5. : ^{1}H NMR (200MHz, $CDCl_3$) δ 4.11 (q, *J* = 7.2, 2H), 3.96-3.74 (m, 4H), 2.34-2.27 (m, 2H), 2.09-1.95 (m, 2H), 1.91-1.88(m, 1H), 1.74-1.63 (m, 3H), 1.50 (d, *J* = 13.8, 1H), 1.22 (t, *J* = 7.2, 3H). 1.08 (s, 3H), 1.05 (s, 3H) ; ^{13}C NMR (50MHz, $CDCl_3$) δ 173.2, 118.7, 84.0, 68.3, 65.0, 64.7, 60.4, 60.1, 49.6, 45.4, 34.0, 33.2, 32.0, 30.4, 14.6, 14.1 ; IR (neat, cm^{-1}) 3289, 2944, 2361, 1728, 1455, 1366, 1319, 1282, 1214, 1183, 1102, 1070, 1039.; Anal. Calcd for $C_{16}H_{24}O_4$: C, 68.55; H, 8.63. Found: C, 68.53; H, 8.89.

6. : ^{1}H NMR (200MHz, $CDCl_3$) δ 384-3.76 (m, 1H), 3.01 (bs, 1H), 2.45-2.37 (m, 2H), 2.25-1.76 (m, 10H), 1.13 (s, 3H), 1.10 (s, 3H). ; ^{13}C NMR (50MHz, $CDCl_3$) δ 221.7, 83.5, 81.2, 73.2, 70.9, 69.1, 55.5, 54.7, 45.2, 33.0, 33.0, 32.6, 30.7, 22.4, 14.2. ; IR (NaCl, cm^{-1}) 3481, 3293, 2951, 1726, 1462, 1406, 1369, 1281, 1158, 1053. ; HRMS calcd for $C_{15}H_{20}O_2$ 232.1463, found 232.1467.

7. : ^{1}H NMR (300MHz, $CDCl_3$) δ 5.23 (t, *J* = 2.5, 1H), 5.16 (t, *J* = 2.2, 1H), 4.90 (t, *J* = 2.3, 1H), 4.81 (t, *J* = 2.4, 1H), 4.05 (t, *J* = 7.9, 1H), 2.69-2.57 (m, 3H), 2.41 (s, 1H), 2.19-2.11 (m, 1H), 1.87 (d, *J* = 14.7, 1H), 1.76-1.58 (m, 3H), 1.40 (d, *J* = 11.5, 1H), 1.09 (s, 3H), 1.05 (s, 3H). ; ^{13}C NMR (75MHz, $CDCl_3$) δ 158.6, 147.4, 113.1, 110.4, 87.6, 72.8, 64.4, 57.6, 41.0, 38.4, 35.4, 32.4, 30.4, 30.1, 27.4. ; IR (NaCl, cm^{-1}) 3422, 2942, 1639, 1465, 1079, 1041, 892. ; Anal. Calcd for $C_{15}H_{22}O_2$: C, 76.88; H, 9.46. Found: C, 76.56; H, 9.81.

8. : ^{1}H NMR (200MHz, $CDCl_3$) δ 4.81 (dd, *J* = 9.4, 7.0, 1H), 4.66-4.61 (m, 2H), 2.75-2.63 (m, 2H), 2.43-2.33 (m, 2H), 2.20-2.08 (m, 1H), 1.99 (s, 3H), 1.95-1.88 (m, 2H), 1.77-1.61 (m, 2H), 1.24 (d, *J* = 14.5, 1H), 0.90 (s, 6H). ; ^{13}C NMR (50MHz, $CDCl_3$) δ 219.0, 170.5, 146.2, 111.0, 78.0, 62.9, 59.4, 53.3, 43.3, 41.6, 37.2, 35.8, 32.3, 28.5, 25.4, 21.0. ; IR (NaCl, cm^{-1}) 2955, 2875, 1736, 1645, 1463, 1373, 1309, 1244, 1178, 1121, 1035. ; HRMS calcd for $C_{16}H_{22}O_3$ 262.1569, found 262.1562.

9. . : ^{1}H NMR (200MHz, $CDCl_3$) δ 5.66-5.53 (m, 1H), 5.04-4.92 (m, 2H), 4.78 (dd, J = 9.8, 6.6, 1H), 4.69-4.64 (m, 2H), 2.89-2.72 (m, 4H), 2.32-2.04 (m, 3H), 1.98 (s, 3H), 1.81 (s, 1H), 1.35 (d, J = 14.8, 1H), 0.95 (s, 3H), 0.93 (s, 3H). ; ^{13}C NMR (50MHz, $CDCl_3$) δ 218.7, 170.3, 146.0, 137.6, 116.2, 111.2, 74.7, 60.1, 59.8, 55.8, 45.3, 43.7, 43.1, 41.0, 35.7, 32.4, 25.4, 21.0. ; IR (NaCl, cm^{-1}) 2955, 1736, 1641, 1465, 1375, 1246, 1231, 1174, 1131, 1072, 1037, 1015 ; HRMS calcd for $C_{18}H_{24}O_3$ 288.1725, found 288.1722.

10. : ^{1}H NMR (200MHz, $CDCl_3$) δ 5.44-5.28 (m, 1H), 5.11 (t, J = 7.3, 1H), 3.56 (t, J = 4.0, 2H), 3.06 (dd, J = 18.4, 7.7, 1H), 2.37 (m, 6H), 2.04 (s, 3H), 2.02 (s, 3H), 1.47 (d, J = 15.0, 1H), 1.31 (s, 3H), 1.04 (s, 3H). ; ^{13}C NMR (50MHz, $CDCl_3$) δ 207.0, 170.6, 170.2, 73.1, 71.1, 65.7, 62.7, 58.3, 51.7, 47.7, 44.2, 43.8, 39.4, 35.7, 31.2, 27.1, 21.1, 20.9. ; IR (NaCl, cm^{-1}). 3500, 2959, 1737, 1470, 1373, 1238, 1102, 1058. ; HRMS calcd for $C_{18}H_{26}O_6$ 338.1729, found 338.1747.

11. : ^{1}H NMR (200MHz, $CDCl_3$) δ 7.34 (d, J = 9.4, 1H), 5.84 (dd, J = 9.4, 1.4, 1H), 5.27-5.19 (m, 1H), 5.04-5.00 (m, 2H), 3.04-2.90 (m, 1H), 2.81 (d, J = 0.9, 1H), 2.73-2.61 (m, 1H), 2.50 (dd, J = 7.2, 1.5, 1H), 2.07 (s, 3H), 1.94 (d, J = 13.4, 1H), 1.68 (dd, J = 13.1, 1.7, 1H), 1.36 (s, 3H), 1.04 (s, 3H). ; ^{13}C NMR (50MHz, $CDCl_3$) δ 202.9, 170.2, 155.4, 149.6, 128.2, 106.8, 73.1, 65.8, 61.9, 58.5, 49.4, 41.0, 40.1, 30.5, 30.0, 21.4. ; IR (NaCl, cm^{-1}). 2958, 1742, 1685, 1365, 1229, 1107. ; HRMS calcd for $C_{16}H_{20}O_3$ 260.1412, found 260.1417.

12 : ^{1}H NMR (300MHz, $CDCl_3$) : δ 5.19-5.14 (m, 1H), 4.97 (t, *J* = 1.7Hz, 1H), 4.69 (t, *J* = 2.0Hz, 1H), 2.80-2.74 (m, 2H), 2.69 (d, *J* = 8.9Hz, 1H), 2.48 (d, *J* = 9.0Hz, 1H), 2.45 (s, 1H), 2.34-2.12 (m, 1H), 2.07 (d, *J* = 21.2Hz, 1H), 2.04 (s, 3H), 1.87 (dd, *J* = 32.4, 14.3Hz, 2H), 1.28 (s, 3H), 1.03 (s, 3H), 0.97 (d, *J* = 6.9Hz, 1H); ^{13}C NMR (75MHz, $CDCl_3$) : δ 210.3, 170.2, 150.9, 107.2, 72.2, 66.9, 59.1, 56.2, 50.9, 45.0, 41.8, 39.8, 34.9, 31.5, 27.7, 21.2, 18.6.; IR (NaCl, cm^{-1}). 2957, 1740, 1710, 1661, 1461, 1451, 1364, 1233, 1184, 1111, 1052, 896; HR-MS (EI) calcd for $C_{17}H_{24}O_3$: 276.1725, found : 276.1732.

1: ^{1}H NMR (500MHz, $CDCl_3$) : δ 5.95 (d, *J* = 0.8Hz, 1H), 4.97 (d, *J* = 0.8Hz, 1H), 2.64 (dd, *J* = 19.5, 12.0Hz, 1H), 2.44 (dd, *J* = 19.5, 9.5Hz, 1H), 2.30 (ddd, *J* = 11.5, 9.5, 0.5Hz, 1H), 2.12 (m, 1H), 2.06 (m, 1H), 1.87 (ddd, *J* = 3.5, 3.0, 1.5Hz, 1H), 1.79 (d, *J* = 14.0Hz, 1H), 1.69 (d, *J* = 14.5Hz, 1H), 1.67 (m, 1H), 1.59 (m, 1H), 1.32 (ddd, *J* = 14.0, 6.5, 1.0Hz, 1H), 1.19 (s, 3H), 1.15 (s, 3H), 0.88 (d, *J* = 7.0Hz, 1H); ^{13}C NMR (75MHz, $CDCl_3$) : δ 208.6, 151.8, 115.2, 57.8, 54.3, 49.7, 45.2, 41.9, 40.2, 36.4, 34.9, 27.8, 26.9, 26.5, 17.2.; IR (NaCl, cm^{-1}) : 2929, 1725, 1637, 1456, 1388, 1115, 928 ; HR-MS (EI) calcd for $C_{15}H_{22}O$: 218.1671, found : 218.1679.