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# *Citrus japonica* 'Marumi'

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## Scientific Name

*Citrus japonica* Thunb. 'Marumi'.

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## Synonyms

*Fortunella japonica* (Thunb.) Swingle.

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## Family

Rutaceae

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## Common/English Names

Golden Orange, Marumi Kumquat, Morgani Kumquat, Round Kumquat, Sweet-Peeled Kumquat.

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## Vernacular Names

**Chinese:** Chin Chü, Jin Gan, Jin Ju, Shan Ju, Yuan Jin Gan (Medicinal Name);

**French:** Kumquat À Fruits Ronds, Kumquat Marumi, Kumquat Rond, Kumquat Du Japon;

**German:** Marumi-Kumquat, Runde Kumquat, Rundkumquat;

**Hungarian:** Japán Kumkvat;

**Italian:** Kumquat Rotondo, Kumquat A Frutto Rondo;

**Japanese:** Maru Kinkan, Marumi Kinkan;

**Korean:** Dong Gul Gyul, Dung Geun Geum Gam, Geum Gyul, Geum Gyul La Mu;

**Portuguese:** Cunquato-Marumi;

**Russian:** Кумкват;

**Spanish:** Kumquat Redondo, Naranjita Japonesa, Kumquat Redondo;

**Vietnamese:** Cây Quất Cảnh.

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## Origin/Distribution

*Citrus japonica* is native to southern China. It is cultivated in China, Japan, Korea, Taiwan, Europe, southern United States (notably Florida and California), Australia and elsewhere.

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## Agroecology

Marumi kumquat is more cold hardy than other kumquats like the Nagami and the Meiwa- and even more cold hardy than the Satsuma Orange Tree. Marumi Kumquat is not damaged by temperatures of  $-20^{\circ}\text{C}$ .

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## Edible Plant Parts and Uses

Ripe Marumi kumquat is eaten whole as its rind is extremely sweet, fragrant and pleasant. The fruit is popularly relished as fresh fruit in Korea and Japan. The fruits are easily preserved whole



**Plate 1** Marumi kumquat fruits and leaves



**Plate 3** Harvested Marumi kumquat



**Plate 2** Close-up of ripening fruit



**Plate 4** Close view Marumi kumquat fruits

in sugar syrup and bottled or canned. The fruits can also be pickled in jars of water, vinegar, and salt sealed and allowed to stand for 2–3 months or made into sweet pickled by boiling in syrup, vinegar and sugar. The kumquats can also be made into marmalade or jelly (Plates 1, 2 and 3).

## Botany

Small evergreen, sparingly armed tree to 2–3 m high with a compact crown and angular green branches when young. Leaves are oval to broadly elliptic, 6–7.5 cm by 3–4.5 cm, medium green, simple, with acute to subacute apex, tapering obtuse base, entire to subcrenulate margin and borne on inconspicuously winged 6–11 mm petioles (Plates 1 and 2). Flowers usually solitary, or paired and axillary, white, bisexual; sepals green glabrous, 5 toothed; petals 5 white, oblong;

stamens 20 in 5 or more coherent fascicles; ovary superior subglobose to globose with a simple globose stigma. Fruit is globose to slightly oblate, or subglobose, 2.0–2.7 cm diameter, glossy golden orange to orangey-yellow (Plates 1–4), thin, sweet, fragrant rind and 4–6 pulpy, juicy, orange segments with 1–3 small pointed seeds or seedless.

## Nutritive/Medicinal Properties

The nutrient composition of raw kumquat (*Fortunella* spp.) (exclude 7% seeds) per 100 g edible portion was reported as: water 80.85 g, energy 71 kcal (296 kJ), protein 1.88 g, total lipid 0.86 g, ash 0.52 g, carbohydrate 15.90 g, total dietary fibre 6.5 g, total sugars 9.36 g, Ca 62 mg, Fe 0.86 mg, Mg 20 mg, P 19 mg, K 186 mg,

Na 10 mg, Zn 0.17 mg, Cu 0.095 mg, Mn 0.135 mg, vitamin C 43.9 mg, thiamine 0.037 mg, riboflavin 0.090 mg, niacin 0.429 mg, pantothenic acid 0.208 mg, vitamin B-6 0.036 mg, total folate 17 µg, total choline 8.4 mg, vitamin A 290 IU (15 µg RAE), vitamin E (α-tocopherol) 0.15 mg, total saturated fatty acids 0.103 g, 14:0 (myristic) 0.004 g, 16:0 (palmitic) 0.090 g, 18:0 (stearic) 0.004 g; total monounsaturated fatty acids 0.154 g, 16:1 undifferentiated (palmitoleic) 0.021 g, 18:1 undifferentiated (oleic) 0.137 g; total polyunsaturated fatty acids 0.171 g, 18:2 undifferentiated (linoleic) 0.124 g, 18:3 undifferentiated (linolenic) 0.047 g; α-carotene 155 µg, β-cryptoxanthine 193 µg, and lutein+zeaxanthin 129 µg (USDA 2011).

Among a total of 91 volatile constituents identified in round kumquat fruit, 47 were identified for the first time in kumquat fruit (Umano et al. 1994). d-limonene was the most abundant compound, comprising 87% of the sample from steam distillation and 97% of the sample from simultaneous purging/extraction (SPE). In addition to d-limonene, linalool, myrcene, and geranyl acetate were found in the sample from steam distillation as major constituents; myrcene, α-pinene, and β-phellandrene were identified in the sample from SPE as major components.

Ten compounds were isolated from fruit peels of *Fortunella japonica* and identified as α-tocopherol (1), lupenone (2), β-amyirin (3), α-amyirin (4), β-sitosterol (5), β-sitosteryl 3-O-glucopyranoside (6), kaempferide 3-O-rhamnopyranoside (7), 3',5'-di-C-β-glucopyranosylphloretin (8), acacetin 7-O-neohesperidoside (9), and acacetin 8-C-neohesperidoside (10) (Cho et al. 2005). Eighty-two compounds were identified in kumquat (*Fortunella japonica* Swingle) cold-pressed peel oil (Choi 2005). The major compounds were limonene (93.73%), myrcene (1.84%), and ethyl acetate (1.13%). Camphene, terpinen-4-ol, citronellyl formate, and citronellyl acetate showed high flavour dilution (FD) factors (≥5) and relative flavour activities (RFA) (>20). Citronellyl formate and citronellyl acetate were regarded as the characteristic odour components of the kumquat peel oil. 106 volatile compounds, were identified in round kumquat (*Fortunella japonica*) peel essential oil (Quijano

and Pino 2009). Limonene was the most abundant compound, comprising 76.7% of peel oil. In addition to limonene, myrcene, germacrene D and linalool and were found as major constituents.

### Traditional Medicinal Uses

The plant is regarded as antiphlogistic, antivenous, carminative, deodorant and stimulant. The fresh fruit is antitussive and expectorant; in Vietnam, it is steamed with sugar candy and used in the treatment of sore throats. It is said to be good for infants.

### Other Uses

Marumi kumquat is grown as an ornamental plant in the garden, parks and as ornamental house plant in patios and terraces and can be used in bonsai. This plant symbolizes good luck in China, Japan and Korea and other southeast Asian countries, where it is sometimes given as a gift during the Lunar New Year.

### Comments

Marumi kumquat is smaller than Meiwa or Nagami kumquats and has the sweetest, golden orange peel.

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