Supporting Information

for

Synthesis of acylglycerol derivatives by mechanochemistry

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Experimental procedures, set-ups and characterization data
1. General information

All chemicals are commercial available and they were used as received unless otherwise stated. Thin-layer chromatography (TLC) was performed using TLC plates (silica gel 60 on aluminum or glass with fluorescence indicator F254) from MERCK. Qualitative analysis of the TLC plates was carried out using UV light ($\lambda = 254$ nm and $\lambda = 366$ nm) and/or by immersion in an aqueous solution of potassium permanganate (KMnO$_4$) and heating of the stained plates with a heat-gun at 300 °C until dryness. Products were purified by column chromatography using silica gel 60 (40–63 μm) from ACROS Organics. Solvents for column chromatography were distilled prior to use.

All NMR spectra were recorded on a VNMRS 400 or on a VNMRS 600 spectrometer. Proton chemical shifts are reported in parts per million on the $\delta$ scale and are calibrated using the residual non-deuterated solvent signal as an internal reference. Spectral data is provided as follows: chemical shift in ppm (from downfield to upfield), multiplicity ($s$ = singlet, $d$ = doublet, $m$ = multiplet), integration and coupling constant $J$.

High-resolution mass spectra were recorded on a THERMO FISHER Scientific Orbitrap XL spectrometer. UV–vis spectra were measured on a Shimadzu UV-
2600 spectrophotometer. Analytical HPLC measurements for the determination of the enantiomer ratios were performed on an Agilent 1100 using a CHIRALPAK® OD-H column (210 mm in length, 4.6 mm in internal diameter) and a mixture of n-heptane:PrOH 98:2 as eluent. The flow of the mobile phase was kept at 0.7 mL/min at 20 °C. Detection of the analytes was done at 210 nm. Mechanochemical reactions were carried out in a RETSCH MM400 mixer mill or in a FRITSCH planetary micro mill model "Pulverisette 7 classic line".

2. General procedures in the ball mill

2.1 Mechanosynthesis of 2

\[
\begin{align*}
&\text{TBDMSCI (1.1 equiv)} \\
&\text{imidazole (2.0 equiv)} \\
&\text{(MM) 25 Hz, 2 h or} \\
&\text{(PBM) 600 rpm, 2 h}
\end{align*}
\]

A mixture of 1 (50 mg, 0.67 mmol), tert-butylchlorodimethylsilane (0.73 mmol), and imidazole (1.34 mmol) was mixed in a 10 mL ZrO\(_2\) milling jar with one ZrO\(_2\) ball of 10 mm in diameter at 25 Hz for 2 h. After the milling was stopped, the reaction mixture was recovered from the milling jar and the product was purified by column chromatography (SiO\(_2\), eluent 50:1 n-pentane/ethyl acetate). After purification, the product was obtained as a colorless oil in 47% yield. Compound 2 is prone to evaporation; therefore the yield of the reaction was also determined by \(^1\)H NMR spectroscopy of the reaction mixture using as an internal standard 1,3,5 trimethoxybenzene, which showed 2 in 86% yield.

An scale up of the reaction using 1 (250 mg, 3.37 mmol), tert-butylchlorodimethylsilane (560 mg, 3.71 mmol), and imidazole (460 mg, 6.74 mmol) was carried out in a planetary ball mill, using 45 mL ZrO\(_2\) milling jars with five ZrO\(_2\) balls of 10 mm in diameter at 600 rpm for 2 h. Analysis of the reaction mixture by \(^1\)H NMR spectroscopy indicated the presence of 2 (558 mg) in 88% yield.

2.2 Mechanosynthesis of 4a

\[
\begin{align*}
&\text{R}^1 = \text{CH}_3(\text{CH}_2)_{16} \text{ (stearic acid, 3a)}
\end{align*}
\]

A mixture of (S,S)-cat (2.5 mol %, 0.02 mmol) and 3a (226.5 mg, 0.796 mmol) was charged in a 20 mL stainless-steel milling jar with one 10 mm ball of the same
material. Initially, a gas balloon containing dioxygen was attached to the gas inlet on the milling jar and a continuous flow of dioxygen was kept for 1 min. Then the gas outlet was closed with a plastic screw to prevent leaking of the reaction mixture and the content was mixed for 15 min at 25 Hz under oxygen atmosphere (Figure S1). After 15 min of milling the dioxygen flow was disrupted by removing the balloon. Then, DIPEA (0.796 mmol) was added and the gas inlet was closed with a plastic screw. Next, the mixture was milled for another 10 min at 25 Hz. Finally, 2 (150 mg, 0.796 mmol) was added into the jar and the content was milled at 25 Hz for 155 min. Once the milling was stopped, the reaction mixture was analyzed by $^1$H NMR spectroscopy using 1,3,5-trimethoxybenzene as an internal standard. The NMR analysis showed full conversion of the starting material and the presence of a mixture of products 4a and 4a’ in a 4:1 ratio. Purification of the products by column chromatography (SiO$_2$, eluent 40:1 n-pentane:ethyl acetate) afforded 4a as a white-yellowish solid in 42% yield.

At no point during this research project we noticed any exothermicity of mechanochemical reactions upon milling under oxygen atmosphere. However, it is important to highlight that some substances react violently with oxygen, which can lead to either combustion after ignition or even self-ignition. Therefore, extra precaution is recommended when reacting organic molecules in oxygen systems using stainless-steel milling media.

**Figure S1:** Setup for cobalt-catalyzed epoxide-ring opening in the mixer mill highlighting a modified 20 mL stainless-steel milling jar with a gas inlet and a gas outlet.
2.3 Mechanosynthesis of 5a–d

\[
\begin{align*}
4a & \quad \text{OH} \quad \text{OTBDMS} \quad + \quad \text{RCOOH} \quad \text{3a-3d} \\
\quad & \quad \downarrow \\
\quad & \quad \text{DCC (1.2 equiv)} \\
\quad & \quad \text{DMAP (10 mol %)} \\
\quad & \quad \downarrow (25 \text{ Hz, 2 h}) \\
\quad & \quad 5a-5d \\
\end{align*}
\]

\[R = \text{CH}_3(\text{CH}_2)_{16}; 18:0 \text{ (stearic acid, 3a)} \]
\[R = \text{CH}_3(\text{CH}_2)_{7}\text{CH=CH(CH}_2)_2; 18:1 \text{ (oleic acid, 3b)} \]
\[R = \text{CH}_3(\text{CH}_2)_4\text{CH=CHCH}_2\text{CH=CH(CH}_2)_2; 18:2 \text{ (linoleic acid, 3c)} \]
\[R = \text{CH}_3(\text{CH}_2)_4\text{CH=CHCH}_2\text{CH=CHCH}_2\text{CH=CH(CH}_2)_2; 20:4 \text{ (arachidonic acid, 3d)} \]

A mixture of 4a (204.9 mg, 0.433 mmol), fatty acid 3 (3a–d, 0.520 mmol), DCC (0.520 mmol) and 4-DMAP (10 mol %, 0.0433 mmol) was milled using a 10 mL ZrO\textsubscript{2} milling jar and one 10 mm ball of the same material at 25 Hz for 2 h. The products 5a–d were purified by column chromatography (SiO\textsubscript{2}, eluent 80:1 \textit{n}-pentane/ethyl acetate).

2.4 Deprotection of 5a

\[
\begin{align*}
\quad & \quad \text{O} \\
\quad & \quad \text{O} \\
\quad & \quad \text{OTBDMS} \\
\quad & \quad \text{5a} \\
\end{align*}
\]

\[
\begin{align*}
\quad & \quad \text{BF}_3\cdot\text{CH}_3\text{CN (1.1 equiv)} \\
\quad & \quad \text{stirring} \\
\quad & \quad \text{6a} \\
\quad & \quad \text{O} \\
\quad & \quad \text{O} \\
\quad & \quad \text{OH} \\
\quad & \quad \text{6a} \\
\end{align*}
\]

Compound 5a (251.4 mg, 0.34 mmol) was dissolved in DCM or CH\textsubscript{3}CN (3 mL) at 0 °C, followed by addition of BF\textsubscript{3}·CH\textsubscript{3}CN (0.37 mmol), the reaction mixture was stirred for 7 min until complete conversion of 5a was confirmed by thin-layer chromatography. The product 6a was isolated after extraction in 81% yield [1].

2.5 Mechanosynthesis of 8a

\[
\begin{align*}
\quad & \quad \text{O} \\
\quad & \quad \text{O} \\
\quad & \quad \text{Cl} \\
\quad & \quad \text{7} \\
\quad & \quad \text{NO}_2 \\
\quad & \quad \text{6a} \\
\quad & \quad \text{NEt}_3 (1.5 \text{ equiv}) \\
\quad & \quad (25 \text{ Hz, 1.5 h}) \\
\quad & \quad \text{8a} \\
\quad & \quad \text{8a}’ \\
\quad & \quad \text{8a:8a’ 82:18} \\
\end{align*}
\]

A mixture of 6a (159.2 mg, 0.254 mmol), 7 (0.254 mmol) and NEt\textsubscript{3} (0.382 mmol)
was milled in a 10 mL ZrO$_2$ milling jar with one 10 mm ball of the same material at 25 Hz for 90 min. Analysis by $^1$H NMR spectroscopy showed full consumption of 6a after 90 min of milling. Therefore, the reaction mixture was used in the next step without further purification.

2.6 Mechanosynthesis of 10a and 10a’

To the reaction mixture containing 8a and 8a’ (section 2.5), 9 (41.35 mg, 0.254 mmol) and NEt$_3$ (0.382 mmol) were added. This mixture was milled at 25 Hz for 3 h. Once the milling was stopped, the reaction mixture was analyzed by $^1$H NMR spectroscopy using 1,3,5-trimethoxybenzene as an internal standard. The NMR analysis showed the presence of DAGs 10a and 10a’ in a 2.5:1 ratio. Products 10a and 10a’ were inseparable by column chromatography (SiO$_2$, eluent 10:1 n-pentane/ethyl acetate). However, a mixture containing exclusively DAG 10a and 10a’ was obtained in 53% yield.
3. Table S1. Comparison between reported methodologies and the mechanochemical approach reported in this work

<table>
<thead>
<tr>
<th>Method</th>
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<th>Reaction time</th>
<th>Yield</th>
<th>References and notes</th>
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<tr>
<td>Solution</td>
<td>CH₂Cl₂</td>
<td>Overnight 0°C to rt</td>
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<td>Org. Lett. 2013, 15, 1424–1427</td>
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<td>Solution</td>
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<td>2 h</td>
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![Diagram](image)

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<th>Reaction time</th>
<th>Yield</th>
<th>References and notes</th>
</tr>
</thead>
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<tr>
<td></td>
<td></td>
<td></td>
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<td>-(R)-TBDMS-glycidyl ether 2 was used. Yield for 4a was not reported, but 4a was used</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>in a sequential reaction leading to the formation of a subsequent product in 91%.</td>
</tr>
<tr>
<td>Ball milling</td>
<td>---</td>
<td>3 h</td>
<td>84%</td>
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![Diagram](image)

<table>
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<th>Solvent</th>
<th>Reaction time</th>
<th>Yield</th>
<th>References and notes</th>
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<tbody>
<tr>
<td>Solution</td>
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<td>91%</td>
<td>Org. Biomol. Chem. 2013, 11, 6919–6928</td>
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<td>-(R)-4a was used.</td>
</tr>
<tr>
<td>Ball milling</td>
<td>---</td>
<td>2 h</td>
<td>97%</td>
<td>This work</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-(R) = CH₃(CH₂)₁₆; (stearic acid)</td>
</tr>
</tbody>
</table>
4. Characterization of the products

**tert-Butyldimethylsilyl-glycidyl ether (2)**

![Structural formula of tert-Butyldimethylsilyl-glycidyl ether (2)]

**Molecular formula:** $C_{9}H_{20}O_{2}Si$

**Molecular Mass:** 188.3420 g/mol

**Physical appearance:** colorless oil

**TLC:** $R_f$ (silica gel) = 0.58 ($n$-pentane/EtOAc 10:1); KMnO$_4$ active.

$^1$H NMR (400 MHz, CDCl$_3$), $\delta$ (ppm): 3.85 (dd, $J$ = 11.9 Hz, $J$ = 3.2 Hz, 1H, CH$_2$), 3.66 (dd, $J$ = 11.9 Hz, $J$ = 4.8 Hz, 1H, CH$_2$), 3.10-3.06 (m, 1H, CH), 2.76 (dd, $J$ = 5.0 Hz, $J$ = 4.2, 1H, CH$_2$), 2.63 (dd, $J$ = 5.2 Hz, $J$ = 2.7 Hz, 1H, CH$_2$), 0.90 (s, 9H, $^1$Bu), 0.08 (s, 3H, CH$_3$), 0.07 (s, 3H, CH$_3$).

$^{13}$C NMR (100 MHz, CDCl$_3$), $\delta$ (ppm): 63.8, 52.5, 44.6, 26.0, 18.5, −5.1, −5.2. The spectral data for this compound match that reported in the literature [2].

**1-Stearoyl-3-(tert-butyldimethylsilyl)-sn-glycerol (4a)**

![Structural formula of 1-Stearoyl-3-(tert-butyldimethylsilyl)-sn-glycerol (4a)]

**Molecular formula:** $C_{27}H_{56}O_{4}Si$

**Molecular Mass:** 472.8260 g/mol

**Physical appearance:** white-yellowish solid

**TLC:** $R_f$ (silica gel) = 0.32 ($n$-pentane/EtOAc 10:1); KMnO$_4$ active.

$^1$H NMR (400 MHz, CDCl$_3$), $\delta$ (ppm): 4.17-4.08 (m, 2H, CH$_2$), 3.90-3.84 (m, 1H, CH), 3.67 (dd, $J$ = 10.1 Hz, $J$ = 4.6 Hz, 1H, CH$_2$), 3.60 (dd, $J$ = 10.1 Hz, $J$ = 5.6 Hz, 1H, CH$_2$), 2.76 (dd, $J$ = 5.0 Hz, $J$ = 4.2, 1H, CH$_2$), 2.50 (br s, 1H, OH), 2.33 (t, $J$ = 7.6 Hz, 2H, CH$_2$), 1.66-1.58 (m, 2H, CH$_2$), 1.28-1.25 (m, 28H, 14 x CH$_2$), 0.90-0.86 (m, 12H, 4 x CH$_3$), 0.07 (s, 6H, 2 x CH$_3$).

$^{13}$C NMR: (100 MHz, CDCl$_3$), $\delta$ (ppm): 174.1, 70.1, 65.1, 63.8, 34.3, 32.0, 29.8, 29.8, 29.8, 29.7, 29.6, 29.5, 29.4, 29.3, 25.9, 25.1, 22.8, 18.4, 14.2, −5.3, −5.3.

HRMS (ESI$^+$) m/z: calcd. for [M+Na]$^+$ = [C$_{27}$$H_{56}$$O_4$$Si$]$: 495.38400; found: 495.38401. The spectral data for this compound match that reported in the literature [3].
1,2-Distearoyl-3-(tert-butylidimethylsilyl)-sn-glycerol (5a)

Molecular formula: $C_{45}H_{90}O_5Si$

Molecular Mass: 738.6558 g/mol

Physical appearance: white solid

TLC: $R_f$ (silica gel) = 0.72 (n-pentane/EtOAc 10:1); KMnO$_4$ active.

$^1$H NMR (400 MHz, CDCl$_3$), $\delta$ (ppm): 5.09-5.06 (m, 1H, CH), 4.34 (dd, $J = 11.9$ Hz, $J = 3.7$ Hz, 1H, CH$_2$), 4.16 (dd, $J = 11.9$ Hz, $J = 6.2$ Hz, 1H, CH$_2$), 3.72-3.70 (m, 2H, CH$_2$), 2.30 (t, $J = 7.4$ Hz 4H, 2 x CH$_2$), 1.63-1.57 (m, 4H, 2 x CH$_2$), 1.30-1.25 (m, 56H, 28 x CH$_2$), 0.88-0.86 (m, 15H, 5 x CH$_3$), 0.06-0.04 (m, 6H, 2 x CH$_3$).

$^{13}$C NMR: (100 MHz, CDCl$_3$), $\delta$ (ppm): 173.4, 173.0, 71.6, 62.4, 61.4, 34.3, 34.1, 31.9, 29.6, 29.6, 29.6, 29.4, 29.3, 29.2, 29.1, 29.0, 25.7, 24.9, 22.6, 18.1, 14.0, −5.5, −5.5.

HRMS (ESI$^+$) m/z: calcd. for [M+K]$^+$ = [C$_{45}$H$_{90}$O$_5$KSi]$^+$: 777.61780; found: 777.61891. The spectral data for this compound match that reported in the literature [3].

1-Stearoyl-2-oleoyl-3-(tert-butylidimethylsilyl)-sn-glycerol (5b)

Molecular formula: $C_{45}H_{88}O_5Si$

Molecular Mass: 736.6401 g/mol

Physical appearance: colorless oil

TLC: $R_f$ (silica gel) = 0.73 (n-pentane/EtOAc 9:1); KMnO$_4$ active.

$^1$H NMR (400 MHz, CDCl$_3$), $\delta$ (ppm): 5.36-5.32 (m, 2H, 2 x HC=C), 5.09-5.04 (m, 1H, CH), 4.34 (dd, $J = 11.8$ Hz, $J = 3.6$ Hz, 1H, CH$_2$), 4.14 (dd, $J = 11.9$ Hz, $J = 6.3$ Hz, 1H, CH$_2$), 3.72-3.70 (m, 2H, CH$_2$), 2.32-2.28 (m, 4H, 2 x CH$_2$), 2.04-1.98 (m, 4H, 2 x CH$_2$), 1.63-1.57 (m, 4H, 2 x CH$_2$), 1.34-1.25 (m, 48H, 24 x CH$_2$), 0.89-0.86 (m, 15H, 5 x CH$_3$), 0.05 (s, 6H, 2 x CH$_3$).

$^{13}$C NMR: (100 MHz, CDCl$_3$), $\delta$ (ppm): 173.4, 173.0, 129.9, 129.6, 71.6, 62.4, 61.4, 34.3, 34.1, 31.8, 29.6, 29.6, 29.6, 29.5, 29.4, 29.3, 29.2, 29.1, 29.1, 29.0, 27.1, 25.7, 24.9, 22.6, 18.1, 14.0, −5.5, −5.5.
HRMS (ESI⁺) m/z: calcd. for [M+Na]⁺ = [C₄₅H₈₈O₅NaSi]⁺: 759.62939; found: 759.62932.

1-Stearoyl-2-linoleoyl-3-(tert-butyldimethylsilyl)-sn-glycerol (5c)

Molecular formula: C₄₅H₈₆O₅Si
Molecular Mass: 734.6245 g/mol
Physical appearance: colorless oil
TLC: Rf (silica gel) = 0.75 (n-pentane/EtOAc 9:1); KMnO₄ active.

¹H NMR (600 MHz, CDCl₃), δ (ppm): 5.39-5.30 (m, 4H, 4 x H=C), 5.09-5.05 (m, 1H, CH), 4.34 (dd, J = 11.8 Hz, J = 3.6 Hz, 1H, CH₂), 4.16 (dd, J = 11.9 Hz, J = 6.3 Hz, 1H, CH₂), 3.72-3.71 (m, 2H, CH₂), 2.77 (t, J = 6.9 Hz, 2H, CH₂), 2.32-2.28 (m, 4H, 2 x CH₂), 2.06-2.03 (m, 4H, 2 x CH₂), 1.63-1.59 (m, 4H, 2 x CH₂), 1.34-1.25 (m, 42H, 21 x CH₂), 0.89-0.86 (m, 15H, 5 x CH₃), 0.05 (s, 6H, 2 x CH₃).

¹³C NMR: (150 MHz, CDCl₃), δ (ppm): 173.4, 173.0, 130.2, 129.9, 128.0, 127.8, 71.6, 62.4, 61.4, 34.3, 34.1, 31.9, 31.5 29.7, 29.6, 29.6, 29.5, 29.4, 29.3, 29.3, 29.2, 29.2, 29.1, 29.0, 27.1, 25.7, 25.6, 24.9, 22.6, 22.5, 18.2, 14.1, 14.0, −5.4, −5.5.

HRMS (ESI⁺) m/z: calcd. for [M+Na]⁺ = [C₄₅H₈₆O₅NaSi]⁺: 757.61389; found: 757.61367.

1-Stearoyl-2-arachidonoyl-3-(tert-butyldimethylsilyl)-sn-glycerol (5d)

Molecular formula: C₄₇H₈₆O₅Si
Molecular Mass: 758.6245 g/mol
Physical appearance: colorless oil
TLC: Rf (silica gel) = 0.67 (n-pentane/EtOAc 9:1); KMnO₄ active.

¹H NMR (400 MHz, CDCl₃), δ (ppm): 5.39-5.30 (m, 8H, 8 x H=C), 5.07-5.04 (m, 1H, CH), 4.32 (dd, J = 11.8 Hz, J = 3.7 Hz, 1H, CH₂), 4.14 (dd, J = 11.9 Hz, J = 6.2 Hz, 1H, CH₂), 3.70-3.68 (m, 2H, CH₂), 2.83-2.77 (m, 6H, 3 x CH₂), 2.32-2.26 (m,
4H, 2 x CH₂), 2.12-2.01 (m, 4H, 2 x CH₂), 1.72-1.61 (m, 4H, 2 x CH₂), 1.29-1.23 (m, 34H, 17 x CH₂), 0.88-0.84 (m, 15H, 5 x CH₃), 0.03 (s, 6H, 2 x CH₃).

**1³C NMR:** (100 MHz, CDCl₃), δ (ppm): 173.4, 172.7, 130.4, 128.8, 128.5, 128.2, 128.0, 127.8, 127.4, 71.7, 62.3, 61.3, 34.3, 34.1, 31.8, 31.4, 29.6, 29.6, 29.4, 29.3, 29.2, 29.1, 29.0, 27.1, 26.4, 25.7, 25.6, 25.5, 24.8, 24.7, 22.6, 22.5, 18.1, 14.0, 14.0, −5.5, −5.5.

**HRMS (ESI⁺)** m/z: calcd. for [M+Na]⁺ = [C₄₇H₈₈O₅NaSi]⁺; 781.61340; found: 781.61367. The spectral data for this compound match that reported in the literature [4].

**1,2-Distearoyl-sn-glycerol (6a)**

![1,2-Distearoyl-sn-glycerol (6a)]

**Molecular formula:** C₃₉H₇₆O₅

**Molecular Mass:** 624.5693 g/mol

**Physical appearance:** white solid

**TLC:** Rf (silica gel) = 0.6 (n-pentane/EtOAc 2:1); 0.3 (n-pentane/EtOAc 9:1); KMnO₄ active.

**¹H NMR** (400 MHz, CDCl₃), δ (ppm): 5.09-5.07 (m, 1H, CH), 4.32 (dd, J = 11.7 Hz, J = 4.6 Hz, 1H, CH₂), 4.24 (dd, J = 11.8 Hz, J = 5.6 Hz, 1H, CH₂), 3.74-3.66 (m, 2H, CH₂), 2.36-2.30 (m, 4H, 2 x CH₂), 2.03 (br s, 1H, OH), 1.65-1.58 (m, 4H, 2 x CH₂), 1.32-1.25 (m, 56H, 28 x CH₂), 0.89-0.86 (m, 6H, 2 x CH₃).

**¹³C NMR:** (100 MHz, CDCl₃), δ (ppm): 173.7, 173.3, 72.0, 61.9, 61.5, 34.2, 34.0, 31.8, 29.6, 29.6, 29.5, 29.4, 29.3, 29.2, 29.0, 29.0, 24.9, 24.8, 22.6, 14.0.

**HRMS (ESI⁺)** m/z: calcd. for [M+Na]⁺ = [C₃₉H₇₆O₅Na]⁺; 647.55743; found: 647.55850. The spectral data for this compound match that reported in the literature [1].

**1,2-Distearoyl-3-(((4-nitrophenoxy)carbonyl)oxy)-sn-glycerol (8a)**

![1,2-Distearoyl-3-(((4-nitrophenoxy)carbonyl)oxy)-sn-glycerol (8a)]
**Molecular formula:** C_{46}H_{79}NO_{9}

**Molecular Mass:** 789.5755 g/mol

**Physical appearance:** white-yellowish solid

**TLC:** $R_f$ (silica gel) = 0.78 ($n$-pentane/EtOAc 3:1); UV (254nm) and KMnO$_4$ active.

$^1$H NMR (400 MHz, CDCl$_3$), $\delta$ (ppm): 8.29 (dt, $J = 9.3$ Hz, $J = 2.1$ Hz, 2H, 2 x CH), 7.39 (dt, $J = 9.2$ Hz, $J = 2.2$ Hz, 2H, 2 x CH), 5.40-5.35 (m, 1H, CH), 4.50 (dd, $J = 11.7$ Hz, $J = 3.7$ Hz, 1H, CH$_2$), 4.38-4.34 (m, 2H, CH$_2$), 4.22 (dd, $J = 11.9$ Hz, $J = 5.6$ Hz, 1H, CH$_2$), 2.38-2.30 (m, 4H, 2 x CH$_2$), 1.66-1.57 (m, 4H, 2 x CH$_2$), 1.32-1.24 (m, 56H, 28 x CH$_2$), 0.89-0.86 (m, 6H, 2 x CH$_3$).

$^{13}$C NMR: (100 MHz, CDCl$_3$), $\delta$ (ppm): 173.1, 172.8, 155.3, 152.2, 145.5, 125.3, 121.7, 68.2, 66.9, 61.5, 34.1, 33.9, 31.8, 29.6, 29.6, 29.5, 29.4, 29.3, 29.2, 29.0, 29.0, 24.8, 22.6, 14.0.

**HRMS (ESI$^+$) m/z:** calcd. for [M+Na]$^+$ = [C$_{46}$H$_{79}$O$_{9}$NNa]$^+$: 812.56848; found: 812.56470.

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Mixture containing 1,2-distearoyl-3-(((2-oxo-2H-chromen-7-yl)oxy)carbonyl)oxy)-sn-glycerol (10a) and 1,3-distearoyl-2-(((2-oxo-2H-chromen-7-yl)oxy)carbonyl)oxy)-sn-glycerol (10a')

![Molecular structure](image)

**Molecular formula:** C_{49}H_{80}O_{9}

**Molecular Mass:** 812.5802 g/mol

**Physical appearance:** white solid

**TLC:** $R_f$ (silica gel) = 0.68 ($n$-pentane/EtOAc 2:1); UV (254nm) and KMnO$_4$ active.

$^1$H NMR (400 MHz, CDCl$_3$), $\delta$ (ppm): 7.69 (d, $J = 9.6$ Hz, 1H, CH), 7.50 (d, $J = 8.4$ Hz, 1H, CH), 7.23 (d, $J = 2.2$ Hz, 1H, CH), 7.14 (dt, $J = 8.6$ Hz, $J = 2.2$ Hz, 1H, CH), 6.41 (d, H, $J = 9.4$ Hz, 1H, CH), 5.39-5.34 (m, 1H, CH), 4.49 (dd, $J = 11.8$ Hz, $J = 3.8$ Hz, 1H, CH$_2$), 4.38-4.33 (m, 2H, CH$_2$), 4.22 (dd, $J = 11.5$ Hz, $J = 5.5$ Hz, 1H, CH$_2$), 2.36-2.31 (m, 4H, 2 x CH$_2$), 1.65-1.58 (m, 4H, 2 x CH$_2$), 1.32-1.23 (m, 56H, 28 x CH$_2$), 0.89-0.85 (m, 6H, 2 x CH$_3$).

$^{13}$C NMR: (100 MHz, CDCl$_3$), $\delta$ (ppm): 173.8, 173.1, 172.8, 160.0, 154.6, 153.1, 152.5, 142.5, 128.6, 117.5, 116.8, 116.3, 109.8, 68.3, 66.8, 64.9, 61.6, 34.1, 34.0,
33.9, 31.8, 29.6, 29.6, 29.5, 29.5, 29.4, 29.4, 29.3, 29.2, 29.2, 29.0, 29.0, 24.8, 22.6, 14.0.

**HRMS (ESI⁺)** m/z: calcd. for [M+Na]+ = [C₄₉H₈₀O₉Na]+: 835.56946; found: 835.56945.
5. NMR spectra

$^1$H NMR of 2

$^{13}$C NMR of 2
$^1$H NMR of 5a

$^{13}$C NMR of 5a
\[^1\text{H} \text{NMR of 5b}\]

\[^{13}\text{C} \text{NMR of 5b}\]
$\textbf{^1H NMR of 5c}$

$\textbf{^13C NMR of 5c}$
$^1$H NMR of 5d

$^{13}$C NMR of 5d
$^1$H NMR of 6a

$^{13}$C NMR of 6a
$^1$H NMR of 10a and 10a'

$^{13}$C NMR of 10a and 10a'
6. Chiral stationary phase high-performance liquid chromatography (CSP-HPLC) analysis.

In order to determine the enantiomeric excess of the MAG 4a, the reaction was repeated using a close related glycidol derivative 11 under otherwise identical conditions (Section 2.2). Analysis of the corresponding MAG 12 by High-Performance Liquid Chromatography-Chiral Stationary Phase (CSP-HPLC) analysis showed an enantiomeric excess of 17%.

Analysis of rac-12. CSP-HPLC conditions OD-H; n-heptane/iPrOH 98:2, 0.7mL/min.

Analysis of MAG 12 obtained using the protocol described in Section 2.2.

$$\text{rac-12}$$
OD-H; n-heptane/iPrOH 98:2, 0.7 mL/min

7. References


