



*J. Serb. Chem. Soc.* 75 (5) S1–S10 (2010)  
JSCS–3990

SUPPLEMENTARY MATERIAL TO

**Esters and amides of hexanoic acid substituted with tertiary amino group in terminal position and their activity as transdermal permeation enhancers**

OLDŘICH FARSA<sup>1\*</sup>, PAVEL DOLEŽAL<sup>2</sup> and ALEXANDR HRABÁLEK<sup>3</sup>

<sup>1</sup>*Institute of Chemical Drugs, Faculty of Pharmacy, University of Veterinary and Pharmaceutical Sciences Brno, Palackého 1/3, 612 42 Brno,* <sup>2</sup>*Department of Pharmaceutical*

*Technology, Faculty of Pharmacy, Charles University, Hradec Králové and*

<sup>3</sup>*Department of Inorganic and Organic Chemistry, Faculty of Pharmacy, Charles University, Hradec Králové, Czech Republic*

*J. Serb. Chem. Soc.* 75 (5) (2010) 605–613

*Ethyl 6-(diethylamino)hexanoate (1).* Yield 50 %; b.p. 104–109 °C at 0.7–0.9 kPa (137–140 °C at 1.86 kPa<sup>16</sup>). IR (CHCl<sub>3</sub>, cm<sup>-1</sup>): 2973, 2838, 1727, 1466, 1375, 1300, 1270. <sup>1</sup>H-NMR (300 MHz, CDCl<sub>3</sub>, δ / ppm): 4.13 (2H, *q*, *J* = 14.5, 7.4 Hz, CH<sub>3</sub>CH<sub>2</sub>O), 2.49 (4H, *q*, *J* = 14.0, 6.9 Hz, (CH<sub>3</sub>CH<sub>2</sub>)<sub>2</sub>N), 2.40 (2H, *t*, *J* = 7.2 Hz, CH<sub>2</sub>CO), 2.30 (2H, *t*, *J* = 7.5 Hz, NCH<sub>2</sub> acyl), 1.70–1.58 (2H, *m*, CH<sub>2</sub> acyl), 1.52–1.38 (2H, *m*, CH<sub>2</sub> acyl), 1.36–1.20 (5H, *m*, CH<sub>2</sub> acyl + CH<sub>3</sub>CH<sub>2</sub>O), 1.00 (6H, *t*, *J* = 6.5 Hz, (CH<sub>3</sub>CH<sub>2</sub>)<sub>2</sub>N). <sup>13</sup>C-NMR (75 MHz, δ / ppm): 173.45 (CO), 60.07 (OCH<sub>2</sub>), 52.70 (CH<sub>2</sub>N acyl), 46.80 ((CH<sub>2</sub>)<sub>2</sub>N), 34.28 (CH<sub>2</sub>CO), 27.22 (CH<sub>2</sub>CH<sub>2</sub>N), 26.73 (CH<sub>2</sub>(CH<sub>2</sub>)<sub>2</sub>CO), 24.95 (CH<sub>2</sub>CH<sub>2</sub>CO), 14.25 (CH<sub>3</sub>CH<sub>2</sub>O) 11.68 ((CH<sub>3</sub>CH<sub>2</sub>)<sub>2</sub>N).

*Ethyl 6-(pyrrolidin-1-yl)hexanoate (2).* Yield 53 %; b.p. 106–112 °C at 0.5–0.6 kPa (143–146 °C at 2.0 kPa<sup>16</sup>). IR (CHCl<sub>3</sub>, cm<sup>-1</sup>): 2965, 2938, 2880, 2865, 2800, 1727, 1464, 1375, 1301, 1271. <sup>1</sup>H-NMR (200 MHz, CDCl<sub>3</sub>, δ / ppm): 4.11 (2H, *q*, *J* = 14.3, 7.3 Hz, OCH<sub>2</sub>), 2.55–2.36 (6H, *m*, (CH<sub>2</sub>)<sub>3</sub>N), 2.29 (2H, *t*, *J* = 7.51 Hz, CH<sub>2</sub>CO), 1.82–1.30 (10H, *m*, 5CH<sub>2</sub>), 1.24 (3H, *t*, *J* = 7.1 Hz, CH<sub>3</sub>). <sup>13</sup>C-NMR (50 MHz, δ / ppm): 173.67 (CO), 60.10 (OCH<sub>2</sub>) 56.40 (NCH<sub>2</sub> acyl), 54.18 ((CH<sub>2</sub>)<sub>2</sub>N pyr.), 34.30 (CH<sub>2</sub>CO), 28.65 (CH<sub>2</sub>), 27.25 (CH<sub>2</sub>), 24.92 (CH<sub>2</sub>), 23.43 (CH<sub>2</sub>), 14.20 (CH<sub>3</sub>).

*1,6-Bis(pyrrolidin-1-yl)hexan-1-one (2a), a side product.* Yield 3 %; b.p. 178–183 °C at 0.06–0.08 kPa; Anal. Calcd. for C<sub>14</sub>H<sub>26</sub>N<sub>2</sub>O: C, 70.54; H, 10.99; N, 11.75; O, 6.71 %. Found: C, 70.61; H, 11.05; N, 11.69; O, 6.80 %. IR (CHCl<sub>3</sub>,

\* Corresponding author. E-mail: farsao@vfu.cz

cm<sup>-1</sup>): 2973, 2936, 2879, 2800, 1624, 1448, 1343, 1328, 1294, 1270, 1252. <sup>1</sup>H-NMR (200 MHz, CDCl<sub>3</sub>, δ / ppm): 3.40 (4H, *qi*, 2 CH<sub>2</sub>); 2.58–2.37 (6H, *m*, (CH<sub>2</sub>)<sub>3</sub>N acyl); 2.24 (2H, *t*, *J* = 7.5 Hz, CH<sub>2</sub>CO), 2.00–1.15 (14H, *m*, 7 CH<sub>2</sub>). <sup>13</sup>C-NMR (50 MHz, δ / ppm): 171.55 (CO), 56.43 (NCH<sub>2</sub> acyl), 54.16 ((CH<sub>2</sub>)<sub>2</sub>N pyrrol-acyl), 46.50 (CON(CH<sub>2</sub>)<sub>2</sub>), 45.48 (CH<sub>2</sub>), 34.63 (CH<sub>2</sub>CO), 28.81 (CH<sub>2</sub>), 27.55 (CH<sub>2</sub>), 26.06 (CH<sub>2</sub>), 24.77 (CH<sub>2</sub>), 24.33 (CH<sub>2</sub>), 23.38 (CH<sub>2</sub>).

*Ethyl 6-(piperidin-1-yl)hexanoate (3)*. Yield 55 %, b.p. 120–124 °C at 0.13 kPa (114–115 °C at 0.11 kPa<sup>17</sup>). IR (CHCl<sub>3</sub>, cm<sup>-1</sup>): 2938, 2865, 2800, 1727, 1464, 1375, 1271. <sup>1</sup>H-NMR (200 MHz, CDCl<sub>3</sub>, δ / ppm): 4.11 (2H, *q*, *J* = 14.3, 7.3 Hz, OCH<sub>2</sub>), 2.43–2.20 (4H, *m*, NCH<sub>2</sub> + CH<sub>2</sub>CN acyl), 2.3 (4H, *4t*, *J* = 7.0 Hz, 2 CH<sub>2</sub>N piperid.), 1.77–1.30 (12H, *m*, β+γ CH<sub>2</sub> piperid. + β+γ+δ CH<sub>2</sub> acyl), 1.24 (3H, *t*, *J* = 7.1 Hz, CH<sub>3</sub>). <sup>13</sup>C-NMR (50 MHz, δ / ppm): 173.67 (CO), 60.10 (OCH<sub>2</sub>), 59.35 (NCH<sub>2</sub> acyl), 54.63 ((CH<sub>2</sub>)<sub>2</sub>N piperid), 34.33 (CH<sub>2</sub>CO), 27.33 (NCH<sub>2</sub>CH<sub>2</sub>), 26.04 (CH<sub>2</sub>), 25.02 (CH<sub>2</sub>CH<sub>2</sub>CO), 14.20 (CH<sub>3</sub>).

*Ethyl 6-(morpholin-4-yl)hexanoate (4)*. Yield: 82 %; b.p. 120–123 °C at 0.4 kPa (140–144 °C at 0.53 kPa,<sup>18</sup> 150–153 °C at 0.53 kPa<sup>19</sup>). IR (CHCl<sub>3</sub>, cm<sup>-1</sup>): 2941, 2863, 1727, 1458, 1375, 1256. <sup>1</sup>H-NMR (300 MHz, CDCl<sub>3</sub>, δ / ppm): 4.11 (2H, *q*, *J* = 14.4, 7.5 Hz, CH<sub>3</sub>CH<sub>2</sub>O), 3.70 (4H, *t*, *J* = 4.7 Hz, O(CH<sub>2</sub>CH<sub>2</sub>)<sub>2</sub>N), 2.40 (4H, *t*, *J* = 4.4 Hz, O(CH<sub>2</sub>CH<sub>2</sub>)<sub>2</sub>N), 2.35–2.25 (4H, *m*, CH<sub>2</sub>CO + NCH<sub>2</sub> acyl), 1.73–1.41 (6H, *m*, (3CH<sub>2</sub>), 0.87 (3H, *t*, *J* = 6.7 Hz, CH<sub>3</sub>). <sup>13</sup>C-NMR (75 MHz, CDCl<sub>3</sub>, δ / ppm): 173.28 (CO), 66.82 ((CH<sub>2</sub>)<sub>2</sub>O morph.), 60.04 (CH<sub>2</sub>OCO), 58.74 (CH<sub>2</sub>N acyl), 53.64 ((CH<sub>2</sub>)<sub>2</sub>N morph.), 34.15 (CH<sub>2</sub>CO), 26.93 (CH<sub>2</sub>CH<sub>2</sub>N acyl), 26.16 (CH<sub>2</sub>(CH<sub>2</sub>)<sub>2</sub>CO), 24.79 (CH<sub>2</sub>CH<sub>2</sub>CO), 14.21 (CH<sub>3</sub>).

*Octyl 6-(diethylamino)hexanoate (5)*. Yield 67 %; b.p. 134–138 °C at 0.035 kPa; Anal. Calcd. for C<sub>18</sub>H<sub>37</sub>NO<sub>2</sub>: C, 72.19; H, 12.45; N, 4.68; O, 10.68 %. Found: C, 72.25; H, 12.35; N, 4.59; O, 10.80 %. IR (CHCl<sub>3</sub>, cm<sup>-1</sup>): 2930, 2856, 1727, 1465, 1378, 1271. <sup>1</sup>H-NMR (300 MHz, CDCl<sub>3</sub>, δ / ppm): 4.04 (2H, *t*, *J* = 6.9 Hz, OCH<sub>2</sub>), 2.50 (4H, *q*, *J* = 7.1, 14.3 Hz, (CH<sub>3</sub>CH<sub>2</sub>)<sub>2</sub>N), 2.36 (2H, *t*, *J* = 7.7 Hz, NCH<sub>2</sub>CH<sub>2</sub>), 2.29 (2H, *t*, *J* = 7.6 Hz, CH<sub>2</sub>CO), 1.68–1.25 (18H, *m*, 9 CH<sub>2</sub>), 0.99 (6H, *t*, *J* = 7.1 Hz, (CH<sub>3</sub>CH<sub>2</sub>)<sub>2</sub>N), 0.87 (3H, *t*, *J* = 6.7 Hz, CH<sub>3</sub> octyl). <sup>13</sup>C-NMR (75 MHz, δ / ppm): 174.12 (CO), 64.66 (OCH<sub>2</sub>), 52.98 (NCH<sub>2</sub>), 47.07 ((CH<sub>3</sub>CH<sub>2</sub>)<sub>2</sub>N), 34.58 (CH<sub>2</sub>CO), 32.01 (CH<sub>2</sub>), 29.44 (CH<sub>2</sub>CO), 29.41 (CH<sub>2</sub>CO), 28.86 (CH<sub>2</sub>CO), 27.48 (CH<sub>2</sub>CO), 26.94 (CH<sub>2</sub>CO), 26.16 (CH<sub>2</sub>CO), 25.23 (CH<sub>2</sub>CO), 22.65 (CH<sub>2</sub>CH<sub>3</sub> octyl), 14.32 (CH<sub>3</sub> octyl), 11.87 ((CH<sub>3</sub>CH<sub>2</sub>)<sub>2</sub>N).

*Decyl 6-(diethylamino)hexanoate (6)*. Yield 52 %; b.p. 154–158 °C at 0.018 kPa. Anal. calcd. for C<sub>20</sub>H<sub>41</sub>NO<sub>2</sub>: C, 73.34; H, 12.62; N, 4.28; O, 9.77 %. Found: C, 73.25; H, 12.54; N, 4.17; O, 9.66 %. IR (CHCl<sub>3</sub>, cm<sup>-1</sup>): 2933, 2859, 1727, 1458, 1378, 1270. <sup>1</sup>H-NMR (300 MHz, CDCl<sub>3</sub>, δ / ppm): 4.05 (2H, *t*, *J* = 6.8 Hz, OCH<sub>2</sub>), 2.51 (4H, *q*, *J* = 7.1, 14.3 Hz, (CH<sub>3</sub>CH<sub>2</sub>)<sub>2</sub>N), 2.37 (2H, *t*, *J* = 7.7 Hz, NCH<sub>2</sub>CH<sub>2</sub>), 2.29 (2H, *t*, *J* = 7.6 Hz, CH<sub>2</sub>CO), 1.69–1.23 (20H, *m*, 10 CH<sub>2</sub>), 0.99 (6H, *t*, *J* = 7.1 Hz, (CH<sub>3</sub>CH<sub>2</sub>)<sub>2</sub>N), 0.87 (3H, *t*, *J* = 6.7 Hz, CH<sub>3</sub> decyl). <sup>13</sup>C-NMR

(75 MHz,  $\delta$  / ppm): 173.91 (CO), 64.48 (OCH<sub>2</sub>), 52.69 (NCH<sub>2</sub>), 46.80 ((CH<sub>3</sub>CH<sub>2</sub>)<sub>2</sub>N), 29.31 (CH<sub>2</sub>), 29.22 (CH<sub>2</sub>), 28.59 (CH<sub>2</sub>), 27.21 (CH<sub>2</sub>); 26.66 (CH<sub>2</sub>), 25.89 (CH<sub>2</sub>), 24.96 (CH<sub>2</sub>), 22.65 (CH<sub>2</sub>), 14.15 (CH<sub>3</sub> decyl), 11.59 ((CH<sub>3</sub>CH<sub>2</sub>)<sub>2</sub>N).

*Dodecyl 6-(diethylamino)hexanoate (7)*. Yield: 52 %; b.p. 162–166 at 0.02 kPa. Anal. Calcd. for C<sub>22</sub>H<sub>45</sub>NO<sub>2</sub>: C, 74.31; H, 12.76; N, 3.94; O, 9.0 %. Found: C, 74.27; H, 12.64; N, 4.02; O, 8.92 %. IR (CHCl<sub>3</sub>, cm<sup>-1</sup>): 2931, 2859, 1727, 1465, 1378, 1270. <sup>1</sup>H-NMR (300 MHz, CDCl<sub>3</sub>,  $\delta$  / ppm): 4.03 (2H, *t*, *J* = 6.7 Hz, OCH<sub>2</sub>), 2.50 (4H, *q*, *J* = 14.3, 7.1 Hz, (CH<sub>3</sub>CH<sub>2</sub>)<sub>2</sub>N), 2.38 (2H, *t*, *J* = 7.6 Hz, NCH<sub>2</sub>CH<sub>2</sub>), 2.30 (2H, *t*, *J* = 7.6 Hz, CH<sub>2</sub>CO), 1.63–1.56 (2H, *m*, OCH<sub>2</sub>CH<sub>2</sub>), 1.49–1.35 (2H, *m*, CH<sub>2</sub>), 1.32–1.24 (18H, *m*, 9 CH<sub>2</sub>), 0.99 (6H, *t*, *J* = 7.1 Hz, (CH<sub>3</sub>CH<sub>2</sub>)<sub>2</sub>N), 0.88 (3H, *t*, *J* = 6.7 Hz, CH<sub>3</sub> dodecyl). <sup>13</sup>C-NMR (75 MHz,  $\delta$  / ppm): 173.83 (CO), 64.38 (OCH<sub>2</sub>), 52.69 (NCH<sub>2</sub>), 46.79 ((CH<sub>3</sub>CH<sub>2</sub>)<sub>2</sub>N), 34.30 (CH<sub>2</sub>CO), 29.60 (CH<sub>2</sub>), 29.59 (CH<sub>2</sub>), 29.54 (CH<sub>2</sub>), 29.49 (CH<sub>2</sub>), 29.31 (CH<sub>2</sub>), 29.22 (CH<sub>2</sub>), 28.59 (CH<sub>2</sub>), 27.21 (CH<sub>2</sub>), 26.66 (CH<sub>2</sub>), 25.89 (CH<sub>2</sub>), 24.96 (CH<sub>2</sub>CH<sub>2</sub>CO), 22.65 (CH<sub>2</sub>CH<sub>3</sub> dodecyl), 14.08 (CH<sub>3</sub> dodecyl), 11.59 ((CH<sub>3</sub>CH<sub>2</sub>)<sub>2</sub>N).

*Octyl 6-(pyrrolidin-1-yl)hexanoate (8)*. Yield: 71 %; b.p. 127–136 °C at 0.03 kPa. Anal. Calcd. for C<sub>18</sub>H<sub>35</sub>NO<sub>2</sub>: C, 72.68; H, 11.86; N, 4.71; O, 10.76 %. Found: C, 72.56; H, 11.92; N, 4.61; O, 10.82 %. IR (CHCl<sub>3</sub>, cm<sup>-1</sup>): 2930, 2858, 2801, 1724, 1466, 1352, 1270. <sup>1</sup>H-NMR (300 MHz, CDCl<sub>3</sub>,  $\delta$  / ppm): 4.04 (2H, *t*, *J* = 6.7 Hz, OCH<sub>2</sub>), 2.51–2.35 (6H, *m*, (CH<sub>2</sub>)<sub>2</sub>N pyr. + NCH<sub>2</sub> acyl), 2.30 (2H, *t*, *J* = 7.5 Hz, CH<sub>2</sub>CO), 1.79–1.73 (4H, *m*, 2 CH<sub>2</sub>), 1.69–1.46 (6H, *m*, 3 CH<sub>2</sub>), 1.40–1.19 (14H, *m*, 7 CH<sub>2</sub>), 0.87 (3H, *t*, *J* = 6.9 Hz, CH<sub>3</sub>). <sup>13</sup>C-NMR (75 MHz,  $\delta$  / ppm): 173.59 (CO), 64.40 (OCH<sub>2</sub>), 56.40 (NCH<sub>2</sub> acyl), 54.20 ((CH<sub>2</sub>)<sub>2</sub>N pyr.), 34.30 (CH<sub>2</sub>CO), 31.79 (CH<sub>2</sub>CH<sub>2</sub>CH<sub>3</sub>), 29.22 (CH<sub>2</sub> alkyl), 29.20 (CH<sub>2</sub> alkyl), 28.80 (OCH<sub>2</sub>CH<sub>2</sub>), 28.66 (NCH<sub>2</sub>CH<sub>2</sub> acyl), 27.29 (CH<sub>2</sub>(CH<sub>2</sub>)<sub>2</sub>CO), 25.95 (O(CH<sub>2</sub>)<sub>2</sub>CH<sub>2</sub>), 24.99 (CH<sub>2</sub>CH<sub>2</sub>CO), 23.40 ((CH<sub>2</sub>)<sub>2</sub>CH<sub>2</sub>N pyr., *i.e.*, 2  $\beta$ CH<sub>2</sub> pyr.), 22.66 (CH<sub>2</sub>CH<sub>3</sub>), 14.13 (CH<sub>3</sub>).

*Decyl 6-(pyrrolidin-1-yl)hexanoate (9)*. Yield: 62 %; b.p. 150–155 °C at 0.02 kPa. Anal. Calcd. for C<sub>20</sub>H<sub>39</sub>NO<sub>2</sub>: C, 73.79; H, 12.08; N, 4.30; O, 9.83 %. Found: C, 73.67; H, 12.15; N, 4.21; O, 9.91 %. IR (CHCl<sub>3</sub>, cm<sup>-1</sup>): 2929, 2858, 2800, 1724, 1467, 1353, 1272. <sup>1</sup>H-NMR (300 MHz, CDCl<sub>3</sub>,  $\delta$  / ppm): 4.07 (2H, *t*, *J* = 6.8 Hz, OCH<sub>2</sub>), 2.51–2.34 (6H, *m*, (CH<sub>2</sub>)<sub>2</sub>N pyr.+ NCH<sub>2</sub> acyl), 2.29 (2H, *t*, *J* = 7.5 Hz, CH<sub>2</sub>CO), 1.79–1.73 (4H, *m*, 2 CH<sub>2</sub>), 1.68–1.45 (6H, *m*, 3 CH<sub>2</sub>), 1.41–1.16 (16H, *m*, 8 CH<sub>2</sub>), 0.87 (3H, *t*, *J* = 6.7 Hz, CH<sub>3</sub>). <sup>13</sup>C-NMR (75 MHz,  $\delta$  / ppm): 173.61 (CO), 64.40 (OCH<sub>2</sub>), 56.42 (NCH<sub>2</sub> acyl), 54.21((CH<sub>2</sub>)<sub>2</sub>N pyr.), 34.33 (CH<sub>2</sub>CO), 31.92 (CH<sub>2</sub>CH<sub>2</sub>CH<sub>3</sub>), 29.66 (CH<sub>2</sub> alkyl), 29.62 (CH<sub>2</sub> alkyl), 29.57 (CH<sub>2</sub> alkyl), 29.35 (CH<sub>2</sub> alkyl), 29.29 (CH<sub>2</sub> alkyl), 28.79 (OCH<sub>2</sub>CH<sub>2</sub>), 28.68 (NCH<sub>2</sub>CH<sub>2</sub> acyl), 27.31 (CH<sub>2</sub>(CH<sub>2</sub>)<sub>2</sub>CO), 25.98 (O(CH<sub>2</sub>)<sub>2</sub>CH<sub>2</sub>), 25.01 (CH<sub>2</sub>CH<sub>2</sub>CO), 23.42 ((CH<sub>2</sub>)<sub>2</sub>CH<sub>2</sub>N pyr., *i.e.*, 2  $\beta$ CH<sub>2</sub> pyr.), 22.73 (CH<sub>2</sub>CH<sub>3</sub>), 14.18 (CH<sub>3</sub>).

*Undecyl 6-(pyrrolidin-1-yl)hexanoate (10)*. Yield: 66 %; b.p. 169–170 °C at 0.04 kPa. IR (CHCl<sub>3</sub>, cm<sup>-1</sup>): 2928, 2856, 2801, 1724, 1466, 1352, 1275; <sup>1</sup>H-NMR (300 MHz, CDCl<sub>3</sub>, δ / ppm): 4.04 (2H, *t*, *J* = 6.8 Hz, OCH<sub>2</sub>), 2.51–2.35 (*m*, 6H, (CH<sub>2</sub>)<sub>2</sub>N pyr. + NCH<sub>2</sub> acyl), 2.29 (2H, *t*, *J* = 7.5 Hz, CH<sub>2</sub>CO), 1.81–1.71 (4H, *m*, 2 CH<sub>2</sub>), 1.69–1.47 (6H, *m*, 3 CH<sub>2</sub>); 1.40–1.18 (18H, *m*, 9 CH<sub>2</sub>), 0.87 (3H, *t*, *J* = 6.6 Hz, CH<sub>3</sub>). <sup>13</sup>C-NMR (75 MHz, δ / ppm): 173.57 (CO), 64.37 (OCH<sub>2</sub>), 56.40 (NCH<sub>2</sub> acyl); 54.21 ((CH<sub>2</sub>)<sub>2</sub>N pyr.), 34.30 (CH<sub>2</sub>CO), 31.92 (CH<sub>2</sub>CH<sub>2</sub>CH<sub>3</sub>); 29.62 (CH<sub>2</sub> alkyl); 29.60 (CH<sub>2</sub> alkyl), 29.55 (CH<sub>2</sub> alkyl), 29.35 (CH<sub>2</sub> alkyl), 29.28 (CH<sub>2</sub> alkyl), 28.81 (OCH<sub>2</sub>CH<sub>2</sub>), 28.66 (NCH<sub>2</sub>CH<sub>2</sub> acyl), 27.29 (CH<sub>2</sub>(CH<sub>2</sub>)<sub>2</sub>CO), 25.96 (O(CH<sub>2</sub>)<sub>2</sub>CH<sub>2</sub>), 25.00 (CH<sub>2</sub>CH<sub>2</sub>CO), 23.41 ((CH<sub>2</sub>)<sub>2</sub>CH<sub>2</sub>N pyr., *i.e.*, 2 βCH<sub>2</sub> pyr.), 22.71 (CH<sub>2</sub>CH<sub>3</sub>), 14.17 (CH<sub>3</sub>).

*Dodecyl 6-(pyrrolidin-1-yl)hexanoate (11)*. Yield 49 %; b.p. 182–183 °C at 0.04 kPa. Anal. Calcd. for C<sub>22</sub>H<sub>43</sub>NO<sub>2</sub>: C, 74.73; H, 12.26; N, 3.96; O, 9.05 %. Found: C, 74.68; H, 12.35; N, 3.89; O, 9.11 %. IR (CHCl<sub>3</sub>, cm<sup>-1</sup>): 2928, 2856, 2801, 1724, 1466, 1352, 1275. <sup>1</sup>H-NMR (300 MHz, CDCl<sub>3</sub>, δ / ppm): 4.04 (2H, *t*, *J* = 6.8 Hz, OCH<sub>2</sub>), 2.52–2.37 (6H, *m*, (CH<sub>2</sub>)<sub>2</sub>N pyr. + NCH<sub>2</sub> acyl), 2.30 (2H, *t*, *J* = 7.4 Hz, CH<sub>2</sub>CO), 1.81–1.71 (4H, *m*, 2 CH<sub>2</sub>), 1.70–1.46 (6H, *m*, 3 CH<sub>2</sub>), 1.42–1.17 (20H, *m*, 10 CH<sub>2</sub>), 0.87 (3H, *t*, *J* = 6.8 Hz, CH<sub>3</sub>). <sup>13</sup>C-NMR (75 MHz, δ / ppm): 173.61 (CO), 64.40 (OCH<sub>2</sub>), 56.42 (NCH<sub>2</sub> acyl), 54.22 (CH<sub>2</sub>)<sub>2</sub>N pyr.), 34.33 (CH<sub>2</sub>CO), 31.95 (CH<sub>2</sub>CH<sub>2</sub>CH<sub>3</sub>), 29.69 (CH<sub>2</sub> alkyl), 29.67 (CH<sub>2</sub> alkyl), 29.62 (CH<sub>2</sub> alkyl), 29.57 (CH<sub>2</sub> alkyl), 29.39 (CH<sub>2</sub> alkyl), 29.30 (CH<sub>2</sub> alkyl), 28.81 (OCH<sub>2</sub>CH<sub>2</sub>), 28.69 (NCH<sub>2</sub>CH<sub>2</sub> acyl), 27.32 (CH<sub>2</sub>(CH<sub>2</sub>)<sub>2</sub>CO), 25.98 (O(CH<sub>2</sub>)<sub>2</sub>CH<sub>2</sub>), 25.02 (CH<sub>2</sub>CH<sub>2</sub>CO), 23.43 ((CH<sub>2</sub>)<sub>2</sub>CH<sub>2</sub>N pyr., *i.e.*, 2 βCH<sub>2</sub> pyr.), 22.74 (CH<sub>2</sub>CH<sub>3</sub>), 14.19 (CH<sub>3</sub>).

*Octyl 6-(piperidin-1-yl)hexanoate (12)*. Yield: 62 %; b.p. 163 °C at 0.04–0.05 kPa; Anal. Calcd. for C<sub>19</sub>H<sub>37</sub>NO<sub>2</sub>: C, 73.26; H, 11.97; N, 4.50; O, 10.27 %. Found: C, 73.18; H, 12.05; N, 4.43; O, 10.39 %. IR (CHCl<sub>3</sub>, cm<sup>-1</sup>): 2934, 2858, 1724, 1469, 1456, 1378, 1271, 1258. <sup>1</sup>H-NMR (300 MHz, CDCl<sub>3</sub>, δ / ppm): 4.04 (2H, *t*, *J* = 6.5 Hz, OCH<sub>2</sub>), 2.41–2.20 (8H, *m*, (4 CH<sub>2</sub>), 1.69–1.37 (12H, *m*, 6 CH<sub>2</sub>), 1.36–1.20 (12H, *m*, 6 CH<sub>2</sub>), 0.88 (3H, *t*, *J* = 6.8 Hz, CH<sub>3</sub>). <sup>13</sup>C-NMR (75 MHz, CDCl<sub>3</sub>, δ / ppm): 173.61 (CO); 64.39 (OCH<sub>2</sub>), 59.35 (NCH<sub>2</sub> acyl), 54.63 ((CH<sub>2</sub>)<sub>2</sub>N piperid.), 34.33 (CH<sub>2</sub>CO), 31.81 (CH<sub>2</sub>); 29.25 (CH<sub>2</sub>) 29.22 (CH<sub>2</sub>), 28.67 (CH<sub>2</sub>), 27.33 (NCH<sub>2</sub>CH<sub>2</sub>), 26.68 (CH<sub>2</sub>); 26.04 (CH<sub>2</sub>), 25.97 (CH<sub>2</sub>), 25.02 (CH<sub>2</sub>CH<sub>2</sub>CO), 24.54 (CH<sub>2</sub>), 22.68 (CH<sub>2</sub>CH<sub>3</sub>); 14.15 (CH<sub>3</sub>).

*2-Octyl 6-(piperidin-1-yl)hexanoate (13)*. Yield: 68 %; pale yellow oil. Anal. Calcd. for C<sub>19</sub>H<sub>37</sub>NO<sub>2</sub>: C, 73.26; H, 11.97; N, 4.50; O, 10.27 %. Found: C, 73.21; H, 12.08; N, 4.41; O, 10.34 %. IR (CHCl<sub>3</sub>, cm<sup>-1</sup>): 2936, 2858, 1725, 1469, 1456, 1378, 1271, 1257. <sup>1</sup>H-NMR (300 MHz, CDCl<sub>3</sub>, δ / ppm): 4.98–4.82 (1H, *m*, OCH), 2.43–2.20 (8H, *m*, 4 CH<sub>2</sub>) 1.69–1.37 (12H, *m*, 6 CH<sub>2</sub>), 1.36–1.13 (13H, *m*, 5 CH<sub>2</sub> + CHCH<sub>3</sub>), 0.87 (3H, *t*, *J* = 6.80 Hz, terminal CH<sub>3</sub>). <sup>13</sup>C-NMR (75 MHz, CDCl<sub>3</sub>, δ / ppm) 173.17 (CO), 70.71 (OCH), 59.37 (NCH<sub>2</sub> acyl), 54.63

((CH<sub>2</sub>)<sub>2</sub>N piperid.), 35.96 (OCHCH<sub>2</sub>), 34.69 (CH<sub>2</sub>CO), 31.78 (CH<sub>2</sub>), 29.14 (CH<sub>2</sub>), 27.32 (NCH<sub>2</sub>CH<sub>2</sub>), 26.70 (CH<sub>2</sub>), 26.04 (CH<sub>2</sub>), 25.41 (OCHCH<sub>2</sub>CH<sub>2</sub>), 25.10 (CH<sub>2</sub>CH<sub>2</sub>CO), 24.54 (CH<sub>2</sub>(CH<sub>2</sub>)<sub>2</sub> piperid.), 22.62 (CH<sub>2</sub>CH<sub>3</sub>), 20.06 (OCHCH<sub>3</sub>), 14.13 (CH<sub>2</sub>CH<sub>3</sub>).

*Nonyl 6-(piperidin-1-yl)hexanoate (14)*. Yield: 47 %; pale yellow oil. Anal. Calcd. for C<sub>20</sub>H<sub>39</sub>NO<sub>2</sub>: C, 73.79; H, 12.08; N, 4.30; O, 9.83 %. Found: C, 73.69; H, 12.15; N, 4.24; O, 9.94 %. IR (CHCl<sub>3</sub>, cm<sup>-1</sup>): 2934, 2857, 1724, 1468, 1456, 1378, 1271, 1257. <sup>1</sup>H-NMR (300 MHz, CDCl<sub>3</sub>, δ / ppm): 4.03 (2H, *t*, *J* = 6.7 Hz, OCH<sub>2</sub>), 2.41–2.21 (8H, *m*, 4 CH<sub>2</sub>), 1.70–1.18 (26H, *m*, 13 CH<sub>2</sub>), 0.86 (3H, *t*, *J* = 6.7 Hz, CH<sub>3</sub>). <sup>13</sup>C-NMR (75 MHz, CDCl<sub>3</sub>, δ / ppm): 173.81 (CO), 64.38 (OCH<sub>2</sub>), 59.30 (NCH<sub>2</sub> acyl), 54.57 ((CH<sub>2</sub>)<sub>2</sub>N piperid.), 34.25 (CH<sub>2</sub>CO), 31.80 (CH<sub>2</sub>), 29.43 (CH<sub>2</sub>), 29.20 (CH<sub>2</sub>), 29.19 (CH<sub>2</sub>), 28.58 (CH<sub>2</sub>), 27.24 (CH<sub>2</sub>), 26.56 (CH<sub>2</sub>), 25.91 (CH<sub>2</sub>), 25.88 (CH<sub>2</sub>), 24.92 (CH<sub>2</sub>CH<sub>2</sub>CO), 24.42 (CH<sub>2</sub>), 22.61 (CH<sub>2</sub>CH<sub>3</sub>), 14.06 (CH<sub>3</sub>).

*Decyl 6-(piperidin-1-yl)hexanoate (15)*. Yield: 55 %; pale yellow oil. Anal. Calcd. for C<sub>21</sub>H<sub>41</sub>NO<sub>2</sub>: C, 74.28; H, 12.17; N, 4.13; O, 9.42 %. Found: C, 74.18; H, 12.25; N, 4.07; O, 9.53 %. IR (CHCl<sub>3</sub> cm<sup>-1</sup>): 2931, 2857, 1724, 1468, 1456, 1378, 1271, 1258. <sup>1</sup>H-NMR (300 MHz, CDCl<sub>3</sub>, δ / ppm): 4.04 (2H, *t*, *J* = 6.7 Hz, OCH<sub>2</sub>), 2.38–2.30 (4H, *m*, 2 CH<sub>2</sub>), 2.26 (2H, *t*, *J* = 7.7 Hz, CH<sub>2</sub>CO), 1.67–1.48 (10H, *m*, 5 CH<sub>2</sub>), 1.35–1.24 (20H, *m*, 10 CH<sub>2</sub>), 0.87 (3H, *t*, *J* = 6.7 Hz, CH<sub>3</sub>). <sup>13</sup>C-NMR (75 MHz, CDCl<sub>3</sub>, δ / ppm): 173.86 (CO), 64.41 (OCH<sub>2</sub>), 59.36 (NCH<sub>2</sub> acyl), 54.62 ((CH<sub>2</sub>)<sub>2</sub>N piperid.), 34.29 (CH<sub>2</sub>CO), 31.89 (CH<sub>2</sub>), 29.62 (CH<sub>2</sub>), 29.61 (CH<sub>2</sub>), 29.55 (CH<sub>2</sub>), 29.51 (CH<sub>2</sub>), 29.33 (CH<sub>2</sub>), 29.24 (CH<sub>2</sub>); 28.61 (CH<sub>2</sub>), 27.27 (CH<sub>2</sub>), 26.62 (CH<sub>2</sub>), 25.97 (CH<sub>2</sub>), 25.91 (CH<sub>2</sub>), 24.95 (CH<sub>2</sub>CH<sub>2</sub>CO), 24.47 (CH<sub>2</sub>), 22.66 (CH<sub>2</sub>CH<sub>3</sub>), 14.10 (CH<sub>3</sub>).

*Undecyl 6-(piperidin-1-yl)hexanoate (16)*. Yield 53 %; pale yellow oil. Anal. Calcd. for C<sub>22</sub>H<sub>43</sub>NO<sub>2</sub>: C, 74.73; H, 12.26; N, 3.96; O, 9.05 %. Found: C, 74.68; H, 12.35; N, 3.88; O, 9.12 %. IR (CHCl<sub>3</sub>, cm<sup>-1</sup>): 2927, 2856, 1724, 1468, 1457, 1378, 1271, 1258. <sup>1</sup>H-NMR (300 MHz, CDCl<sub>3</sub>, δ / ppm): 4.04 (2H, *t*, *J* = 6.7 Hz, OCH<sub>2</sub>), 2.40–2.24 (8H, *m*, 4 CH<sub>2</sub>), 1.68–1.25 (30H, *m*, 15 CH<sub>2</sub>), 0.87 (3H, *t*, *J* = 6.6 Hz, CH<sub>3</sub>). <sup>13</sup>C-NMR (75 MHz, CDCl<sub>3</sub>, δ / ppm): 174.11 (CO), 64.67 (OCH<sub>2</sub>), 59.57 (NCH<sub>2</sub> acyl), 54.84 ((CH<sub>2</sub>)<sub>2</sub>N piperid.), 34.54 (CH<sub>2</sub>CO), 32.14 (CH<sub>2</sub>), 31.82 (CH<sub>2</sub>), 29.84 (CH<sub>2</sub>); 29.81 (CH<sub>2</sub>), 29.76 (CH<sub>2</sub>), 29.57 (CH<sub>2</sub>), 29.49 (CH<sub>2</sub>), 28.87 (CH<sub>2</sub>), 27.52 (CH<sub>2</sub>), 26.83 (CH<sub>2</sub>), 26.18 (CH<sub>2</sub>), 25.20 (CH<sub>2</sub>), 24.69 (CH<sub>2</sub>), 22.89 (CH<sub>2</sub>CH<sub>3</sub>); 14.36 (CH<sub>3</sub>).

*Dodecyl 6-(piperidin-1-yl)hexanoate (17)*. Yield: 78 %; pale yellow oil. Anal. Calcd. for C<sub>23</sub>H<sub>45</sub>NO<sub>2</sub>: C, 75.15; H, 12.34; N, 3.81; O, 8.70 %. Found: C, 75.08; H, 12.42; N, 3.75; O, 8.79 %. IR (CHCl<sub>3</sub>, cm<sup>-1</sup>): 2930, 2856, 1724, 1468, 1457, 1378, 1271, 1258; <sup>1</sup>H-NMR (300 MHz, CDCl<sub>3</sub>, δ / ppm): 4.05 (2H, *t*, *J* = 6.7 Hz, OCH<sub>2</sub>), 2.40–2.24 (8H, *m*, 4 CH<sub>2</sub>), 1.69–1.26 (32H, *m*, 16 CH<sub>2</sub>), 0.88 (3H, *t*, *J* = 6.6 Hz, CH<sub>3</sub>). <sup>13</sup>C-NMR (75 MHz, CDCl<sub>3</sub>, δ / ppm): 173.86 (CO),

64.41 (OCH<sub>2</sub>), 59.36 (NCH<sub>2</sub> acyl), 54.62 ((CH<sub>2</sub>)<sub>2</sub>N piperid.), 34.29 (CH<sub>2</sub>CO), 31.89 (CH<sub>2</sub>), 29.62 (CH<sub>2</sub>), 29.61 (CH<sub>2</sub>), 29.55 (CH<sub>2</sub>), 29.51 (CH<sub>2</sub>), 29.33(CH<sub>2</sub>), 29.23 (CH<sub>2</sub>), 28.61 (CH<sub>2</sub>), 27.27 (NCH<sub>2</sub>CH<sub>2</sub> acyl), 26.62 (CH<sub>2</sub>), 25.97 (CH<sub>2</sub>), 25.91 (CH<sub>2</sub>), 24.95 (CH<sub>2</sub>CH<sub>2</sub>CO), 24.47 (CH<sub>2</sub>), 22.66 (CH<sub>2</sub>CH<sub>3</sub>), 14.10 (CH<sub>3</sub>).

*Octyl 6-(morpholin-4-yl)hexanoate (18)*. Yield: 58 %, b.p. 161–163 °C at 0.04–0.05 kPa. Anal. Calcd. for C<sub>18</sub>H<sub>35</sub>NO<sub>3</sub>: C, 68.97; H, 11.25; N, 4.47; O, 15.31 %. Found: C, 69.08; H, 11.33; N, 4.38; O, 15.39 %. IR (CHCl<sub>3</sub>, cm<sup>-1</sup>): 2930, 2859, 1724, 1468, 1373, 1287, 1258. <sup>1</sup>H-NMR (300 MHz, CDCl<sub>3</sub>, δ / ppm): 4.04 (2H, *t*, *J* = 6.7 Hz, OCH<sub>2</sub> alkyl), 3.70 (4H, *t*, *J* = 4.6 Hz, O(CH<sub>2</sub>CH<sub>2</sub>)<sub>2</sub>N), 2.41 (4H, *t*, O(CH<sub>2</sub>CH<sub>2</sub>)<sub>2</sub>N), 2.30–2.26 (4H, *m*, CH<sub>2</sub>CO + NCH<sub>2</sub> acyl), 1.73–1.41 (6H, *m*, 3 CH<sub>2</sub>), 1.40–1.18 (12H, *m*, 6 CH<sub>2</sub>), 0.87 (3H, *t*, *J* = 6.8 Hz, CH<sub>3</sub>).

<sup>13</sup>C-NMR (75 MHz, CDCl<sub>3</sub>, δ / ppm): 173.53 (CO), 66.93 ((CH<sub>2</sub>)<sub>2</sub>O morph.), 64.41 (OCH<sub>2</sub>), 58.86 (NCH<sub>2</sub> acyl), 53.74 ((CH<sub>2</sub>)<sub>2</sub>N morph.), 34.28 (CH<sub>2</sub>CO), 31.79 (CH<sub>2</sub>CH<sub>2</sub>CH<sub>3</sub>), 29.23 (CH<sub>2</sub>), 29.21 (CH<sub>2</sub>), 28.66 (OCH<sub>2</sub>CH<sub>2</sub>), 27.05 (NCH<sub>2</sub>CH<sub>2</sub> acyl), 26.26 (CH<sub>2</sub>(CH<sub>2</sub>)<sub>2</sub>CO), 25.95 (O(CH<sub>2</sub>)<sub>2</sub>CH<sub>2</sub>), 24.93 (CH<sub>2</sub>CH<sub>2</sub>CO), 22.67 (CH<sub>2</sub>CH<sub>3</sub>), 14.15 (CH<sub>3</sub>).

*Nonyl 6-(morpholin-4-yl)hexanoate (19)*. Yield 56 %; b.p. 175–179 °C at 0.04–0.06 kPa. Anal. Calcd. for C<sub>19</sub>H<sub>37</sub>NO<sub>3</sub>: C, 69.68; H, 11.39; N, 4.28; O, 14.66 %. Found: C, 69.78; H, 11.43; N, 4.19; O, 14.69 %. IR (CHCl<sub>3</sub>, cm<sup>-1</sup>): 2928, 2858, 1725, 1467, 1375, 1287, 1259. <sup>1</sup>H-NMR (300MHz, CDCl<sub>3</sub>, δ / ppm): 4.15–3.95 (2H, *m*, OCH<sub>2</sub>), 3.70 (4H, *t*, *J* = 6.8 Hz, O(CH<sub>2</sub>CH<sub>2</sub>)<sub>2</sub>N), 2.41 (4H, *t*, *J* = 4.5 Hz, O(CH<sub>2</sub>CH<sub>2</sub>)<sub>2</sub>N), 2.34–2.24 (4H, *m*, CH<sub>2</sub>CO + NCH<sub>2</sub> acyl), 1.70–1.43 (6H, *m*, 3 CH<sub>2</sub>), 1.39–1.19 (14H, *m*, 7 CH<sub>2</sub>), 0.87 (3H, *t*, *J* = 6.8 Hz, CH<sub>3</sub>). <sup>13</sup>C-NMR (75 MHz, CDCl<sub>3</sub>, δ / ppm): 173.52 (CO), 66.94 ((CH<sub>2</sub>)<sub>2</sub>O morph.), 64.41 (OCH<sub>2</sub>), 58.87 (NCH<sub>2</sub> acyl), 53.75 ((CH<sub>2</sub>)<sub>2</sub>N morph.), 34.28 (CH<sub>2</sub>CO), 31.91 (CH<sub>2</sub>CH<sub>2</sub>CH<sub>3</sub>), 29.55 (CH<sub>2</sub>), 29.33 (CH<sub>2</sub>), 29.27 (CH<sub>2</sub>), 28.66 (OCH<sub>2</sub>CH<sub>2</sub>), 27.05 (NCH<sub>2</sub>CH<sub>2</sub> acyl), 26.27 (CH<sub>2</sub>(CH<sub>2</sub>)<sub>2</sub>CO), 25.96 (O(CH<sub>2</sub>)<sub>2</sub>CH<sub>2</sub>), 24.94 (CH<sub>2</sub>CH<sub>2</sub>CO), 22.71 (CH<sub>2</sub>CH<sub>3</sub>), 14.17 (CH<sub>3</sub>).

*Decyl 6-(morpholin-4-yl)hexanoate (20)*. Yield 48 %; b.p. 150 °C at 0.02 kPa. Anal. Calcd. for C<sub>20</sub>H<sub>39</sub>NO<sub>3</sub>: C, 70.33; H, 11.51; N, 4.10; O, 14.05 %. Found: C, 70.44; H, 11.63; N, 4.08; O, 14.11 %. IR (CHCl<sub>3</sub>, cm<sup>-1</sup>): 2929, 2857, 1724, 1467, 1375, 1287, 1258. <sup>1</sup>H-NMR (300 MHz, CDCl<sub>3</sub>, δ / ppm): 4.05 (2H, *t*, *J* = 6.7 Hz, OCH<sub>2</sub>), 3.71 (4H, *t*, *J* = 5.0 Hz, O(CH<sub>2</sub>CH<sub>2</sub>)<sub>2</sub>N), 2.42 (4H, *t*, *J* = 4.5 Hz, O(CH<sub>2</sub>CH<sub>2</sub>)<sub>2</sub>N), 2.35–2.27 (4H, *m*, CH<sub>2</sub>CO + NCH<sub>2</sub> acyl), 1.72–1.44 (6H, *m*, 3 CH<sub>2</sub>), 1.42–1.17 (16H, *m*, 8 CH<sub>2</sub>), 0.87 (3H, *t*, *J* = 6.7 Hz, CH<sub>3</sub>). <sup>13</sup>C-NMR (75 MHz, CDCl<sub>3</sub>, δ / ppm): 173.52 (CO), 66.93 ((CH<sub>2</sub>)<sub>2</sub>O morph.), 64.41 (OCH<sub>2</sub>), 58.85 (NCH<sub>2</sub> acyl), 53.74 ((CH<sub>2</sub>)<sub>2</sub>N morph.), 34.26 (CH<sub>2</sub>CO), 31.86 (CH<sub>2</sub>CH<sub>2</sub>CH<sub>3</sub>), 29.50 (CH<sub>2</sub>), 29.44 (CH<sub>2</sub>), 29.27 (CH<sub>2</sub>), 29.25 (CH<sub>2</sub>), 28.66 (OCH<sub>2</sub>CH<sub>2</sub>), 27.04 (NCH<sub>2</sub>CH<sub>2</sub> acyl), 26.26 (CH<sub>2</sub>(CH<sub>2</sub>)<sub>2</sub>CO), 25.95 (O(CH<sub>2</sub>)<sub>2</sub>CH<sub>2</sub>), 24.93 (CH<sub>2</sub>CH<sub>2</sub>CO), 22.69 (CH<sub>2</sub>CH<sub>3</sub>), 14.16 (CH<sub>3</sub>).

*Undecyl 6-(morpholin-4-yl)hexanoate (21)*. Yield 43 %; b.p. 180 °C at 0.055 kPa. Anal. Calcd. for C<sub>21</sub>H<sub>41</sub>NO<sub>3</sub>: C, 70.94; H, 11.62; N, 3.94; O, 13.50 %. Found: C, 71.08; H, 11.73; N, 3.82; O, 13.59 %. IR (CHCl<sub>3</sub>, cm<sup>-1</sup>): 2928, 2857, 1725, 1467, 1375, 1287, 1259. <sup>1</sup>H-NMR (300 MHz, CDCl<sub>3</sub>, δ / ppm): 4.07 (2H, *t*, *J* = 6.8 Hz, OCH<sub>2</sub>), 3.71 (4H, *t*, *J* = 4.9 Hz, O(CH<sub>2</sub>CH<sub>2</sub>)<sub>2</sub>N), 2.41 (4H, *t*, *J* = 5.7 Hz, O(CH<sub>2</sub>CH<sub>2</sub>)<sub>2</sub>N), 2.35–2.23 (4H, *m*, CH<sub>2</sub>CO + NCH<sub>2</sub> acyl), 1.73–1.42 (6H, *m*, 3 CH<sub>2</sub>), 1.40–1.15 (18H, *m*, 9 CH<sub>2</sub>), 0.86 (3H, *t*, *J* = 7.0 Hz, CH<sub>3</sub>). <sup>13</sup>C-NMR (75 MHz, CDCl<sub>3</sub>, δ / ppm): 173.48 (CO), 66.92 ((CH<sub>2</sub>)<sub>2</sub>O morph.), 64.38 (OCH<sub>2</sub>), 58.81 (NCH<sub>2</sub> acyl), 53.73 ((CH<sub>2</sub>)<sub>2</sub>N morph.), 34.25 (CH<sub>2</sub>CO), 31.91 (CH<sub>2</sub>CH<sub>2</sub>CH<sub>3</sub>), 29.69 (CH<sub>2</sub>), 29.61 (CH<sub>2</sub>), 29.52 (CH<sub>2</sub>), 29.36 (O(CH<sub>2</sub>)<sub>3</sub>CH<sub>2</sub>), 29.26 (CH<sub>2</sub>(CH<sub>2</sub>)<sub>2</sub>CH<sub>3</sub>), 28.64 (OCH<sub>2</sub>CH<sub>2</sub>), 27.03 (NCH<sub>2</sub>CH<sub>2</sub> acyl), 26.22 (CH<sub>2</sub>(CH<sub>2</sub>)<sub>2</sub>CO), 25.94 (O(CH<sub>2</sub>)<sub>2</sub>CH<sub>2</sub>), 24.98 (CH<sub>2</sub>CH<sub>2</sub>CO), 22.73 (CH<sub>2</sub>CH<sub>3</sub>), 14.18 (CH<sub>3</sub>).

*Dodecyl 6-(morpholin-4-yl)hexanoate (22)*. Yield 29 %; b.p. 178–182 °C at 0.03 kPa. Anal. Calcd. for C<sub>22</sub>H<sub>43</sub>NO<sub>3</sub>: C, 71.5; H, 11.73; N, 3.79; O, 12.99 %. Found: C, 71.58; H, 11.81; N, 3.65; O, 13.09 %. IR (CHCl<sub>3</sub>, cm<sup>-1</sup>): 2927, 2856, 1724, 1467, 1374, 1287, 1257. <sup>1</sup>H-NMR (300 MHz, CDCl<sub>3</sub>, δ / ppm): 4.05 (2H, *t*, *J* = 6.8 Hz, OCH<sub>2</sub>), 3.71 (4H, *t*, *J* = 4.9 Hz, O(CH<sub>2</sub>CH<sub>2</sub>)<sub>2</sub>N), 2.42 (4H, *t*, *J* = 4.4 Hz, O(CH<sub>2</sub>CH<sub>2</sub>)<sub>2</sub>N), 2.35–2.27 (4H, *m*, CH<sub>2</sub>CO + NCH<sub>2</sub> acyl), 1.73–1.43 (6H, *m*, 3 CH<sub>2</sub>), 1.41–1.19 (20H, *m*, 10 CH<sub>2</sub>), 0.88 (3H, *t*, *J* = 6.7 Hz, CH<sub>3</sub>). <sup>13</sup>C-NMR (75 MHz, CDCl<sub>3</sub>, δ / ppm): 173.47 (CO), 66.92 ((CH<sub>2</sub>)<sub>2</sub>O morph.), 64.38 (OCH<sub>2</sub>), 58.84 (NCH<sub>2</sub> acyl), 53.73 ((CH<sub>2</sub>)<sub>2</sub>N morph.), 34.25 (CH<sub>2</sub>CO), 31.91 (CH<sub>2</sub>CH<sub>2</sub>CH<sub>3</sub>), 29.65 (CH<sub>2</sub>), 29.64 (CH<sub>2</sub>), 29.58 (CH<sub>2</sub>), 29.54 (CH<sub>2</sub>), 29.36 (O(CH<sub>2</sub>)<sub>3</sub>CH<sub>2</sub>), 29.26 (CH<sub>2</sub>(CH<sub>2</sub>)<sub>2</sub>CH<sub>3</sub>), 28.65 (OCH<sub>2</sub>CH<sub>2</sub>), 27.03 (NCH<sub>2</sub>CH<sub>2</sub> acyl), 26.26 (CH<sub>2</sub>(CH<sub>2</sub>)<sub>2</sub>CO), 25.94 (O(CH<sub>2</sub>)<sub>2</sub>CH<sub>2</sub>), 24.92 (CH<sub>2</sub>CH<sub>2</sub>CO), 22.70 (CH<sub>2</sub>CH<sub>3</sub>), 14.16 (CH<sub>3</sub>).

*6-(Dimethylamino)-N-octyl-hexanamide (24)*. Yield: 77 %; b.p.: 152 °C at 0.4 kPa. Anal. Calcd. for C<sub>16</sub>H<sub>34</sub>N<sub>2</sub>O: C, 71.06; H, 12.67; N, 10.36; O, 5.92 %. Found: C, 71.12; H, 12.75; N, 10.54; O, 6.01 %. IR (KBr, cm<sup>-1</sup>): 3449, 2930, 2859, 1660, 1518, 1467, 1378. <sup>1</sup>H-NMR (300 MHz, CDCl<sub>3</sub>, δ / ppm): 5.60 (1H, *s*, CONH), 3.21 (2H, *q*, *J* = 7.0, 13.1 Hz, CH<sub>2</sub>), 2.25–2.12 (10H, *m*, (CH<sub>3</sub>)<sub>2</sub>N + 2 CH<sub>2</sub>), 1.68–1.58 (2H, *m*, CH<sub>2</sub>), 1.48–1.41 (4H, *m*, 2 CH<sub>2</sub>), 1.36–1.25 (12H, *m*, 6 CH<sub>2</sub>), 0.88 (3H, *t*, *J* = 6.7 Hz, CH<sub>3</sub> octyl). <sup>13</sup>C-NMR (75 MHz, CDCl<sub>3</sub>, δ / ppm): 172.83 (CO), 59.52 ((CH<sub>3</sub>)<sub>2</sub>NCH<sub>2</sub>), 45.56 ((CH<sub>3</sub>)<sub>2</sub>N), 39.46 (CONHCH<sub>2</sub>), 36.74 (CH<sub>2</sub>), 31.74 (CH<sub>2</sub>), 29.65 (CH<sub>2</sub>), 29.22 (CH<sub>2</sub>), 29.17 (CH<sub>2</sub>), 27.38 (CH<sub>2</sub>), 26.98 (CH<sub>2</sub>), 26.89 (CH<sub>2</sub>), 25.60 (CH<sub>2</sub>), 22.59 (CH<sub>2</sub>), 14.05 (CH<sub>3</sub>).

*6-(Dimethylamino)-N-(1-methylheptyl)-hexanamide (25)*. Yield: 54 %; b.p.: 176–178 °C at 0.6–0.8 kPa. Anal. Calcd. for C<sub>16</sub>H<sub>34</sub>N<sub>2</sub>O: C, 71.06; H, 12.67; N, 10.36; O, 5.92 %. Found: C, 71.10; H, 12.73; N, 10.45; O, 5.87 %. IR (KBr, cm<sup>-1</sup>): 3436, 2931, 2860, 1656, 1511, 1466, 1379. <sup>1</sup>H-NMR (300 MHz, CDCl<sub>3</sub>, δ / ppm): 5.31 (1H, *d*, *J* = 8.8 Hz, CONH), 4.08–3.88 (1H, *m*, NHCH(CH<sub>3</sub>)CH<sub>2</sub>),

2.32–2.20 (8H, *m*, (CH<sub>3</sub>)<sub>2</sub>N + CH<sub>2</sub>), 2.15 (2H, *t*, *J* = 7.3 Hz, CH<sub>2</sub>CO), 1.73–1.35 (16H, *m*, 8 CH<sub>2</sub>), 1.11 (3H, *d*, *J* = 6.6 Hz, NHCH(CH<sub>3</sub>)CH<sub>2</sub>), 0.88 (3H, *t*, *J* = 6.4 Hz, CH<sub>3</sub> terminal). <sup>13</sup>C-NMR (75 MHz, CDCl<sub>3</sub>, δ / ppm): 172.05 (CO), 59.57 ((CH<sub>3</sub>)<sub>2</sub>NCH<sub>2</sub>), 45.38 (CONHCH), 45.08 ((CH<sub>3</sub>)<sub>2</sub>N), 37.05 (CONHCH(CH<sub>3</sub>)CH<sub>2</sub>), 36.94 (CH<sub>2</sub>CO), 31.75 (CH<sub>2</sub>), 29.14 (CH<sub>2</sub>), 27.34 (CH<sub>2</sub>), 27.00 (CH<sub>2</sub>), 25.97 (CH<sub>2</sub>), 25.67 (CH<sub>2</sub>), 22.53 (CH<sub>2</sub>), 21.02 (CONHCH(CH<sub>3</sub>)CH<sub>2</sub>), 13.97 (CH<sub>3</sub> terminal).

*6-(Dimethylamino)-N-nonyl-hexanamide (26)*. Yield 59 %; b.p. 211–212 °C at 0.7–0.8 kPa. Anal. Calcd. for C<sub>17</sub>H<sub>36</sub>N<sub>2</sub>O: C, 71.77; H, 12.76; N, 9.85; O, 5.62 %. Found: C, 71.70; H, 12.81; N, 9.91; O, 5.55 %. IR (KBr, cm<sup>-1</sup>): 3449, 2930, 2858, 1660, 1518, 1467, 1378. <sup>1</sup>H-NMR (300 MHz, CDCl<sub>3</sub>, δ / ppm): 5.64 (1H, *s*, CONH); 3.21 (2H, *q*, *J* = 7.0, 13.1 Hz, CH<sub>2</sub>), 2.24–2.11 (10H, *m*, (CH<sub>3</sub>)<sub>2</sub>N + 2 CH<sub>2</sub>), 1.67–1.57 (2H, *m*, CH<sub>2</sub>), 1.50–1.42 (4H, *m*, 2 CH<sub>2</sub>), 1.40–1.23 (14H, *m*, 7 CH<sub>2</sub>), 0.85 (3H, *t*, *J* = 6.7 Hz, CH<sub>3</sub> nonyl). <sup>13</sup>C-NMR (75 MHz, CDCl<sub>3</sub>, δ / ppm): 173.10 (CO), 59.78 ((CH<sub>3</sub>)<sub>2</sub>NCH<sub>2</sub>); 45.71 ((CH<sub>3</sub>)<sub>2</sub>N) 39.72 (CONHCH<sub>2</sub>), 36.98 (CH<sub>2</sub>), 32.07 (CH<sub>2</sub>), 29.91 (CH<sub>2</sub>), 29.73 (CH<sub>2</sub>), 29.53 (CH<sub>2</sub>), 29.46 (CH<sub>2</sub>), 27.64 (CH<sub>2</sub>), 27.24 (CH<sub>2</sub>), 27.16 (CH<sub>2</sub>), 25.87 (CH<sub>2</sub>), 22.87 (CH<sub>2</sub>), 14.33 (CH<sub>3</sub>).

*6-(Dimethylamino)-N-decyl-hexanamide (27)*. Yield 69 %; colorless powder, m.p. 36–40 °C, b.p. 173–175 °C at 0.03 kPa. Anal. Calcd. for C<sub>18</sub>H<sub>38</sub>N<sub>2</sub>O: C, 72.42; H, 12.83; N, 9.38; O, 5.36 %. Found: C, 72.35; H, 12.81; N, 9.45; O, 5.28 %. IR (KBr, cm<sup>-1</sup>): 3449, 2928, 2856, 1660, 1518, 1467, 1378. <sup>1</sup>H-NMR (300 MHz, CDCl<sub>3</sub>, δ / ppm): 5.60 (1H, *s*, (CONH), 3.21 (2H, *q*, *J* = 7.0, 13.2 Hz, CH<sub>2</sub>), 2.26–2.13 (10H, *m*, ((CH<sub>3</sub>)<sub>2</sub>N + 2 CH<sub>2</sub>), 1.67–1.57 (2H, *m*, CH<sub>2</sub>), 1.49–1.40 (4H, *m*, 2 CH<sub>2</sub>), 1.38–1.21 (16H *m*, 8 CH<sub>2</sub>), 0.87 (3H, *t*, *J* = 6.7 Hz, CH<sub>3</sub> decyl). <sup>13</sup>C-NMR (75 MHz, CDCl<sub>3</sub>, δ / ppm): 172.82 (CO), 59.51 ((CH<sub>3</sub>)<sub>2</sub>NCH<sub>2</sub>) 45.45 ((CH<sub>3</sub>)<sub>2</sub>N), 39.46 (CONHCH<sub>2</sub>), 36.74 (CH<sub>2</sub>CO), 29.05 (CH<sub>2</sub>), 29.12 (CH<sub>2</sub>), 29.27 (CH<sub>2</sub>), 29.48 (CH<sub>2</sub>), 27.37 (CH<sub>2</sub>), 26.97 (CH<sub>2</sub>), 26.90 (CH<sub>2</sub>), 25.60 (CH<sub>2</sub>), 22.64 (CH<sub>2</sub>), 14.09 (CH<sub>3</sub>).

*6-(Dimethylamino)-N-dodecyl-hexanamide (28)*. Yield 40 %; colorless powder, m.p. 48–49 °C (48–50 °C).<sup>12</sup> IR (KBr, cm<sup>-1</sup>): 3449, 2927, 2856, 1660, 1518, 1467, 1377. <sup>1</sup>H-NMR (300 MHz, CDCl<sub>3</sub>, δ / ppm): 5.57 (1H *s*, (CONH), 3.21 (2H, *q*, *J* = 7.0, 13.1, CH<sub>2</sub>), 2.25–2.12 (10H, *m*, (CH<sub>3</sub>)<sub>2</sub>N + 2 CH<sub>2</sub>), 1.68–1.58 (2H, *m*, CH<sub>2</sub>), 1.51–1.36 (2H, *m*, CH<sub>2</sub>), 1.35–1.23 (22H, *m*, 11 CH<sub>2</sub>), 0.86 (3H, *t*, *J* = 6.6 Hz, CH<sub>3</sub> dodecyl). <sup>13</sup>C-NMR (75 MHz, CDCl<sub>3</sub>, δ / ppm): 172.82 (CO), 59.51 ((CH<sub>3</sub>)<sub>2</sub>NCH<sub>2</sub>), 45.45 ((CH<sub>3</sub>)<sub>2</sub>N), 39.46 (CONHCH<sub>2</sub>), 36.74 (CH<sub>2</sub>CO) 31.87 (CH<sub>2</sub>), 29.65 (CH<sub>2</sub>), 29.61 (CH<sub>2</sub>), 29.59 (CH<sub>2</sub>), 29.58 (CH<sub>2</sub>), 29.55 (CH<sub>2</sub>), 29.31 (CH<sub>2</sub>), 29.27 (CH<sub>2</sub>), 27.37 (CH<sub>2</sub>), 26.97 (CH<sub>2</sub>), 26.90 (CH<sub>2</sub>), 25.60 (CH<sub>2</sub>), 22.64 (CH<sub>2</sub>), 14.09 (CH<sub>3</sub>).

*N-Decyl-6-(piperidin-1-yl)hexanamide (29)*. Yield: 40 %; colorless powder, m.p. 36–40 °C. Anal. Calcd. for C<sub>21</sub>H<sub>42</sub>N<sub>2</sub>O: C, 74.5; H, 12.5; N, 8.27; O, 4.73 %. Found: C, 74.39; H, 12.53; N, 8.38; O, 4.61 %. IR (CHCl<sub>3</sub>, cm<sup>-1</sup>): 3450, 2930,



2856, 1660, 1518, 1468, 1377.  $^1\text{H-NMR}$  (300 MHz,  $\text{CDCl}_3$ ,  $\delta$  / ppm): 5.51 (1H, *s*, NH), 3.24–3.17 (2H, *q*,  $\text{CH}_2$ ), 2.33 (4H, *s*, 2  $\text{CH}_2$ ), 2.25 (2H, *t*,  $J = 7.7$  Hz,  $\text{NCH}_2$ ), 2.14 (2H, *t*,  $J = 7.6$  Hz,  $\text{CH}_2\text{CO}$ ), 1.68–1.23 (28H, *m*, 14  $\text{CH}_2$ ), 0.86 (3H, *t*,  $J = 6.6$  Hz,  $\text{CH}_3$ ).  $^{13}\text{C-NMR}$  (75 MHz,  $\text{CDCl}_3$ ,  $\delta$  / ppm): 172.84 (CO), 59.34 ( $\text{CH}_2(\text{CH}_2\text{CH}_2)_2\text{N}$ ), 54.61 ( $\text{NCH}_2$  acyl), 39.45 ( $\text{CONHCH}_2$ ), 36.74 ( $\text{CH}_2\text{CO}$ ), 31.84 ( $\text{CONHCH}_2\text{CH}_2$ ), 29.65 ( $\text{CH}_2$ ), 29.50 ( $\text{CH}_2$ ), 29.27 ( $\text{CH}_2$ ), 27.30 ( $\text{CH}_2$ ), 26.89 ( $\text{CH}_2$ ), 26.63 ( $\text{CH}_2$ ), 25.95 ( $\text{CH}_2$ ), 25.70 ( $\text{CH}_2$ ), 24.44 ( $\text{CH}_2$ ), 22.64 ( $\text{CH}_2\text{CH}_3$ ), 14.08 ( $\text{CH}_3$ ).

*N-Dodecyl-6-(piperidin-1-yl)hexanamide (30)*. Yield: 38 %; colorless powder, m.p. 45–49 °C. Anal. Calcd. for  $\text{C}_{23}\text{H}_{46}\text{N}_2\text{O}$ : C, 75.35; H, 12.65; N, 7.64; O, 4.36 %. Found: C, 75.28; H, 12.73; N, 7.74; O, 4.29 %. IR ( $\text{CHCl}_3$ ,  $\text{cm}^{-1}$ ): 3449, 2931, 2856, 1660, 1518, 1468, 1377.  $^1\text{H-NMR}$  (300 MHz,  $\text{CDCl}_3$ ,  $\delta$  / ppm): 5.50 (1H, *s*, NH), 3.24–3.18 (2H, *q*,  $\text{CH}_2$ ), 2.33 (4H, *s*, 2  $\text{CH}_2$ ), 2.26 (2H, *t*,  $J = 7.8$  Hz,  $\text{NCH}_2$ ), 2.14 (2H, *t*,  $J = 7.6$  Hz,  $\text{CH}_2\text{CO}$ ), 1.68–1.24 (32H, *m*, 16  $\text{CH}_2$ ), 0.86 (3H, *t*,  $J = 6.7$  Hz,  $\text{CH}_3$ ).  $^{13}\text{C-NMR}$  (75 MHz,  $\text{CDCl}_3$ ,  $\delta$  / ppm): 172.83 (CO), 59.35 ( $\text{CH}_2(\text{CH}_2\text{CH}_2)_2\text{N}$ ), 54.62 ( $\text{NCH}_2$  acyl), 39.46 ( $\text{CONHCH}_2$ ), 36.76 ( $\text{CH}_2\text{CO}$ ), 31.88 ( $\text{CONHCH}_2\text{CH}_2$ ), 29.66 ( $\text{CH}_2$ ), 29.61 ( $\text{CH}_2$ ), 29.60 ( $\text{CH}_2$ ), 29.55 ( $\text{CH}_2$ ), 29.52 ( $\text{CH}_2$ ), 29.31 ( $\text{CH}_2$ ), 29.28 ( $\text{CH}_2$ ), 27.30 ( $\text{CH}_2$ ), 26.90 ( $\text{CH}_2$ ), 26.64 ( $\text{CH}_2$ ), 25.96 ( $\text{CH}_2$ ), 25.70 ( $\text{CH}_2$ ), 24.45 ( $\text{CH}_2$ ), 22.65 ( $\text{CH}_2\text{CH}_3$ ), 14.10 ( $\text{CH}_3$ ).

*6-(Morpholin-4-yl)-N-octyl-hexanamide (31)*. Yield 28 %; b.p. 225–230 °C at 0.2 kPa. Anal. Calcd. for  $\text{C}_{18}\text{H}_{36}\text{N}_2\text{O}_2$ : C, 69.18; H, 11.61; N, 8.96; O, 10.24 %. Found: C, 69.28; H, 11.73; N, 9.04; O, 10.29 %. IR ( $\text{CHCl}_3$ ,  $\text{cm}^{-1}$ ): 3449, 2930, 2857, 1660, 1518, 1467, 1459, 1373.  $^1\text{H-NMR}$  (300 MHz,  $\text{CDCl}_3$ ,  $\delta$  / ppm): 5.58 (1H, *s*, CONH), 3.72 (4H, *t*,  $\text{O}(\text{CH}_2\text{CH}_2)_2\text{N}$ ), 3.20 (2H, *q*,  $J = 7.2$ , 12.8 Hz,  $\text{CH}_2$ ), 2.39 (4H, *t*,  $J = 4.5$  Hz,  $\text{O}(\text{CH}_2\text{CH}_2)_2\text{N}$ ), 2.32 (2H, *t*,  $J = 7.7$  Hz,  $\text{NCH}_2$  acyl), 2.13 (2H, *t*,  $J = 7.6$  Hz,  $\text{CH}_2\text{CO}$ ), 1.70–1.55 (2H, *m*,  $\text{CH}_2\text{CH}_2\text{CO}$ ), 1.52–1.41 (4H, *m*, 2  $\text{CH}_2$ ), 1.38–1.25 (12H, *m*, 6  $\text{CH}_2$ ), 0.88 (3H, *t*,  $J = 6.7$  Hz,  $\text{CH}_3$ ).  $^{13}\text{C-NMR}$  (75 MHz,  $\text{CDCl}_3$ ,  $\delta$  / ppm): 172.72 (CO), 66.75 ( $\text{O}(\text{CH}_2\text{CH}_2)_2\text{N}$ ), 58.80 ( $\text{NCH}_2$  acyl), 53.54 ( $\text{O}(\text{CH}_2\text{CH}_2)_2\text{N}$ ), 39.44 ( $\text{CONHCH}_2$ ), 36.55 ( $\text{CH}_2\text{CO}$ ), 31.82 ( $\text{CH}_2$ ), 29.71 ( $\text{CH}_2$ ), 29.48 ( $\text{CH}_2$ ), 29.28 ( $\text{CH}_2$ ), 27.11 ( $\text{CH}_2$ ), 26.86 ( $\text{CH}_2$ ), 26.19 ( $\text{CH}_2$ ), 25.63 ( $\text{CH}_2$ ), 22.60 ( $\text{CH}_2$ ), 14.05 ( $\text{CH}_3$ ).

*6-(Morpholin-4-yl)-N-nonyl-hexanamide (32)*. Yield 41 %; colorless powder, m.p. 41–47 °C, b.p. 201–203 °C at 0.05 kPa. Anal. Calcd. for  $\text{C}_{19}\text{H}_{38}\text{N}_2\text{O}_2$ : C, 69.89; H, 11.73; N, 8.58; O, 9.80 %. Found: C, 69.95; H, 11.83; N, 8.64; O, 9.91 %. IR ( $\text{CHCl}_3$ ,  $\text{cm}^{-1}$ ): 3449, 2930, 2858, 1661, 1518, 1467, 1459, 1375.  $^1\text{H-NMR}$  (300 MHz,  $\text{CDCl}_3$ ,  $\delta$  / ppm): 5.45 (1H, *s*, CONH), 3.70 (4H, *t*,  $J = 4.7$  Hz,  $\text{O}(\text{CH}_2\text{CH}_2)_2\text{N}$ ), 3.21 (2H, *q*,  $J = 7.1$ , 12.9,  $\text{CH}_2$ ), 2.40 (4H, *t*,  $J = 4.4$  Hz,  $\text{O}(\text{CH}_2\text{CH}_2)_2\text{N}$ ), 2.31 (2H, *t*,  $J = 7.7$  Hz,  $\text{NCH}_2$  acyl), 2.14 (2H, *t*,  $J = 7.6$  Hz,  $\text{CH}_2\text{CO}$ ), 1.69–1.59 (2H, *m*,  $\text{CH}_2\text{CH}_2\text{CO}$ ), 1.54–1.44 (4H, *m*, 2  $\text{CH}_2$ ), 1.37–1.24 (14H, *m*, 7  $\text{CH}_2$ ), 0.86 (3H, *t*,  $J = 6.7$  Hz,  $\text{CH}_3$ ).  $^{13}\text{C-NMR}$  (75MHz,  $\text{CDCl}_3$ ,  $\delta$  /

/ ppm): 172.73 (CO), 66.95 (O(CH<sub>2</sub>CH<sub>2</sub>)<sub>2</sub>N), 58.88 (NCH<sub>2</sub> acyl), 53.73 (O(CH<sub>2</sub>CH<sub>2</sub>)<sub>2</sub>N), 39.46 (CONHCH<sub>2</sub>), 36.73 (CH<sub>2</sub>CO), 31.81 (CH<sub>2</sub>), 29.65 (CH<sub>2</sub>), 29.47 (CH<sub>2</sub>), 29.26 (CH<sub>2</sub>), 29.20 (CH<sub>2</sub>), 27.11 (CH<sub>2</sub>), 26.88 (CH<sub>2</sub>), 26.27 (CH<sub>2</sub>), 25.65 (CH<sub>2</sub>), 22.62 (CH<sub>2</sub>CH<sub>3</sub>), 14.08 (CH<sub>3</sub>).

*N-Decyl-6-(morpholin-4-yl)hexanamide (33)*. Yield 44 %; colorless powder, m.p. 45–48 °C. Anal. Calcd. for C<sub>20</sub>H<sub>40</sub>N<sub>2</sub>O<sub>2</sub>: C, 70.54; H, 11.84; N, 8.23; O, 9.40 %. Found: C, 70.65; H, 11.75; N, 8.14; O, 9.51 %. IR (CHCl<sub>3</sub>, cm<sup>-1</sup>): 3449, 2930, 2857, 1660, 1518, 1467, 1459, 1378. <sup>1</sup>H-NMR (300 MHz, CDCl<sub>3</sub>, δ / ppm): 5.45 (1H, s, CONH), 3.70 (4H, t, J = 4.7 Hz, O(CH<sub>2</sub>CH<sub>2</sub>)<sub>2</sub>N), 3.21 (2H, q, J = 7.1, 12.9 Hz, CH<sub>2</sub>), 2.40 (4H, t, J = 4.4 Hz, O(CH<sub>2</sub>CH<sub>2</sub>)<sub>2</sub>N), 2.31 (2H, t, J = 7.7 Hz, NCH<sub>2</sub> acyl), 2.14 (2H, t, J = 7.6 Hz, CH<sub>2</sub>CO), 1.69–1.59 (2H, m, CH<sub>2</sub>CH<sub>2</sub>CO), 1.54–1.44 (4H, m, 2 CH<sub>2</sub>), 1.37–1.24 (14H, m, 7 CH<sub>2</sub>), 0.86 (3H, t, J = 6.7 Hz, CH<sub>3</sub>). <sup>13</sup>C-NMR (75 MHz, CDCl<sub>3</sub>, δ / ppm): 172.72 (CO), 66.74 (O(CH<sub>2</sub>CH<sub>2</sub>)<sub>2</sub>N), 58.76 (NCH<sub>2</sub> acyl), 53.60 (O(CH<sub>2</sub>CH<sub>2</sub>)<sub>2</sub>N), 39.43 (CONHCH<sub>2</sub>), 36.60 (CH<sub>2</sub>CO), 31.80 (CH<sub>2</sub>), 29.59 (CH<sub>2</sub>), 29.47 (CH<sub>2</sub>), 29.46 (CH<sub>2</sub>), 29.43 (CH<sub>2</sub>), 29.22 (CH<sub>2</sub>), 26.98 (CH<sub>2</sub>), 26.85 (CH<sub>2</sub>), 26.05 (CH<sub>2</sub>), 25.55 (CH<sub>2</sub>), 22.59 (CH<sub>2</sub>CH<sub>3</sub>), 14.04 (CH<sub>3</sub>).

*N-Dodecyl-6-(morpholin-4-yl)hexanamide (34)*. Yield 50 %; colorless powder, m.p. 48–53 °C. Anal. Calcd. for C<sub>22</sub>H<sub>44</sub>N<sub>2</sub>O<sub>2</sub>: C, 71.69; H, 12.03; N, 7.6; O, 8.68 %. Found: C, 71.58; H, 11.93; N, 7.54; O, 8.71 %. IR (CHCl<sub>3</sub>, cm<sup>-1</sup>): 3449, 2930, 2858, 1660, 1518, 1467, 1459, 1376. <sup>1</sup>H-NMR (300 MHz, CDCl<sub>3</sub>, δ / ppm): 5.56 (1H, s, CONH), 3.77 (4H, t, J = 4.6 Hz, O(CH<sub>2</sub>CH<sub>2</sub>)<sub>2</sub>N), 3.22 (2H, q, J = 13.2 Hz, 6.6 Hz, CH<sub>2</sub>), 2.43 (4H, t, J = 7.5 Hz, O(CH<sub>2</sub>CH<sub>2</sub>)<sub>2</sub>N), 2.34 (2H, t, J = 4.6 Hz, NCH<sub>2</sub> acyl), 2.17 (2H, t, J = 7.51 Hz, CH<sub>2</sub>CO), 1.65–1.12 (26H, m, 13 CH<sub>2</sub>), 0.87 (3H, t, J = 6.42, CH<sub>3</sub>). <sup>13</sup>C-NMR (75 MHz, CDCl<sub>3</sub>, δ / ppm): 172.70 (CO), 66.43 (O(CH<sub>2</sub>CH<sub>2</sub>)<sub>2</sub>N), 58.65 (NCH<sub>2</sub> acyl), 53.49 (O(CH<sub>2</sub>CH<sub>2</sub>)<sub>2</sub>N), 39.55 (CONHCH<sub>2</sub>), 36.55 (CH<sub>2</sub>CO), 31.88 (CH<sub>2</sub>), 29.69 (CH<sub>2</sub>), 29.59 (CH<sub>2</sub>), 29.55 (CH<sub>2</sub>), 29.30 (CH<sub>2</sub>), 29.01 (CH<sub>2</sub>), 28.93 (CH<sub>2</sub>), 27.82 (CH<sub>2</sub>), 26.93 (CH<sub>2</sub>), 26.56 (CH<sub>2</sub>), 25.64 (CH<sub>2</sub>), 25.43 (CH<sub>2</sub>), 22.64 (CH<sub>2</sub>CH<sub>3</sub>), 14.03 (CH<sub>3</sub>).