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Review Article

Styrax: A Review on its Past and Traditional Uses

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Abstract

Tropical or subtropical environments are home to the Styracaceae family. An important medicinal plant called *Styrax officinalis* L. establish in the Mediterranean Basin, the subtropics, the desert, and temperate climates. It has been utilized for agricultural, cosmetic, medicinal, and religious purposes. There are over 130 different species of *Styrax*, and when they are burned, they produce aromatic resin. The goal of this review was to compile from the literature all information that was available regarding the phytochemistry, traditional medicinal values, scientifically supported uses, morphology, and habitat of the *S. officinalis* plant. This paper is a review of the literature on the chemical components, description, origin, traditional therapeutic usage, and scientifically supported uses of *S. officinalis*. The current work revealed that many substances, including egonol, egonol oleate, americanin, different phenolic acids, and benzofuran derivatives, have been identified from *S. officinalis* leaves, fruits, fruit peels, seeds, flowers, and stems. In addition to the numerous portions employed as extracts, these likely chemicals and its artificial imitative also shown beneficial biological effects, such as anticancer, hemolytic, anti-complement, anti-leukemic, antifungal, antibacterial, antioxidant, and tyrosinase inhibitory activity. Traditional uses of the *styrax* plant include the treatment of wounds, muscle discomfort, neurological problems, anxiety, and arthritis.

Keywords: *Styrax officinalis,* Antibacterial, Phenolic acids, Arthritis

Introduction

Genus *Styrax* belongs to the family Styracaceae and consists of approximately 130 species of trees or shrubs. The approximately 30 species and 7 varieties that grow in China are mainly distributed in the provinces south of the Yangtze River basin (Editorial Committee of Chinese flora, 1987). *Styrax* genera are frequently described Storax or snowbell, grows 2 to 14 m in tallness. The leaves are oval in shape with alternate venation and deciduous

nature. Length of the leaf is about 1-18 cm, while, width are about 2-10 cm with oblong-shaped and smooth drupes fruits [1]. *Styrax tonkinensis*, a deciduous tree of the family Styracaceae, is mainly distributed in South-East Asia including Vietnam and China. The resin of this plant, benzoin, has been used in traditional medicine for waking up the patient from unconsciousness, promoting the flow of Qi and blood, and alleviating pain (Chinese pharmacopeia commission, 2015). Scientific knowledge about *Styrax tonkinensis* is very limited, even though *S. tonkinensis* has important social value and potentially high commercial value. The main economic value of the species currently arises from its gum. Timber products are not used commercially at the moment. However, it has high potential value for industrial uses. Closely related species that are in the same genus, produce similar gum, and are better known include *S. parallelonerum* in Indonesia, *S. benzoin* in Malaysia, and *S. hypoglauca* in China. The delay resistance of the low durability wood of *S. tonkinensis* was enhanced by temperature action [2].

Styrax japonicus is a deciduous tree species having white flowers and extensively dispersed in eastern Asia and China [3], by higher decorative and therapeutic values. Studies done in past on this species was attention on seed germination and tissue culture [4].

Styrax americanus Lam. is a small tree and height goes upto 1.2-5 meters. This species is broadly scattered in the south-eastern United States and Virginia and Illinois. At their origin sites, trees grow alongside streams in sunlight [5]. During spring season *S. americanus* perfumed white blossoms from leaf axils. Our attention was focused on the fruits of *S. officinalis* L. This species is commonly known as Storax tree and is a perennial brushy plant belonging to the Styracaceae family. Its name derives from the combination of two words: the first word, related to the genus, is Syrian and refers to a specific place in Syria where this species abundantly grew in ancient times; the second word, related to the species, is Latin and mentions the fact that this species was widely used in medicine. In fact, it's aromatic (as incense) and therapeutic properties were well-known by Romans, Egyptians, Phoenicians, and Ionians [6].

Past history of *styrax*

Preceding data and observations by scientists reported that trees and shrubs remains the soil wet and plays significant role in drought tolerance. *Alnus maritima* widely reported in the saturated soil and have proven tolerant to dry root when grown in managed landscapes. Like the other species (*Taxodium distichum*, *Acer rubrum* and *Magnolia virginiana*), *A. maritima* is also included in the list of wetland species with drought tolerance nature [7]. *Styrax americanus* is a horticulturally tree and has untapped latent for countryside and city plantings. The tree is little, ornamental value in controlled garden and under helpfulness appearance. The ostentatious exhibit of perfumed pallid flower in spring contributes to its elevated decorative appeal, and the type is tolerant of wet soils. *Styrax ferrugineus* is important plant, is healthily adapted in the savanna types regions with shrubs and herbs. *Styrax camporum* is widely distributed in the cerrado areas, such as in specific physiognomies called cerradao (Portuguese augmentative of cerrado). Mature tree of *S. camporum* are of 8–12 m tall. Juvenile plants of *S. camporumare* are found at the edge of the cerradao [8], which designates that *S. camporum* is a light serious species.

Traditional uses of *styrax*

In fact, *S. officinalis* has been known for its oleo-resin (Storax) since early era. It has been used by Ionians, Phenicians, Romans, and Egyptians as an anger fabric and in medicines. Storax resin had immense inexpensive worth in the deal from the east for a long time which is lost due to the loss of pre-existing conventional information and newly it is utilized merely in the Roman Catholic Churches in Europe [9]. In addition, in several Muslim countries, Storax is used for the manufacture of praying beads and incense which is burned to manufacture smoke that is used chiefly to clean the evil eye [10]. Moreover, in Latin American conventional drug, it is used therapeutically as an antiseptic, expectorant, and also for the curing of heart disease, apoplexy, leprosy, constipation, and bronchitis [11]. Moreover, it is used superficially to heal skin sores and for the management of scabies [12]. In addition, a combination of benzoin balsam and Storax has been generally used by the Pharaohs to treat chronic respiratory tract communicable diseases and microbial infections, cough and wounds [13]. In China, the whole *S. officinalis* plant has been utilized conventionally as antibacterial, antifungal and for accelerates the wound healing process. While its tincture is used as a mouthwash as well as against asthma, coughs, gonorrhea, tuberculosis, and edema [14]. Additionally, in conventional Jordanian and Palestinian drugs, *S. officinalis* seeds are used in skin rash, leprosy and further skin diseases [15]. However, leaves and flowers of *S. officinalis* are also used as conventional drug against coughs, diphtheria and leucorrhoea. Moreover, *S. officinalis* oleo-resin, fruits, and leaves were used orally to prevent the tumors, fever, intestinal ulcers, kidney and bladder pains, bronchitis,

ophthalmitis, rash, toothache, acute earache and hemorrhoids in many countries [16]. Besides, as conventional drug, *S. officinalis* is prepared as a paste by shatter the fruits then boiling them until dryness and the powder formed is mixed with cow milk, sugar, and fat. This mixture is traditionally used as a strong male-sterilizer [17]. While in Iranian folk medicine, *S. officinalis* seed oil is used for the prevention of constipation [18]. In adding, the methanol pull out from *S. officinalis* fruits has antibacterial action to *Staphylococcus* aureus and *Escherichia coli* strains. This action was contrast with strong broad-spectrum antibiotics such as ceftriaxone, amikacin, and cefepime [19]. A study conducted by Nakano., *et al*. found that the hydro-alcoholic extract of the aerial parts of *S. officinalis* has an antitumor activity [20-30].

Conclusion and future perspective

The current review's summary of the data showed that *S. officinalis* is a valuable and important medicinal plant used in folk medicine to treat ailments like kidney and bladder pains, ophthalmitis, toothaches, acute earaches, hemorrhoids, edema, apoplexy, leprosy, skin sores, scabies, respiratory tract illnesses, skin rash, diphtheria, leucorrhoea, hematological malignancies, and intestinal. The pharmacological and biological analyses of the plant parts, unprocessed extracts, and chemically separated components of *S. officinalis* provided experimental and scientific evidence for some of its traditional medical benefits. Additionally, certain novel pharmaceutical and pharmacological applications were found, including its usage as a suspending agent in the formulation of antacid medications as well as its antioxidant, antityrosinase, and superoxide radical scavenging properties. However, additional research is required to comprehend the pharmacodynamic and pharmacokinetic impacts of the bioactive chemical elements of plants. The results of this investigation may lay the groundwork for its eventual therapeutic application in modern science. Additionally, more recent techniques and additional clinical trials are still required to support the majority of *S. officinalis*' traditional usage. To research its phytochemical standardization and bioactivity determination in accordance with its metabolism, a few other features such as pharmacokinetics, molecular biology, and natural medicinal chemistry should be used.

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