCTGGTGATGGTGTCAGC | TCATGTCCCTCACAATTT |
| ***OsDXS1*** | CTCAAGGGAGGGAAGAACAA | ACACCTGCTTGTTGTCGTTG |
| ***OsDXS2*** | TGTTGTGGAGCTCGCTATTG | TCCTCCCACCTAGATCCCTT |
| ***OsDXS3*** | ACCTCCTCGGGAAGAAGAAG | GAGGGACACCTGCTTGTTGT |
| ***OsDXR*** | TCCACCCACAATCTATCA | GGTGACCTCTGAGCAATA |
| ***OsMCT*** | GACTTGAGGTCACTGATG | AGCAAGTCATCAGGAGTC |
| ***OsCMK*** | GTATTTGCAGCATGCGTCGT | ACCTGGTGCTTTCTACTCACAG |
| ***OsMDS*** | TCGTCGGTGTTCATGAGG | TTGTCTCCTTGAATGGGC |
| ***OsHDS*** | GGGTTGCATTGTCAATGG | CTGAATCAAGGCGTCAGT |
| ***OsCHLG*** | CTGACTTCTTTGTATAGCATAGCTGG | CTGCAACGGATAATTGAGTTATGTCA |
| ***OsPORA*** | CGGCCTCGTCTGAGTTTATTAT | CCTCTCTCACTGAAAGCTGAAA |
| ***OsPORB*** | GTGAGTGAGAGTGATGTGCTATT | CTCCTCCATCGATCTTTCTTGG |
| ***OsCAO1*** | GGGAGACCTGGATGTGTTATG | ATGGTAAGGGCATTGGATTCT |
| ***OsPSY1*** | GAGGCGGGAAGAGGAGATAAA | GGAAGGCAGATGCTGTCTGATT |
| ***OsPSY2*** | TTCTTTTGATTTCGCACGATTTC | TGGCAGGCTTATGGCATACA |
| ***OsPDS*** | GATCCAAACCGTTCAATGCTGG | TGTCACTCCGTCCAACCCATT |
| ***OsZDS*** | GCTGCCCTTTTTGCCTTGA | CACAATAACGAAGAACAC ACCATTG |
| ***OsLYCB*** | CGTCCAGTACGACAAGCCGTA | AAGGGCATGGCGTAGAGGAACG |
| ***OsLYCE*** | GTATGGCAGGGTTCACAGGGAC | GCCAGCGTCATAGCATCGTCTC |
| ***OsBCH2*** | TCGAGAACGTGCCCTACTTCC | ACCCACCTCCTCCAACTCCTT |
| ***OsHGGT*** | ATGGGGATTTCTTGAGGCTTTATC | GGCTGGGCTTATTGACCTTATC |

| | | |
|---|---|---|
| ***OsGGR*** | GCACCCGAGGCCTAAGAGGG | GAAGTAGATCCCCTCGCCGGAG |
| ***OsVTE1*** | ATAACTTTTGGGGAAGTAGGCATG | AAACTCGACTAGAAAATTCCTGAG |
| ***OsVTE2*** | TCACTGGTTTGCTGGAGGCAG | AAGAGTTGGCTTGTTAACCTTATC |
| ***OsVTE4*** | GTCACTGTCTCTTGAGGATATAAG | TCTTATCGTCTTCCACCCACTTC |
| ***OsVTE5*** | GCGGGGTCTTCGAGCAGAAAC | GCATAGCTTCCTGACCTGAAAAG |
| ***OsHMGS1*** | TTGTTGCCTCCTGGGACGTT | GATCTCCTCGTCGGCCTTCC |
| ***OsHMGS2*** | GCCTACGCCTTCCTCCCAAT | ATGCCCACGTCCTTCCTCTC |
| ***OsHMGS3*** | GGGATGGACGCTACGGTCTT | TAGCAGCAGCACCACCTGTT |
| ***OsHMGR1*** | TGGGCTTGTACATACTGCTGA | AACCTGACCTGCTGCTATCC |
| ***OsHMGR2*** | ACCCAAGAGCTTCACATGCT | TCCGGAGTTAGCGACTTTGT |
| ***OsHMGR3*** | TCCTGTGAAATGGGTGGCTTT | ACCGGTTTCATGACTCAGCA |
| ***OsMK*** | CACTAGTGGATCGCGACCGT | TGGCCTGCACAATGCAAACT |
| ***OsPMK*** | ACTTGGGTCATCAGCTGCCA | GATCTCGTCCAGCTGCGTTG |
| ***OsMVD*** | CCGTCAACGACAGCATCAGC | ATCTCCTTGCCGTTGAGCCA |

Abbreviations: ***OsDXS1/2/3***, rice (*Oryza sativa*) 1-deoxy-D-xylulose-5-phosphate synthase 1/2/3 genes; ***OsDXR***, rice 1-deoxy-D-xylulose 5-phosphate reductoisomerase gene; ***OsMCT***, rice MEP cytidyltransferase gene; ***OsCMK***, rice CDP-ME kinase gene; ***OsMDS***, rice 2-C-methyl-D-erythritol 2,4-cyclodiphosphate (ME-2,4cPP) synthase gene; ***OsHDS***, rice 1-hydroxy-2-methyl-2-butenyl 4-diphosphate (HMBPP) synthase gene; ***OsCHLG***, rice chlorophyll synthase gene; ***OsPORA***, rice protochlorophyllide oxidoreductase A gene; ***OsPORB***, rice protochlorophyllide oxidoreductase B gene; ***OsCAO1***, chlorophyllide *a* oxygenase 1 gene; ***OsPSY1/2***, rice phytoene synthase 1/2 genes; ***OsPDS***, rice phytoene desaturase gene; ***OsZDS***, rice ζ-carotene desaturase gene; ***OsLYCB***, rice lycopene β-cyclase gene; ***OsLYCE***, rice lycopene ε-cyclase gene; ***OsBCH2***, rice β-carotene hydroxylase gene; ***OsHGGT***, rice homogentisate geranylgeranyltransferase gene; ***OsVTE1***, rice tocopherol cyclase gene; ***OsVTE2***, rice homogentisate phytyltransferase gene; ***OsVTE4***, rice γ-tocopherol methyltransferase gene; ***OsVTE5***, rice phytol kinase gene; ***OsHMGS1/2/3***, rice HMG synthase 1/2/3 genes; ***OsHMGR1/2/3***, rice 3-hydroxy-3-methylglutaryl-CoA reductase 1/2/3 genes; ***OsMK***, rice MVA kinase gene; ***OsPMK***, rice phospho-MVA kinase gene; ***OsMVD***, rice MVA diphosphate decarboxylase gene.

**Table S2.** Primers used for rice *DXS* cDNA cloning in this study.

| Gene | Forward primer (5′- 3′) | Reverse primer (5′- 3′) |
|---|---|---|
| ***OsDXS1*** | GAATTCCATGGCGCTCACGACGTTCTCC ATTTCGAGAGGAGG | GGATCCTACGCGTTGGGCACCGTCATGA TGGCGAGCGCCT |
| ***OsDXS2*** | GAATTCCATGGGTGGGAGATATCTGCAT TCTCCACCTGCTGTTA | AAGCTTCCTTCTTACTTCATCAACAAAA GTGCGTCTCGGTGTC |
| ***OsDXS3*** | GAATTCCATGGGTGGGAGATATCTGCAT TCTCCACCTGCTGTTA | GGATCCTCAGCTGAGCTGAAGTGCCTCC AATGGCCTCCCAAG |

EcoRI (GAATTC), BamHI (GGATCC) and HindIII (AAGCTT) restriction sites are underlined. Abbreviations: ***OsDXS1/2/3***, rice (*Oryza sativa*) 1-deoxy-D-xylulose-5-phosphate synthase 1/2/3 genes