



## Sophora Japanese - A Beautiful Decorative and Medicinal Tree

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**Abstract:** This paper presents the useful, medicinal and biological properties of Japanese Sophora. As well as Japanese Sophora is a beautiful decorative tree. Due to its decorative effect, Japanese Sophora is widely used in landscape design in the city of Bukhara and its environs. Scientific research is underway to adapt this tree to the climate of Bukhara.

**Keywords:** Sophora Japanese, useful, medicinal, biological properties, folk medicine.

### Features of growing sophora - Japanese acacia

Sophora is part of a family called Legumes (Fabaceae), which also includes up to 62 plant species. They are mostly low trees or shrubs, but can also be herbaceous. The breeding area of these plants is quite extensive, it includes South-Eastern Europe, South Asian areas, Central Asia, Australia, Pacific island territories and also some areas in the east of South Africa. It can be decided from the name that Sophora takes its origins from Greece or the Mediterranean countries, but Japan and China are considered to be its true homeland, where this tree was treated with sacred awe. It has many other names in different languages: the British call it the “Japanese pagoda”, the Spaniards call it the Japanese acacia, in Vietnam it is found as the “hoe tree”, and the botanists gave it the name of the Japanese *Styphnolobium* (*Styphnolobium japonicum*).

In natural nature, the sophora can reach up to 15–25 m in height. The bark of the “Japanese pagoda” acquires a dark gray color only with the age of the tree, since the branches are gray-greenish in youth. The entire trunk is dotted with deep slits-cracks. In the summer, the foliage of the Sophora attracts the eye with a rich emerald color, and it keeps on the tree until late autumn. Foliage and young shoots completely cover the hairs, due to which the petiole of the leaf blade has a strong thickening at the base. The leaves are quite large, pinnate. And only by the end of the November days, all the foliage gradually falls off, but the sophora does not cease to be beautiful, since its yellowish fruits remain on it. All trees with intricately curved branches and trunk do not lose their decorative appeal.

The plant blooms only once every two years. From mid to late summer, inflorescences appear on the sophora, which look like long disheveled panicles, distinguished by pale yellow-white, soft pink or bluish-purple hues. The color depends on the plant variety. Sophora is a dioecious plant, when flowers of both sexes are present on the same tree or bush. Some varieties have a pleasant fragrant aroma of buds.

After the flowering process is completed, these panicle inflorescences turn into bundles consisting of fleshy fruits. They are non-expanding beans. Their length reaches approximately 10 cm. The color of the beans is greenish and there is a frame along the edge with a yellow stripe, they are completely covered with constrictions. They will stay on the tree all winter, pleasing the eye with a bright color. In these bean fruits, seed material begins to ripen.

Parts of the plant contain the substance maakiain, which has pronounced properties of inhibiting parasitic fungal spores (it is a fungicide of natural origin). For medical purposes, Sophora uses almost all components - leaf plates, buds (buds), fruits and seeds. Despite its toxicity, the substances contained in the plant help a person stay strong and help restore a young look to the skin. Sophora flowers have learned to extract a useful substance - rutin, which is very similar to the properties of vitamin P.

Most often, Japanese Sophora is used for this. The number of diseases in which tinctures are used, drugs created on the basis of this medicinal plant is quite large. Here, only some of them are listed: diathesis, hemorrhages, radiation sickness, rheumatoid diseases, hypertension, diabetes mellitus, measles, typhus and many others.

The visual beauty of the Sophora japonica tree makes it very attractive to use in garden landscaping. The main feature of Sophora, which determines its popularity, is the healing properties of inflorescences and fruits. They are widely used in traditional, folk medicine for the manufacture of medicinal infusions.

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### **Useful properties of Japanese Sophora**

Sophora japonica contains a large amount of alkaloids: in leaves - 3%, in seeds - 4%, in roots 2-3%. They form the basis of the chemical composition of the plant. In addition, phenolic dyes are present in the roots, and up to 6% fatty oil in the seeds. Also, bioactive substances such as kaempferol, quercetin, flavonoids, organic acids and vitamin C have been isolated from different parts of Sophora.

In addition, rutin, which has the properties of vitamin P, was found in the flowers of the plant. This substance well reduces the fragility of capillaries, therefore it is indispensable in the treatment of diabetes mellitus, typhus and measles. Doctors in some countries of Southeast Asia suggest that specially prepared flowers of the plant can prevent the occurrence of a stroke, since the substances contained in them effectively strengthen the walls of blood vessels and lower blood pressure.

Unblown buds and fruits of the plant are used as medicinal raw materials. The buds are cut in June-July, when they are just beginning to bloom, the fruits are harvested after ripening, carefully breaking off or cutting off the pods with secateurs in dry weather. The collected raw materials are cleaned of twigs and impurities and sent for drying as soon as possible. Fruits and flowers are dried in well-ventilated rooms or in dryers at a temperature of 25-30 ° C, stirring occasionally. Store finished raw materials in multilayer paper bags.

### **The healing properties of Sophora japonica**

What are the benefits of preparations based on Japanese Sophora:

- Return elasticity to the walls of blood vessels, making them less fragile and brittle;
- Regulate the metabolism of many systems of the human body and metabolic processes in it, allowing you to lower blood glucose and cholesterol levels;
- Clear vessels from cholesterol plaques;
- Significantly reduce the level of blood pressure;
- They clean the subcutaneous vessels to the capillary level, they intensively supply blood to the hair follicles and stimulate hair growth;
- Contribute to strengthening the immune system and thus reduce the likelihood of allergic reactions;
- Improve blood supply to tissues, which has a positive effect on the prevention of strokes, heart attacks and visual impairment associated with the trophism of the vessels that feed the eye;

- Reduce swelling of tissues and joints;
- Struggling with prothrombin of capillaries and small vessels of the scalp, which helps in the fight against baldness.

The positive effect of Japanese Sophora on the circulatory system makes it an indispensable remedy for such serious complications of diabetes as diabetic atherosclerosis with numbness of the legs and the development of gangrene. This complication, which threatens the life of the patient, begins its development with the darkening of the fingers of the lower extremities, in advanced cases it threatens with amputation and death.

Japanese Sophora also helps with complications of obliterating endarteritis - spontaneous gangrene. With this disease, the arteries of the lower leg and foot are affected. Their lumen narrows, the general blood supply to the tissues of the extremities is disturbed. The effect of taking preparations based on Sophora is already noted on the 4th-5th day, when an improvement in blood supply becomes noticeable.

### **Japanese Sophora in medicine**

Preparations made on the basis of this plant are used to treat the most severe forms of tuberculosis, even with the formation of cavities in the lungs. These pathological changes stop in their development, the process of regeneration starts. Sophora preparations act as an antihelminthic for all types of parasites. They are especially effective on hepatic worms.

The effectiveness of Japanese Sophora has also been proven in the treatment of pathologies of the digestive tract. Medicines created on its basis regenerate the gastric mucosa, neutralize excessive acidity of gastric juice, and have a positive effect on pancreatic tissue.

Hypoglycemic (hyperglycemic) properties of sophora allow it to be used at any stage of diabetes:

- In the initial stages - as the only drug, subject to the principles of dietary nutrition;
- In complicated forms - in combination with drugs for the treatment of the underlying disease.

The stimulating properties of this universal remedy are widely used in the treatment of impotence and for the normalization of blood pressure in hypotension. As a local remedy, extracts and infusions with this medicinal plant are used as a compress, washing, wet applications and dressings, rinsing and irrigation of various cavities of the human body and skin lesions.

### **Japanese Sophora in folk medicine**

As a medicinal plant, Japanese Sophora is used quite widely. In official medicine, its preparations are recommended both for the treatment and prevention of diseases of the heart and blood vessels, gastrointestinal tract, liver, kidneys, joints, and in dermatology.

In folk medicine, in addition, the beneficial and healing properties of Japanese Sophora are used for diseases of the respiratory system, pancreas, nervous system, female genital area, hair loss, etc. The use of Japanese Sophora is great, as an antitumor agent, as an addition to the main, medical, treatment.

The plant contains a high percentage of rutin in its composition, especially in flower buds. On this basis, in the pharmaceutical industry, Japanese Sophora is a raw material for the production of this substance. Rutin in combination with ascorbic acid is prescribed both for the treatment and prevention of vascular diseases. On the basis of the fruits, the wound-healing drug Soforin is made.

Due to its decorative effect, Japanese Sophora is widely used in landscape design. The plant is drought- and shade-tolerant, but suffers from cold winds and great frosts, therefore it can only grow in a fairly mild climate.

Japanese Sophora is a first-class honey plant.

Many species have medicinal properties and are used in medicine. So the thick-fruited Sophora is recognized as official medicine in the CIS countries.

## References

1. Abdallah H.M., Al-Abd A.M., Asaad G.F., Abdel-Naim A.B., El-halawany A.M. Isolation of antiosteoporotic compounds from seeds of *Sophora japonica* - PLoS. One. 2014, Jun 3, 9(6), e98559.
2. Chen H., Zhang J., Luo J., Lai F., Wang Z., Tong H., Lu D., Bu H., Zhang R., Lin S. Antiangiogenic effects of oxymatrine on pancreatic cancer by inhibition of the NF- $\kappa$ B-mediated VEGF signaling pathway - Oncol. Rep. 2013, Aug., 30(2), 589-595.
3. Chen H.N., Hsieh C.L. Effects of *Sophora japonica* flowers (Huaihua) on cerebral infarction - Chin. Med. 2010, Sep 27, 5, 34.
4. Dong X.Q., Du Q., Yu W.H., Zhang Z.Y., Zhu Q., Che Z.H., Chen F., Wang H., Chen J. Anti-inflammatory Effects of Oxymatrine Through Inhibition of Nuclear Factor-kappa B and Mitogen-activated Protein Kinase Activation in Lipopolysaccharide-induced BV2 Microglia Cells - Iran. J. Pharm. Res. 2013, Winter, 12(1), 165-174.
5. Fan D.L., Zhao W.J., Wang Y.X., Han S.Y., Guo S. Oxymatrine inhibits collagen synthesis in keloid fibroblasts via inhibition of transforming growth factor- $\beta$ 1/Smad signaling pathway - Int. J. Dermatol. 2012, Apr., 51(4), 463-472.
6. Kuchkarova S., Yarkulova Z. *Paulownia (Paulownia siebold&zucc) miracle tree*// Scientific Progress vol. 3 (4), (2022), p. 1283-1288
7. Kim J.M., Yun-Choi H.S. Anti-platelet effects of flavonoids and flavonoid-glycosides from *Sophora japonica* - Arch. Pharm. Res. 2008, Jul., 31(7), 886-890.
8. Lee H.K., Kim H.S., Kim Y.J., Kim J.S., Park Y.S., Kang J.S., Yuk D.Y., Hong J.T., Kim Y., Han S.B. Sophoricoside isolated from *Sophora japonica* ameliorates contact dermatitis by inhibiting NF- $\kappa$ B signaling in B cells - Int. Immunopharmacol. 2013, Mar., 15(3), 467-473.
9. Li L., Liu Q., Fan L., Xiao W., Zhao L., Wang Y., Ye W., Lan F., Jia B., Feng H., Zhou C., Yue X., Xing G., Wang T. Protective effects of oxymatrine against arsenic trioxide-induced liver injury - Oncotarget. 2017, Feb 21, 8(8), 12792-12799.
10. Lo Y.H., Lin R.D., Lin Y.P., Liu Y.L., Lee M.H. Active constituents from *Sophora japonica* exhibiting cellular tyrosinase inhibition in human epidermal melanocytes - J. Ethnopharmacol. 2009, Jul 30, 124(3), 625-629.
11. Man K.M., Chen W.C., Wang H.M., Chen H.Y., Shen J.L., Chen L.D., Tsai F.J., Chen Y.H., Yu D.X., Chiang F.F. A randomized, double-blind, placebo-controlled trial of a Chinese herbal *Sophora* flower formula in patients with symptomatic haemorrhoids: a preliminary study - Afr. J. Tradit. Complement. Altern. Med. 2012, Dec 31, 10(2), 343-351.