**Table S1.** Protein sequences and access numbers of insect AOXs and XDHs for phylogenetic analysis.

|  |  |  |
| --- | --- | --- |
| Species name | Gene name | Accession number |
| *Bombyx\_mori* | *BmAOX1* | NP\_001103812 |
| *Bombyx\_mori* | *BmAOX2* | NP\_001103811 |
| *Amyelois\_transitella* | *AtAOX* | NP\_001299599 |
| *Papilio\_xuthus* | *PxAOX1* | XP\_013162410 |
| *Papilio\_xuthus* | *PxAOX2* | KPJ03063 |
| *Drosophila\_melanogaster* | *DmAOX1* | NP\_650475 |
| *Drosophila\_melanogaster* | *DmAOX2* | NP\_732047 |
| *Drosophila\_melanogaster* | *DmAOX3* | NP\_650477 |
| *Drosophila\_melanogaster* | *DmAOX4* | NP\_650478 |
| *Anopheles\_gambiae\_* | *AgAOX* | XP\_001688700 |
| *Aedes\_aegypti* | *AaAOX* | XP\_001654511 |
| *Apis\_florea* | *AfAOX* | XP\_003693286 |
| *Anoplophora\_glabripennis* | *AglAOX* | XP\_018569700 |
| *Bombyx\_mori* | *BmXDH1* | NP\_001037325 |
| *Bombyx\_mori* | *BmXDH2* | NP\_001037333 |
| *Drosophila\_melanogaster* | *DmXDH* | NP\_524337 |
| *Anopheles\_gambiae* | *AgXDH* | AAO14865 |
| *Aedes\_aegypti* | *AaXDH* | XP\_001662131 |

**Table S2.** Sequence information of AOXs in *T. castaneum*.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Accession number | Gene name | mRNA (bp) | CDS (bp) | ORF (aa) | MW (Da) | pI |
| TC013628 | *TcAOX1* | 3776 | 3711 | 1236 | 136988.91 | 8.01 |
| TC001977 | *TcAOX2* | 4257 | 4038 | 1345 | 148982.99 | 7.11 |
| TC001978 | *TcAOX3* | 4327 | 3786 | 1261 | 138910.51 | 5.25 |