American Herbal Pharmacopoeia (AHP): Star Anise Adulteration

The American Herbal Products Association (AHPA) recently updated their list of adulterated species to include Chinese and Japanese Star Anise (*Illicium verum* and *Illicium anisatum*). *I. verum*, or true star anise, is widely used worldwide as a digestive aid including its use in babies for colic. This is an especially popular practice in South America. *Illicium* species contain sesquiterpene lactones that have been associated with neurotoxicity. Japanese star anise (*I. anisatum*), also known as *shikimi*, is a very common adulterant of the true star anise market, contains higher concentration of these lactones, and is associated with many of the toxic events that have been reported, including convulsions.

In 2006, the American Herbal Pharmacopoeia (AHP) was commissioned by FDA to develop basic characterizations between the two botanicals and published *Differentiation Between Star Anise (Illicium verum) and the Toxic Adulterant Shikimi (Illicium anisatum)*. The publication provides a detailed review of the toxicity, history of adulteration, and botanical, morphological, microscopic, organoleptic, and chemical differences between the species. Analytical methods for differentiating between the species include colorimetric assays used by early pharmacognosists (in a simple color reaction test shikimi gives a yellow color and true star anise a pink to red color), HPTLC, and a HPLC-MS method that is routinely used in the European Union to prevent *Illicium* adulteration. As with all AHP monographs, the *Illicium* document provides detailed photographic images of the true and adulterating species along with clear images of the colorimetric assay and HPTLC chromatograms. Perhaps most importantly, the AHP *Illicium* monograph provides commentary as to the strengths and limitations of the various testing methodologies.

According to AHP Executive Director Roy Upton: "The adulteration between these two species has occurred since at least the late 1800s and has persisted throughout the past decades. The problem is compounded by the fact that numerous plants used in Mexico are known as *anise in Spanish*, including fennel (*Foeniculum vulgare*) and anise seed (*Pimpinella anisum*), both of which are used for colic in babies. Thus, it is extremely important for these species of star anise to be clearly distinguished."

The inclusion of *Illicium* on AHPA's adulterants list is tantamount to a trade recommendation encouraging industry and AHPA members to ensure they have adequate testing methods for distinguishing between true and adulterating species. Other common adulterants on AHPA's list for which AHP has detailed monographs include aristolochic acid (commissioned by FDA and in collaboration with the SFDA of China, TGA of Australia, University of Mississippi, and Kew Gardens), bilberry, and black cohosh.

The Illicium and other AHP monographs are available through AHP: [http://www.herbal-ahp.org/](http://www.herbal-ahp.org/) or by contacting AHP: 831-461-6318; email: ahpadmin@got.net.