**Supplements**

Table 1S. Content of TAGs in *T. ramosissima*

| RT | TAG | % |
|---|---|---|
| 23.2 | EEE | 0.31 |
| 25.4 | AEE | 1.53 |
| 25.8 | LnEE | 0.29 |
| 29.5 | PoEE | 0.26 |
| 30.1 | AAE | 2.74 |
| 33.1 | AELn | 1.51 |
| 34.2 | EEL | 0.38 |
| 34.8 | PoEE | 0.26 |
| 35.2 | MEE | 0.25 |
| 35.6 | LnELn | 0.27 |
| 37.0 | AAA | 3.96 |
| 38.1 | OEE | 0.37 |
| 39.0 | PEE | 0.74 |
| 40.2 | AEL | 1.60 |
| 40.3 | ALnLn | 1.49 |
| 41.6 | AALn | 2.72 |
| 41.8 | AEPo | 1.48 |
| 42.5 | LnEL | 0.36 |
| 42.9 | EEP | 0.74 |
| 43.2 | LnLnLn | 0.25 |
| 43.5 | LnEPo | 0.24 |
| 44.3 | AEM | 1.47 |
| 44.9 | LnEM | 0.23 |
| 46.2 | AAL | 2.81 |
| 46.7 | AAPo | 2.69 |
| 47.8 | LEL | 0.45 |
| 48.0 | AEP | 1.95 |
| 48.1 | ALnL | 1.57 |
| 48.3 | LnAPo | 1.46 |
| 49.0 | PoEL | 0.33 |
| 49.7 | LnLnL | 0.34 |
| 49.9 | AAM | 2.68 |
| 50.0 | LnEP | 0.72 |
| 50.2 | LnPoLn | 0.22 |
| 50.5 | PoEPo | 0.22 |
| 50.7 | ALnM | 1.45 |
| 50.9 | MEL | 0.32 |
| 51.3 | MEPo | 0.20 |
| 51.5 | LnLnM | 0.21 |
| 51.7 | MEM | 0.19 |
| 53.8 | AAP | 3.17 |
| 54.6 | PoAL | 1.55 |
| 55.1 | LnAP | 1.93 |
| 55.2 | ALL | 1.66 |
| 55.6 | PEL | 0.81 |
| 55.8 | OLnLn | 0.33 |
| 55.9 | PoEO | 0.32 |
| 56.4 | LnLL | 0.43 |
| 57.2 | PoAPo | 1.43 |
| 57.4 | LnPoL | 0.31 |
| 58.1 | LnPLn | 0.70 |
| 59.0 | PoEP | 0.69 |
| 59.2 | LnPoPo | 0.19 |
| 59.3 | MAPo | 1.42 |
| 59.4 | MEP | 0.68 |
| 59.5 | LnML | 0.30 |
| 59.6 | LnMPo | 0.18 |
| 59.7 | AML | 1.53 |
| 59.8 | AMM | 1.41 |
| 60.2 | EOO | 0.43 |
| 60.4 | EOP | 0.80 |
| 60.5 | PAL | 2.02 |
| 60.6 | LLL | 0.52 |
| 60.7 | LPoL | 0.40 |
| 61.3 | LPoL | 0.40 |
| 61.4 | LnPL | 0.79 |
| 61.5 | PoAP | 1.91 |
| 61.6 | PEP | 1.17 |
| 61.8 | PoPoL | 0.28 |
| 61.9 | LnPoP | 0.67 |
| 62.2 | MLL | 0.39 |
| 62.3 | MAP | 1.89 |
| 62.4 | PoPoPo | 0.17 |
| 62.8 | PoML | 0.27 |
| 64.2 | LnMP | 0.66 |
| 64.5 | PoMPo | 0.15 |
| 64.7 | MML | 0.26 |
| 65.6 | MMPo | 0.14 |
| 65.7 | MMM | 0.13 |
| 65.8 | OPoL | 0.39 |
| 66.0 | PAP | 2.38 |
| 66.1 | PLL | 0.88 |
| 66.5 | OPoPo | 0.27 |
| 66.7 | LPPo | 0.76 |
| 66.9 | PoPL | 0.76 |
| 67.1 | LnPP | 1.15 |
| 67.3 | PPoPo | 0.64 |
| 67.6 | PML | 0.75 |
| 67.9 | LMP | 0.75 |
| 68.0 | PoMP | 0.63 |
| 68.5 | PMM | 0.62 |
| 69.6 | OPoO | 0.38 |
| 70.4 | OPL | 0.87 |
| 70.6 | OMO | 0.37 |
| 70.8 | OPPo | 0.75 |
| 71.6 | PPL | 1.24 |
| 71.9 | PPoP | 1.12 |
| 72.1 | PMO | 0.74 |
| 72.5 | PMP | 1.11 |
| 73.4 | OOO | 0.49 |
| 75.1 | OPO | 0.86 |
| 76.4 | OPP | 1.23 |
| 77.6 | PPP | 1.60 |

Fig. 1S. Analysis of total TAGs of *T. ramosissima* by RP-HPLC/MS-APCI

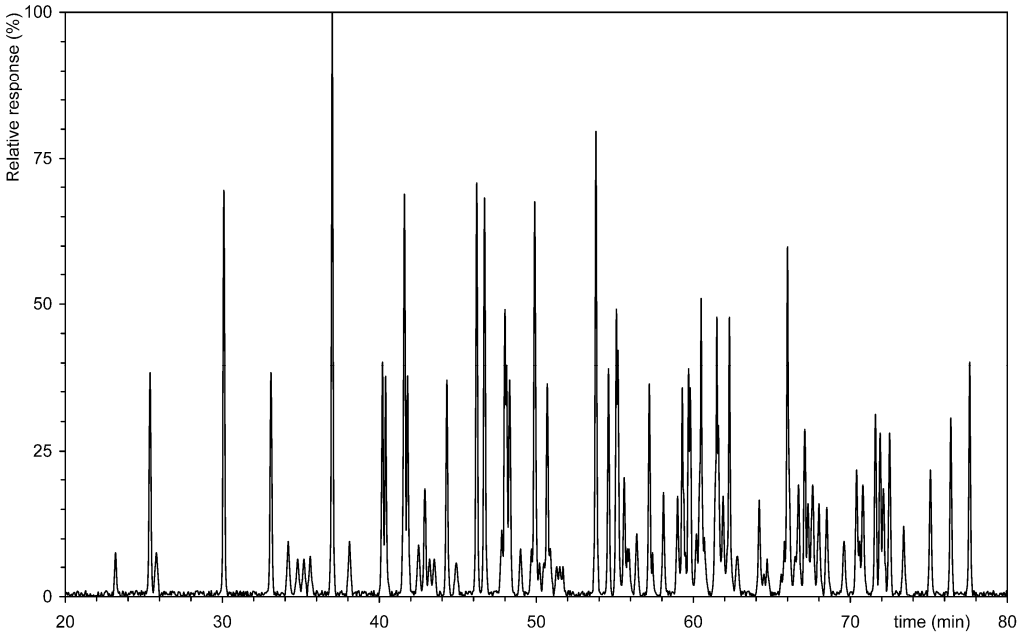
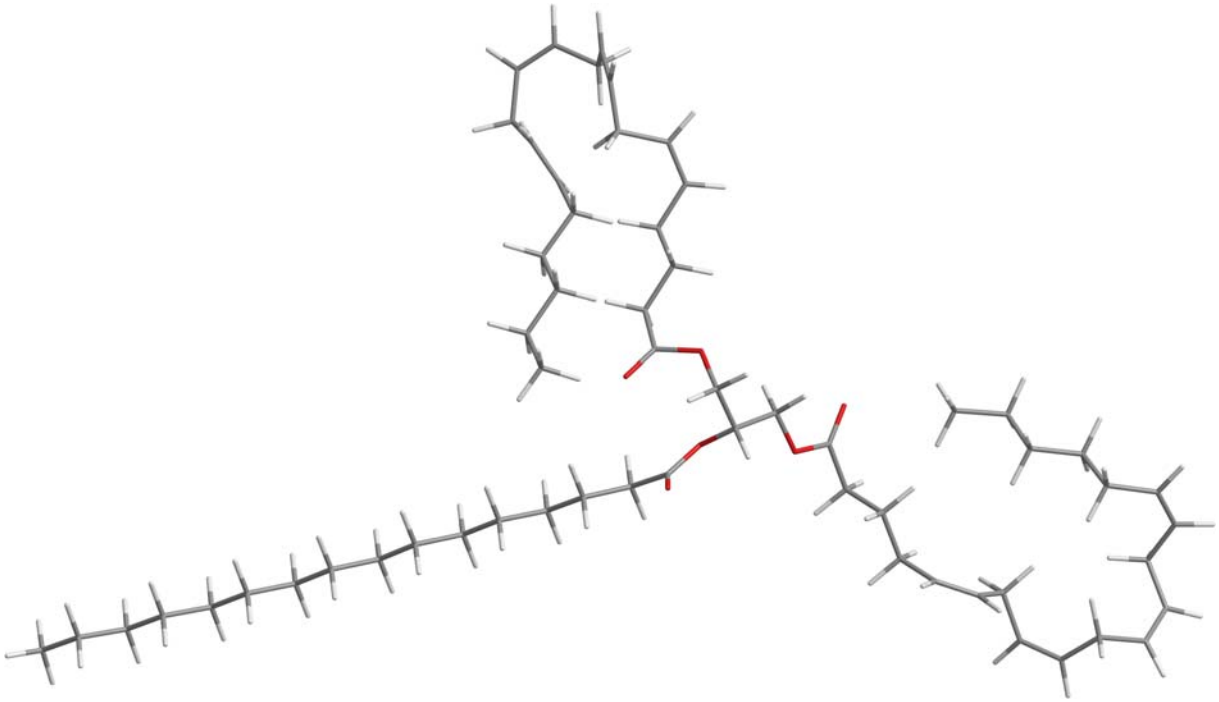
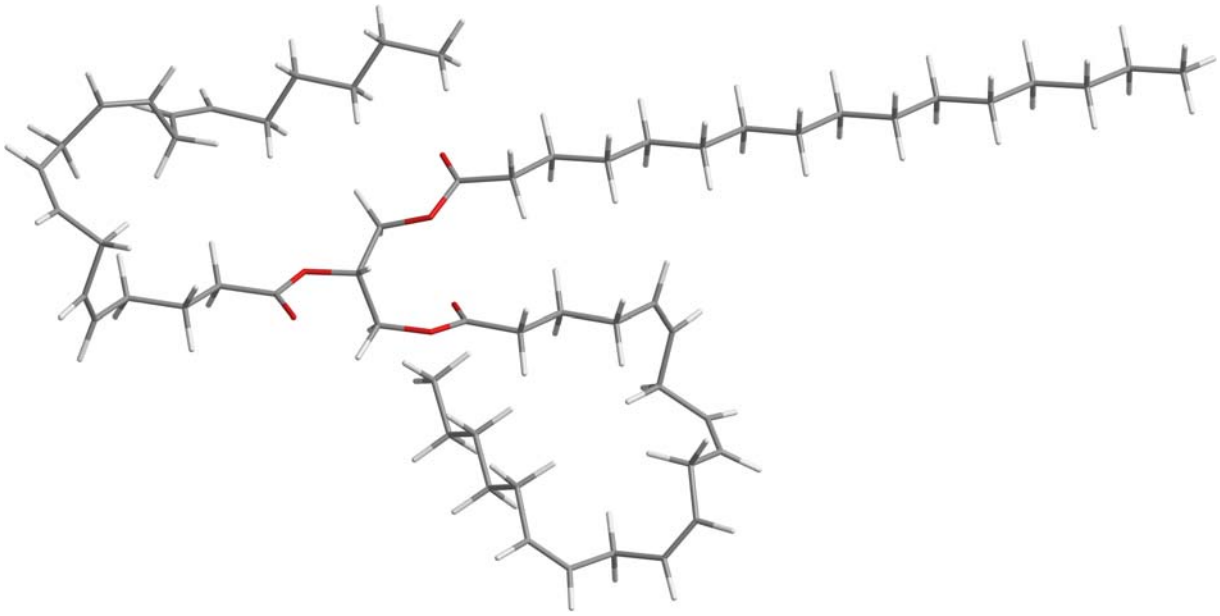
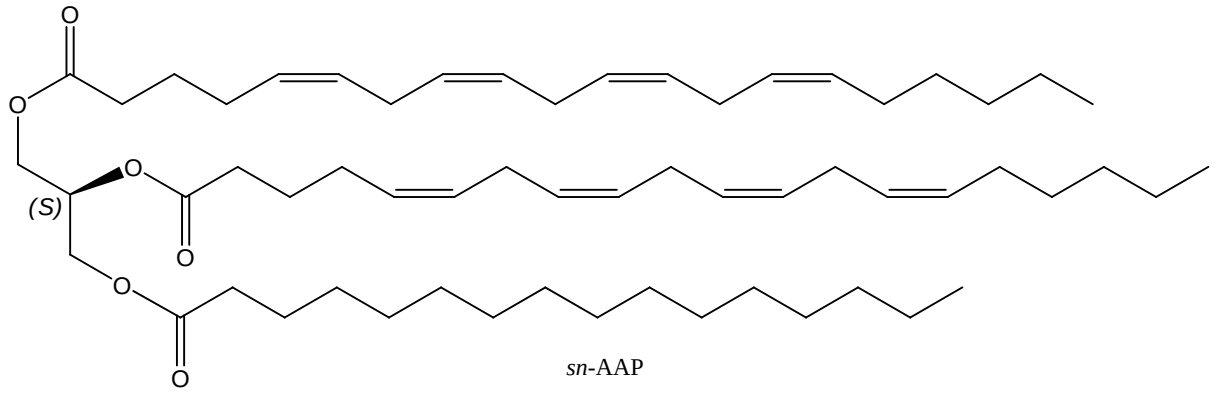


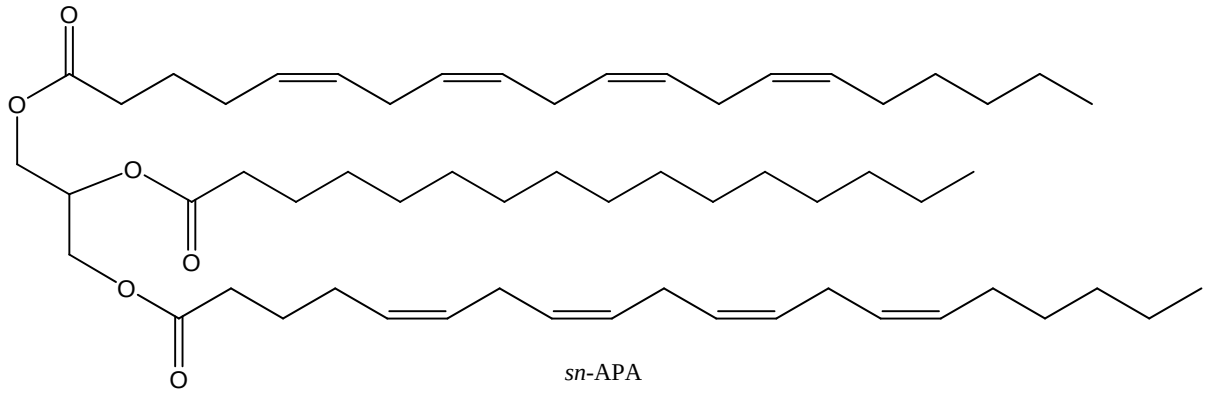

Fig 2S. Structural formulas of *sn*-APA (Fig. 2Sa) and *sn*-AAP TAGs (Fig. 2Sb).








*sn*-AAP




*sn*-APA

Fig. 3S Chiral separation of a natural mixture of *sn*-EEP, *sn*-PEE, and *sn*-EPE from the control and N- and P-starvation cultivation of *Trachydiscus minutus*.

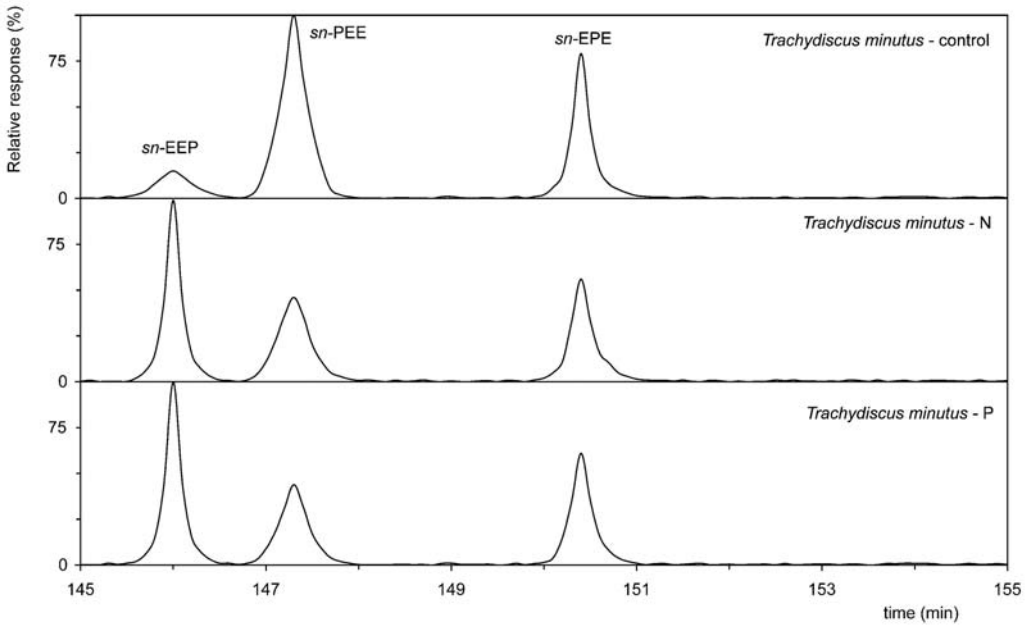



Fig. 4S Chiral separation of a natural mixture of *sn*-EPP, *sn*-PPE, and *sn*-PEP from the control and N- and P-starvation cultivation of *Trachydiscus minutus*.