

Chapter 7

Phytochemistry and Ethanopharmacology of *Illicium verum* (Staranise)

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ABSTRACT

Illicium verum, as a spice and pharmaceutical treatment of many harmful diseases, has been widely used in most Asian countries. The Ministry of Health of the People's Republic of China considered it as both food and medicine due to its non-toxicity towards human health. In the present study, the review focuses mainly on food and medical applications of *I. verum*. The fruits are commonly used as an ingredient of the traditional "five-spice" powder of Chinese cooking, and the essential oil of *I. verum* can be used as flavoring. The extraction from *I. verum* has carminative, stomachic, stimulant, and diuretic properties, and is used as a pharmaceutical supplement. Shikimic acid extracted from *I. verum* is one of the main ingredients in the antiviral drug Tamiflu, which is used to fight avian influenza. It has also been reported to possess antimicrobial and antioxidative properties as well as significant anticancer potential. This review presents a detailed compilation of the literature on phytochemicals and pharmacological properties of *Illicium verum*.

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INTRODUCTION

The Schisandraceae family contains the sole genus *Illicium*. It consists of forty-two species of evergreen small trees and shrubs. The species is native of the tropical and subtropical regions of South Eastern North America, Eastern and South Eastern Asia and the West Indies. The most frequently occurring species are *Illicium dunnianum*, *Illicium verum*, *Illicium anisatum*, and *Illicium griffithii*. Commonly *Illicium verum* is known as star anise or star aniseed or Chinese star anise. (Kumar et al., 2012) It is a spice that very similar to anise in flavor, obtained from the star-shaped pericarp of the plant. It is a medium-sized native evergreen small or medium-sized plant of subtropical and temperate regions. They consist of star-shaped fruits, which are reddish-brown in color and contain 6–8 carpels attached in a whorl arrangement. The shape and size of the carpel is boat-shaped and 10 mm long, also contain a seed. The seeds are brown colored, ovoid shaped, and possess smooth, shiny, and brittle texture. This plant is propagated by its seeds for its application in different types of medicines, perfume, and as a culinary spice in southern China and Vietnam. The fruits are harvested before they ripen, and sun drying is done for further use. Anethole, is the main ingredient found in Star anise, that gives the unrelated anise its flavor, hence it has become a less expensive substitute for anise in baking as well as in liquor production, most distinctively in the production of the liquor Galliano. The fruits are commonly used as a spice, and the seeds are sometimes chewed after the meals to aid the digestion. Star anise has many culinary uses like, enhances the flavor of meat, the major component of *garam masala* and used as a spice in the preparation of *biryani* and *masala chai*. Traditionally, dried seedless fruit is used as incense. It is used for sweet fragrance while preparing butter-salted tea or sugar tea. Besides these properties, it is also gaining importance in the natural health world due to the medicinal values of phytochemicals present in the fruits. These plants have been extensively used for the treatment of infectious diseases in Iranian traditional medicine. The fruit consists of essential, as well as volatile oil. Traditionally, the fruit has been used as carminative, digestive, dyspepsia, antispasmodic, stimulant, antirheumatic, and diuretic. The paste/powder of Star anise is used to treat rheumatism and nostalgia, and is also used as an antiseptic. They are also used as medicine to treat cough, toothache, and sinusitis and to improve the strength of local alcohol. The fruit is considered as carminative, stomachic, and galactagogic. It is also used in curing vomiting, abdominal pain, dyspepsia, and food poisoning.

The star anise is a major source of chemical compound, such as shikimic acid, a primary precursor in the pharmacological synthesis of anti influenza drugs namely Oseltamivir (Tamiflu). There is a growing demand for star anise as a source of shikimic acid for the manufacture of anti-viral drugs widely used in the treatment and prophylaxis of avian flu (commonly bird flu). Shikimic acid is the starting compound utilized for the manufacture of the anti-viral drug oseltamivir. It is also a warming spice that contains powerful terpene antioxidants i.e. Linalool and limonene. Linalool is capable of protecting the lipid bilayer present in the cell membranes, which protects the arteries and improves blood flow. Limonene shows strong anticancer activity within the body. These components also have the property of improving the energy levels and as an expectorant to remediate the mucous associated with bronchitis, asthma, common cold, and whooping cough. Chinese use fruits to treat some skin problems (Lai *et al.*, 1997). Star anise has been reported to have antifungal, antibacterial, carminative, analgesic, anticarcinogenic, sedative, and antioxidant properties.

The similar variety known as Japanese star anise (*I. anisatum* L.), is a closely resembling species but is not edible as it contains shikimitoxin and possesses high toxicity. It can cause illness like serious neurological problems, “such as seizures”. Many cases of illness have been reported after using star anise

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