Coffee senna: an important species for different ethnic groups

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ABSTRACT

Popularly known as coffee senna, Senna occidentalis (L.) Link (synonym: Cassia occidentalis L.) is a ubiquitous plant appreciated by many tropical communities, especially as a herbal medicine. It has been widely used for centuries, principally for the treatment of weakness, constipation, liver disorders and skin infections. Due to its poisonous potential to grazing animals, coffee senna is included in several toxicological studies and constitutes a promising species in the study of new active substances.

Keywords: Senna occidentalis, Cassia occidentalis, ethnobotany, poisonous plants.

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INTRODUCTION

Cassia is a larger genus in the family Fabaceae Lindl (Leguminosae) often used in folk medicine. The scientific knowledge has been found that Cassia species comprise a rich source of phenolic derivatives, many with important biological and pharmacological properties (Junior et al. 2006).

The species Senna occidentalis (L.) Link - formerly Cassia occidentalis L. - is a perennial shrub native to South America and indigenous to tropical regions throughout the world (Figure 1), commonly found as a weed in wastelands, roadsides, pastures and cereal crops (Lachman-White et al. 1992).

According to the legacy of Corrêa (1926), S. occidentalis is characterized as an erect shrubby herb up to two meters high, with alternate and pinnate leaves, and ovate to lanceolate leaflets. The stem is reddish purple and the flower is perfect, with five yellow petals. Pods are linear and rather compressed containing seeds in one row. The seeds are about four millimeters long, ovoid and dark olive-coloured.

The plant grows in sandy and clay soils, being more prevalent at low altitudes, near the coast. Generally, flowers occur from September to December, and the fruits until April, spreading by seeds. It is cosmopolitan and spontaneous throughout Brazil, especially in the suburbs and roadsides. This species is usually cultivated in India to fertilize the soil and in Europe as an ornamental (Corrêa 1926, Lachman-White et al. 1992).

A rare illustration from XIX century can be found in the posthumous edition of the Augustinian Friar Francisco Manuel Blanco, author of the first comprehensive flora of the Philippines, following the system of Linnaeus (Figure 2).

This species also has been fully described by Irwin and Barneby (1982) in the precious work intitled Memoirs of the New Botanical Garden.

DISCUSSION

Ethnobotanical and toxicological aspects. The species S. occidentalis is popularly known as ant bush, foetid cassia, or coffee senna since this plant is considered a weed, that releases a volatile fetid odor, and its seeds are used as a coffee substitute in many regions of Brazil, Central America, Africa, and India (Corrêa 1926).

Northeast Brazilian hinterland populations use S. occidentalis seeds like a real alternative to coffee, mainly in Ceará. Historical data show that in 1925 the industrial roasting of coffee senna was established in Piauí (Brazil) due to the high price of the coffee at that time. Since many years, several countries took advantage of it to defraud the legitimate coffee powder (Corrêa 1926).

By presenting similar size and density to most grains, the decontamination process to remove S. occidentalis seeds from crops is difficult and the systems developed to perform farming control has proven to be expensive and inefficient (Keeton et al. 1996).

Numerous works have been demonstrated that S. occidentalis is poisonous to animals that ingest it in large quantities, accidentally or through contaminated feed. The toxic effects have been observed in several animal species, such as cattle, horses and wild boars (Sant’Ana et al. 2011, Takeuti et al. 2011, Oliveira-Filho et al. 2013).

Scientific reports from different countries have shown outbreaks of animals intoxication with serious consequences, as weakness, incoordination, reluctance to move and death. The skeletal and cardiac muscles degeneration were the injury predominantly found. Hepatotoxicity and alterations in the immune system were already observed in experimental studies (Barth et al. 1994, Huez et al. 2007, Barbosa-Ferreira et al. 2011).

The literature indicates that the toxin and its mechanism of action have not been definitively identified, but it may be attributed to toxoalbumins or anthraquinones (Moussu 1925, Kim et al. 1971) and some authors suggest the occurrence of mitochondria damage (O’Hara and Pierce 1974).

Lombardo et al. (2004) detected the presence of toxic proteins in S. occidentalis seeds. According to studies of França et al. (2005), these proteins were able to affect the humoral and cellular immune response of mice. Pinto et al. (2005) demonstrated that seeds toxicity could be attributed to lectins, since it was observed an in vitro blood agglutination.

Data about the toxicity of S. occidentalis for humans are scarce. This legume is used as a daily food by poor classes of Ceylon and India. The pods are cooked and have a pleasant taste, similar to beans (Corrêa 1926).

Medoua and Mbofung (2006) stated that there is no risk of the beverage prepared with S. occidentalis seeds, since the toxic factor is eliminated by the usual toasting procedure.

However, according to Vashishtha et al. (2007) the ingestion of a small amount of the plant can be fatal to a child. They described a significant association of encephalopathy syndrome and the accidental poisoning with S. occidentalis in different regions of India, since the pods are attractive and used by children to play.
Ethnopharmacological studies. The species *S. occidentalis* has several therapeutic indications. In Indian therapies (Ayurveda) it is widely used as a medicinal herb principally to treat liver diseases (Bardhan et al. 1985). In traditional Chinese medicine the seeds are known as *jue ming zi* and conventionally used to remove the “heat” of the liver and improve the visual acuity (Yen et al. 1998).

Tribes of Amazon and Africa consider this species very effective in combating malaria (Brandão et al. 1992, Tona et al. 2004). Furthermore, Nigerians employ a tea of the roots to treat constipation, a soup of the leaves to treat measles and smallpox, and rubbing the leaves into the skin affected by eczema and fungal infections (Corrêa 1926, Ogunkunle and Ladejobi 2006).

In Brazilian folk medicine, leaves and seeds are also employed as a topical antifungal, especially against wounds and mycoses whereby ringworm (*tinea corporis*) and pityriasis versicolor (Fenner et al. 2006). For Guarani indians (South America) *S. occidentalis* is called *taperiva* and it is an important antispasmodic and vermifuge remedy (Noelli 1998).

In the Xingó region (Alagoas - Brazil) *S. occidentalis* has a high therapeutic value for many clinical conditions, from throat inflammation and gastritis to hemorrhage and cancer (Almeida et al. 2006). Reports of Quilombola communities (Mato Grosso - Brazil) reveal that seeds decoction is
contraindicated for pregnant women because of the abortifacient potential (Rodrigues 2007).

Considering the widespread use of *S. occidentalis* in traditional medicine, numerous scientific studies have proven the pharmacological applications of it, as antifungal (Caceres et al. 1993), antibacterial (Ali et al. 1999), antimarial (Tona et al. 2004), antitumor (Calderón et al. 2006), and hepatoprotective (Abongwa et al. 2011).

**CONCLUSION**

Since long time *Senna occidentalis* has been useful for different communities around the world, probably due to its pantropic distribution and multiple applications. This plant stands out in the literature to be incriminated as the cause of severe poisoning outbreaks in animals. Because of the toxicological properties, *S. occidentalis* can be considered a promising species regarding new active substances, particularly those with antimicrobial and antitumor activity.

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**References**


