# Atractylodes Rhizome

*Atractylodis Rhizoma*

ビャクジュツ

Atractylodes Rhizome is the rhizome of *Atractylodes japonica* Koidzumi ex Kitamura (Wa-byakujutsu), or is the rhizome of *Atractylodes ovata* De Candolle (Kara-byakujutsu) (*Compositae*).

**Description** (1) Wa-byakujutsu—Periderm-removed rhizome is irregular masses or irregularly curved cylinder, 3 – 8 cm in length, 2 – 3 cm in diameter; externally light grayish yellow to light yellowish white, with scattered grayish brown parts. The rhizome covered with periderm is externally grayish brown, often with node-like protuberances and coarse wrinkles. Difficult to break, and the fractured surface is fibrous. A transverse section, with fine dots of light yellow-brown to brown secrete.

Odor, characteristic; taste, somewhat bitter.

Under a microscope, a transverse section reveals periderm with stone cell layers; fiber bundles in the parenchyma of the cortex, often adjoined to the outside of the phloem; oil sacs containing light brown to brown substances, situated at the outer end of medullary rays; in the xylem, radially lined vessels, surrounding large pith, and distinct fiber bundle surrounding the vessels; in pith and in medullary rays, oil sacs similar to those in cortex, and in parenchyma, crystals of inulin and small needle crystals of calcium oxalate.

(2) Kara-byakujutsu—Irregularly enlarged mass, 4 – 8 cm in length, 2 – 5 cm in diameter; externally grayish yellow to dark brown, having sporadic, knob-like small protrusions. Difficult to break; fractured surface has a light brown to dark brown xylem remarkably fibrous.

Odor, characteristic; taste, somewhat sweet, but followed by slight bitterness.

Under a microscope, a transverse section usually reveals periderm with stone cells, absence of fibers in the cortex; oil sacs containing yellow-brown contents in phloem ray and also at the outer end of it; xylem with radially lined vessels surrounding large pith, and distinct fiber bundle surrounding the vessels; pith and medullary ray exhibit oil sacs as in cortex; parenchyma contains crystals of inulin and small needle crystals of calcium oxalate.

**Identification** Macerate 0.5 g of pulverized Atractylodes Rhizome with 5 mL of ethanol (95) by warming in a water bath for 2 minutes, and filter. To 2 mL of the filtrate add 0.5 mL of vanillin-hydrochloric acid TS, and shake immediately: a red to red-purple color develops and persists.

**Purity** Atractylodes lancea rhizome—To 2.0 g of pulverized Atractylodes Rhizome add exactly 5 mL of hexane, shake for 5 minutes, filter, and use this filtrate as the sample solution. Perform the test with this solution as directed under the Thin-layer Chromatography. Spot 10 $\mu$L of the solution on a plate of silica gel for thin-layer chromatography. Develop the plate with a mixture of hexane and acetone (7:1) to a distance of about 10 cm, and air-dry the plate. Spray evenly 4-dimethylaminobenzaldehyde TS for spraying on the plate, and heat at 100°C for 5 minutes: no green to grayish green spot appears between *Rf* 0.3 and 0.6.

**Total ash** Not more than 7.0%.

**Acid-insoluble ash** Not more than 1.0%.

**Essential oil content** Perform the test as directed in the Essential oil content under the Crude Drugs, with 50.0 g of pulverized Atractylodes Rhizome: the volume of essential oil is not less than 0.5 mL.

# Powdered Atractylodes Rhizome

*Atractylodis Rhizoma Pulveratum*

ビャクジュツ末

Powdered Atractylodes Rhizome is the powder of Atractylodes Rhizome.

**Description** Powdered Atractylodes Rhizome occurs as a light brown to yellow-brown powder, and has a characteristic odor and a slightly bitter or slightly sweet taste, followed by a slightly bitter aftertaste.

Under a microscope, Powdered Atractylodes Rhizome reveals mainly parenchyma cells, crystals of inulin and fragments of parenchyma cells containing small needle crystals of calcium oxalate; fragments of light yellow thick-walled fibers, stone cells and cork cells; a few fragments of reticulate and scalariform vessels; small yellow-brown secrete masses or oil droplets; starch grains absent.

**Identification** Macerate 0.5 g of Powdered Atractylodes Rhizome with 5 mL of ethanol (95) by warming in a water bath for 2 minutes, and filter. To 2 mL of the filtrate add 0.5 mL of vanillin-hydrochloric acid TS, and shake immediately: a red to red-purple color develops and persists.

**Purity** Atractylodes lancea rhizome—To 2.0 g of Powdered Atractylodes Rhizome add exactly 5 mL of hexane, shake for 5 minutes, filter, and use this filtrate as the sample solution. Perform the test with the sample solution as directed under the Thin-layer Chromatography. Spot 10 $\mu$L of the solution on a plate of silica gel for thin-layer chromatography. Develop the plate with a mixture of hexane and acetone (7:1) to a distance of about 10 cm, and air-dry the plate. Spray evenly 4-dimethylaminobenzaldehyde TS for spraying on the plate, and heat at 100°C for 5 minutes: no green to grayish green spot appears at the *Rf* value of between 0.3 and 0.6.

**Total ash** Not more than 7.0%.

**Acid-insoluble ash** Not more than 1.0%.

**Essential oil content** Perform the test directed in the Essential oil content under the Crude Drugs, with 50.0 g of Powdered Atractylodes Rhizome: the volume of essential oil is not less than 0.4 mL.

**Containers and storage** Containers—Tight containers.