

**Table 7**

**List of CRS in Japanese pharmacopoeia**



List of CRS in Japanese Pharmacopoeia (JP)

| Compound   | Purity (%) | IR (cm <sup>-1</sup> )   | UV <sub>λ</sub> max nm (E1% 1cm)     | mp          | HPLC  | TLC Rf value (1: Dev. solv., 2: Detect)  | <sup>1</sup> H-NMR  | <sup>13</sup> C-NMR   | Available from   | Reference Standard for                               | Applied to                                       | References   |
|--|------------|--|--------------------------------------|-------------|---|--|---|---|--|--|--|--|
| <b>Glycyrrhizic acid (Glycyrrhizic acid, Glycyrrhizin)</b> | 99.7       | 3400, 2990, 1720, 1670, 1460, 1275, 1220, 1170, 1115, 1080, 1050, 970, 910 | 251                                  |             |   | 0.23 [1: 1-BuOH/H <sub>2</sub> O/ AcOH (7:2:1), 2: UV 254 nm, dil. H <sub>2</sub> SO <sub>4</sub> , 105°C, 10min]    |   |   | Reference Standard Prepared by Society of Japanese Pharmacopoeia 30 mg, 35,700 JPY | TLC (identification), HPLC (assay)                   | GLYCYRRHIZAE RADIX, GLYCYRRHIZAE RADIX PULVERATA | <i>Bull. Natl. Inst. Health Sci.</i> , <b>119</b> , 93-96 (2001) |
| <b>Baicalin</b>  | 99.5       | 3385, 1728, 1662, 1611, 1575   | 277.2                                | 210.4       |   |  | 4.06 (1H), 5.24 (1H), 5.29 (1H), 5.49 (1H), 7.001 (1H), 7.004 (1H), 7.57-7.62 (3H), 8.06-8.07 (2H), 12.6 (1H).  | 71.3 (CH), 72.7 (CH), 75.2 (CH), 75.5 (CH), 93.7 (CH), 99.9 (CH), 104.8 (CH), 106.1 (C), 126.4 (CH), 129.1 (CH), 130.6 (C), 130.8 (C), 132.0 (CH), 146.8 (C), 149.2 (C), 151.3 (C), 170.0 (C), 182.5.                                       | Reference Standard Prepared by Society of Japanese Pharmacopoeia 30 mg, 29,000 JPY | TLC (identification), HPLC (component determination) | SCUTELLARIAE RADIX, SCUTELLARIAE RADIX PULVERATA | <i>IYAKUJIN KENKYU</i> , <b>31</b> (7), 465-470 (2000)           |
| <b>Paeoniflorin</b>  | >99.5      | 3414, 1713, 1280, 1076   | 231.6 (260.3)                        |             | ODS column (I.D. 4.6 mm x 15 cm), detector 232 nm, Column temp 20°C, H <sub>2</sub> O/CH <sub>3</sub> CN/H <sub>3</sub> PO <sub>4</sub> (850:150:1)   | 0.30-0.33 [1: acetone/EtOAc/ AcOH (10:10:1), 2: 4-methoxybenzaldehyde-H <sub>2</sub> SO <sub>4</sub> , 105°C, 5 min] |   |   | Reference Standard Prepared by Society of Japanese Pharmacopoeia 20 mg, 33,900 JPY | TLC (identification), HPLC (component determination) | PAEONIAE RADIX, PAEONIAE RADIX PULVERATA         | <i>IYAKUJIN KENKYU</i> , <b>29</b> (10), 725-729 (1998)          |
| <b>Swertiamarin</b>  | 99.7       | 3346, 1697, 1619, 1282, 1066, 1013   | 236.2 (257.2)                        |             | ODS column (I.D. 4.6 mm x 15 cm), column temp 50°C, H <sub>2</sub> O/CH <sub>3</sub> CN (91:9), detector 236 nm, adjust flow rate to elute Paeoniflorin at ca. 12 min   | 0.73 [1: EtOAc/1-PrOH/H <sub>2</sub> O (6:4:3), 2: UV 254 nm]  | 1.86 (1H, brd, J = 13.5 Hz), 2.03 (1H, brd, J = 5.2, 13.5 Hz), 3.03 (1H, brd, J = 1.4, 7.0 Hz), 3.34 (1H, dd, J = 8.7, 10.5 Hz), 3.49 (1H, t, J = 10.5 Hz), 3.52 (1H, m), 3.61 (1H, t, J = 10.5 Hz), 3.75 (1H, dd, J = 2.0, 12.5 Hz), 3.92 (1H, dd, J = 5.1, 12.5 Hz), 4.42 (1H, brd, J = 5.2, 13.5 Hz), 4.70 (1H, brd, J = 13.5 Hz), 4.84 (1H, d, J = 8.7 Hz), 5.29 (1H, m), 5.45 (2H, m), 5.75 (1H, d, J = 1.4 Hz), 7.73 (1H, s). | 171.6 (C), 157.9 (CH), 134.4 (CH), 123.9 (CH <sub>2</sub> ), 109.2 (C), 102.2 (CH), 101.6 (CH), 79.2 (CH), 78.3 (CH), 75.2 (CH), 72.3 (CH), 68.4 (CH <sub>2</sub> ), 66.0 (C), 63.4 (CH <sub>2</sub> ), 52.8 (CH), 36.3 (CH <sub>2</sub> ). | Reference Standard Prepared by Society of Japanese Pharmacopoeia 20 mg, 34,100 JPY | TLC (identification), HPLC (component determination) | SWERTIAE HERBA, SWERTIAE HERBA PULVERATA         | <i>IYAKUJIN KENKYU</i> , <b>32</b> (3), 118-123 (2001)           |
| <b>Sennoside A</b>   | 98.7       | 3419, 1714, 1637, 1074   | 334 (171.9 ± 0.5), 270 (225.9 ± 0.7) | 217.2 ± 0.6 | ODS column (I.D. 4.6 mm x 15 cm), column temp 50°C, pH 5, 1 mol/l AcOH-AcONH <sub>4</sub> Buffer (1 in 10)/ CH <sub>3</sub> CN (17:8) 1000 ml + Tetra- <i>n</i> -heptyl ammonium bromide (2.45 g), detector 340 nm, adjust flow rate to elute Sennoside A at ca. 26 min | 0.32 [1: 1-PrOH/ AcOEt/ H <sub>2</sub> O/ AcOH (40:40:30:1), 2: UV 254 nm]   |   | Reference Standard Prepared by Society of Japanese Pharmacopoeia 20 mg, 32,800 JPY  | TLC (identification), HPLC (Assay)   | SENNAE FOLIUM, SENNAE FOLIUM PURVERATUM              |  |  |

|                           |       |                        |   |             |   |   |  |  |  |                                    |   |   |
|---------------------------|-------|------------------------|---|-------------|---|---|--|--|--|------------------------------------|---|---|
| <b>Sennoside B</b>        | 98.79 | 3412, 1712, 1637, 1074 | 354 (164.8 ± 0.9), 309 (167.8 ± 0.9), 270 (231.0 ± 1.3) | 184.1 ± 1.3 | ODS column (I.D. 4.6 mm x 15 cm), column temp 50°C, pH 5, 1 mol/l AcOH-AcONH <sub>4</sub> Buffer (1 in 10)/ CH <sub>3</sub> CN (17:8) 1000 ml + Tetra- <i>n</i> -heptyl ammonium bromide (2.45 g), detector 340 nm, adjust flow rate to elute Sennoside B at ca. 15 min | 0.23 [1: 1-PrOH/ AcOEt/ H <sub>2</sub> O/ AcOH (40:40:30:1), 2: UV 254 nm]  |  |  | Reference Standard Prepared by Society of Japanese Pharmacopoeia 20 mg, 31,600 JPY | HPLC (Assay)                       | SENNAE FOLIUM, SENNAE FOLIUM PURVERATUM                                       |   |
| <b>Barberine chloride</b> | >99.5 | 3400, 1600, 1250       | 420 (155), 345 (724), 263 (796), 228 (820)              |             | ODS column (I.D. 4.6 mm x 150 mm), Column temp 40°C, detector 345 nm, flow rate 1.0 ml/min  | 0.32 [1: 1-BuOH/ H <sub>2</sub> O/ AcOH (7:2:1), 2: UV 254 nm]  |  |  | Reference Standard Prepared by Society of Japanese Pharmacopoeia 30 mg, 32,400 JPY | TLC (identification), HPLC (Assay) | PHELLODENDRI CORTEX, PHELLODENDRI CORTEX PULVERATUS, RHIZOMA COPTIDIS RHIZOMA | Bull. Natl. Inst. Health Sci., <b>119</b> , 97-100 (2001) |
| <b>Ginsenoside Rb1</b>    |       | 3390, 2932             | no specific absorbance                                  | 200.1 ± 0.3 | [JP15] ODS column (I.D. 4.6 mm x 150 mm), column temp 40 °C, H <sub>2</sub> O/ acetonitrile (7:3), detector 203 nm, adjust flow rate Ginsenoside Rb1 at ca. 20 min  | [JP15] [1: lower layer of CHCl <sub>3</sub> / MeOH/H <sub>2</sub> O (13:7: 2), 2: dil. H <sub>2</sub> SO <sub>4</sub> , 110°C, 5 min] | 0.49 (1H, d, J = 11.0 Hz), 1.44 (1H, br d, J = 14.1 Hz), 3.73 (1H, dt, J = 5.4, 10.2 Hz), 2.30 (1H, br dd, J = 10.6, 19.3 Hz), 1.01 (3H, s), 0.93 (3H, s), 1.37 (3H, s), 1.69 (3H, s), 1.63 (3H, s), 1.08 (3H, s), 0.86 (3H, s), 0.93 (3H, s), 4.44 (1H, br d, J = 7.5 Hz), 4.68 (1H, dd, J = 2.4, 7.5 Hz), 4.59 (1H, br d, J = 7.9 Hz), 4.36 (1H, dd, J = 2.2, 7.7 Hz). |  | Reference Standard Prepared by Society of Japanese Pharmacopoeia 15 mg, 53,000 JPY | TLC (identification), HPLC (Assay) | GINSENG RADIX, GINSENG RADIX PULVERATA, GINSENG RADIX RUBRA                   | IYAKUJIN KENKYU, <b>36</b> (5), 211-222 (2005)            |
| <b>Ginsenoside Rg1</b>    |       | 3390, 2932             | no specific absorbance                                  | 194.7 ± 0.3 | [JP15] ODS column (I.D. 4.6 mm x 150 mm), column temp 30 °C, H <sub>2</sub> O/ acetonitrile (4:1), detector 203 nm, adjust flow rate Ginsenoside Rg1 at ca. 25 min  | [JP15] [1: lower layer of CHCl <sub>3</sub> / MeOH/H <sub>2</sub> O (13:7: 2), 2: dil. H <sub>2</sub> SO <sub>4</sub> , 110°C, 5 min] | 3.10 (1H, dd, J = 5.1, 11.7 Hz), 4.10 (dt, J = 3.3, 10.6 Hz), 1.49 (1H, dd, J = 2.3, 13.1 Hz), 3.68 (1H, dt, J = 5.3, 10.4 Hz), 2.29 (1H, dt, J = 7.7, 10.8 Hz), 1.10 (3H, s), 1.00 (3H, s), 1.35 (3H, s), 1.69 (3H, s), 1.63 (3H, s), 1.33 (3H, s), 1.01 (3H, s), 0.96 (3H, s), 4.35 (1H, d, J = 7.7 Hz), 4.61 (1H, d, J = 7.7 Hz).                                     |  | Reference Standard Prepared by Society of Japanese Pharmacopoeia 15 mg, 65,000 JPY | TLC (identification), HPLC (Assay) | GINSENG RADIX, GINSENG RADIX PULVERATA, GINSENG RADIX RUBRA                   | IYAKUJIN KENKYU, <b>36</b> (5), 211-222 (2005)            |
| <b>Puerarin</b>           | 99.1  | 3364, 1634, 1515, 1060 | 305.6 (243.5), 249.4 (732.4)                            | 201.5       |   | 0.42 [1: CHCl <sub>3</sub> / MeOH/H <sub>2</sub> O (6:4:1), 2: UV 366 nm]   | 4.80 (1H, d, J = 9 Hz), 6.80 (2H, dd, J = 8.5, 2.5 Hz), 6.98 (1H, d, J = 8.5 Hz), 7.39 (2H, dd, J = 8.5, 2.5 Hz), 7.93 (1H, d, J = 9 Hz), 8.33 (1H, s).  |  | Reference Standard Prepared by Society of Japanese Pharmacopoeia 20 mg, 34,800 JPY | TLC (identification)               | PUERARIAE RADIX   | IYAKUJIN KENKYU, <b>33</b> (2), 118-123 (2002)            |