

15 : ¹H NMR δ 4.20-4.08 (4H, m), 3.06-2.83 (2H, m), 1.40-0.90 (19H, m); ¹³C NMR δ 62.5, 62.1, 52.4, 47.4, 33.3, 23.6, 23.1, 19.8, 19.6, 16.9, 14.3. Anal. Calcd for C₁₁H₂₆O₃NP : C, 52.57; H, 10.42; N, 5.57. Found : C, 52.41; H, 10.32; N, 5.39.

16 : ¹H NMR δ 7.31-7.21 (5H, m), 5.11-5.07 (2H, m), 4.14-3.63 (7H, m), 2.10-1.11 (19H, m); ¹³C NMR δ 142.6, 140.0, 132.1, 129.0, 128.5, 128.2, 124.3, 120.0, 63.0, 62.8, 53.3, 51.8, 40.2, 33.0, 26.6, 26.0, 16.9. Anal. Calcd for C₂₂H₃₄O₃NP : C, 67.50; H, 8.75; N, 3.37. Found : C, 67.31; H, 8.68; N, 3.22.

17 : ¹H NMR δ 7.37-7.20 (5H, m), 4.19-3.85 (6H, m), 1.81-1.69 (4H, m), 1.32 (3H, t, J = 7.06 Hz), 0.98 (3H, t, J = 7.50 Hz); ¹³C NMR δ 141.6, 128.8, 128.7, 127.2, 62.0, 60.2, 47.6, 26.0, 17.0, 8.0. Anal. Calcd for C₁₆H₂₈O₃NP : C, 61.32; H, 9.01; N, 4.47. Found : C, 61.20; H, 8.92; N, 4.31.

18 : ¹H NMR δ 7.67-7.26 (10H, m), 4.08-3.49 (6H, m), 1.90, 1.85 (3H, 2s), 1.27 (3H, t, J 7.05), 1.15 (3H, t, J = 6.05 Hz); ¹³C NMR δ 141.0, 139.8, 128.8, 128.5, 128.4, 127.7, 127.3, 63.7, 63.6, 63.4, 60.7, 46.6, 46.3, 21.5, 16.9, 16.7. Anal. Calcd for C₁₉H₂₆O₃NP : C, 65.69; H, 7.54; N, 4.03. Found : C, 65.49; H, 7.44; N, 3.85.

19 : ¹H NMR δ 7.44-7.21 (15H, m), 4.13-3.79 (8H, m), 1.46-0.85 (14H, m); ¹³C NMR δ 139.0, 135.5, 128.6, 128.4, 127.9, 127.4, 125.3, 81.3, 62.9, 62.8, 62.7, 59.5, 51.2, 51.0, 41.4, 16.3, 16.2, 12.0, 11.9. Anal. Calcd for C₃₀H₄₀O₃NP : C, 68.55; H, 7.67; N, 2.6. Found : C, 68.35; H, 7.52; N, 2.51.

20 : ¹H NMR δ 7.25-7.05 (5H, m), 4.04-3.76 (6H, m), 1.71-1.06 (16H, m); ¹³C NMR δ 148.8, 128.9, 128.6, 128.5, 127.1, 62.1, 47.5, 30.0, 26.0, 20.2, 20.1, 17.0, 16.9, 16.6. Anal. Calcd for C₁₇H₂₈O₃NP : C, 62.75; H, 8.67; N, 4.30. Found : C, 62.51; H, 8.57; N, 4.19.

21 : ¹H NMR δ 7.39-7.19 (5H, m), 4.19-3.91 (6H, m), 1.96-0.77 (24H, m); ¹³C NMR δ 141.9, 128.6, 128.5, 128.4, 127.0, 62.0, 55.7, 47.4, 32.8, 30.4, 30.3, 27.9, 27.7, 21.0, 20.8, 17.0. Anal. Calcd for C₂₁H₃₆O₃NP : C, 66.12; H, 9.51; N, 3.67. Found : C, 66.01; H, 9.41; N, 3.54.

22 : ¹H NMR δ 7.51-7.20 (10H, m), 4.15-3.51 (6H, m), 2.69-2.61 (2H, m), 2.41-2.34 (2H, m), 1.27 (3H, t, J = 7.09 Hz), 1.12 (3H, t, J = 6.97 Hz); ¹³C NMR δ 145.4, 140.9, 140.7, 135.0, 128.8, 128.5, 127.1, 126.8, 126.0, 125.2, 63.8, 63.2, 63.1, 32.4, 31.0, 30.9, 16.8, 16.7. Anal. Calcd for C₂₀H₂₇O₃NP : C, 66.65; H, 7.55; N, 3.88. Found : C, 66.42; H, 7.48; N, 3.73.

23 : ¹H NMR δ 7.41-7.26 (10H, m), 6.67, 6.62 (1H, dd, J = 4.95 Hz), 6.47, 6.29 (1H, dd, J = 6.13 Hz), 4.23-3.75 (6H, m), 1.60 (3H, 2s), 1.36-1.22 (6H, m); ¹³C NMR δ 141.2, 137.1, 132.2, 130.1, 129.4,

5 : ^1H NMR δ 7.42-7.23 (5H, m), 4.16-3.74 (5H, m), 2.34-1.07 (17H, m), ^{13}C NMR δ 137.0, 128.8, 128.6, 128.0, 63.4, 63.0, 57.9, 53.9, 53.7, 34.6, 32.3, 26.4, 25.2, 24.7, 16.7, 16.5. Anal. Calcd for $\text{C}_{17}\text{H}_{28}\text{NP}$: C, 62.75; H, 8.67; N, 4.30. Found : C, 62.57; H, 8.61; N, 4.15.

7 : ^1H NMR δ 7.34-6.87 (4H, m), 4.16-3.73 (m, 8H), 2.71-2.63 (1H, m), 1.36-0.98 (12H, m), ^{13}C NMR δ 159.5, 129.9, 128.5, 114.2, 63.4, 63.1, 57.8, 55.5, 46.0, 45.8, 24.2, 21.5, 16.8, 16.6. Anal. Calcd for $\text{C}_{15}\text{H}_{26}\text{O}_3\text{NP}$, C : 60.19; H, 8.75; N, 4.68. Found : C, 60.01; H, 8.66; N, 4.52.

10 : m.p. 93°C; ^1H NMR δ 7.20-6.54 (9H, m), 4.76-3.56 (m, 5H), 1.23-1.0 (6H, m); ^{13}C NMR δ 157.9, 146.8, 146.6, 137.4, 130.2, 129.6, 120.1, 118.9, 116.1, 115.1, 114.3, 64.5, 64.2, 56.4, 16.8, 16.6. Anal. Calcd for $\text{C}_{17}\text{H}_{22}\text{O}_4\text{NP}$: C, 60.89; H, 6.61; N, 4.17. Found : C, 60.81; H, 6.56; N, 4.10.

11 : m.p. 90°C; ^1H NMR δ 8.59-6.67 (m, 9H), 5.00 (1H, dd, $^1J_{\text{PH}} = 29.73$ Hz, $J = 7.74$ Hz), 4.16-3.87 (4H, m), 1.28-1.12 (6H, m); ^{13}C NMR δ 156.2, 149.6, 147.1, 146.9, 137.0, 129.5, 123.2, 123.1, 123.1, 118.8, 114.4, 63.8, 63.5, 56.4, 16.8, 16.6. Anal. Calcd for $\text{C}_{16}\text{H}_{21}\text{O}_3\text{N}_2\text{P}$: C, 59.94; H, 6.60; N, 8.74. Found : C, 59.79; H, 6.54; N, 8.54.

12 : ^1H NMR δ 8.64-7.16 (9H, m), 4.17-3.38 (6H, m), 1.38-1.1 (9H, m); ^{13}C NMR δ 156.7, 149.8, 149.3, 144.6, 136.7, 128.8, 127.6, 124.5, 123.8, 63.6, 62.9, 60.3, 59.0, 56.6, 56.4, 25.3, 16.9, 16.6. Anal. Calcd for $\text{C}_{18}\text{H}_{25}\text{O}_3\text{N}_2\text{P}$: C, 62.06; H, 7.23; N, 8.04. Found : C, 61.96; H, 7.15; N, 7.91.

13 : ^1H NMR δ 7.33-7.22 (5H, m), 5.55-5.49 (1H, m), 4.18-3.36 (7H, m), 2.13-2.09 (4H, m), 1.47-0.86 (14H, m); ^{13}C NMR δ 140.1, 135.4, 130.4, 130.2, 130.1, 128.6, 127.4, 63.2, 62.5, 61.3, 60.3, 51.3, 51.2, 30.2, 23.3, 23.0, 16.9, 13.6, 12.7. Anal. Calcd for $\text{C}_{19}\text{H}_{32}\text{O}_3\text{NP}$: C, 64.57; H, 9.12; N, 3.96. Found : C, 64.35; H, 9.01; N, 3.75.

14 : ^1H NMR δ 7.37-7.20 (5H, m), 4.20-3.81 (6H, m), 2.73 (1H, dd, $^1J_{\text{PH}} = 18.36$ Hz, $J = 3.7$ Hz), 2.17-2.11 (1H, m), 1.35-1.30 (6H, m), 1.02-0.99 (6H, m); ^{13}C NMR δ 140.6, 128.8, 127.4, 62.0, 61.9, 61.8, 59.9, 53.7, 29.4, 21.2, 21.0, 17.0, 16.9, 16.9. Anal. Calcd for $\text{C}_{15}\text{H}_{26}\text{O}_3\text{NP}$: C, 60.19; H, 7.54; N, 4.68. Found : C, 60.01; H, 7.44; N, 4.52.

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129.0, 128.7, 128.5, 128.1, 127.0, 63.6, 63.5, 59.4, 47.3, 47.1, 20.0, 17.0. Anal. Calcd for $C_{27}H_{30}O_3NP$: C, 72.46; H, 6.75; N, 3.12. Found : C, 72.31; H, 6.61; N, 3.01.

24 : 1H NMR δ 7.42-7.23 (5H, m), 4.26-3.58 (8H, m), 2.27 (2H, s), 1.55, 1.50 (3H, 2s), 1.37-1.10 (9H, m); ^{13}C NMR δ 170.5, 128.7, 128.4, 128.3, 128.2, 127.9, 127.1, 62.8, 62.4, 60.6, 56.0, 47.6, 39.3, 20.5, 16.5, 16.4, 14.1. Anal. Calcd for $C_{17}H_{28}O_5NP$: C, 57.13; H, 7.90; N, 3.92. Found : C, 57.01; H, 7.83; N, 3.78.