

# Quality Evaluation of Commercial Samples of 'Karanj' Seeds- *Pongamia pinnata* (L.) Pierre: A Unani Herbal Drug

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## Abstract

Authentic and commercial samples of *Pongamia pinnata* (L.) Pierre were evaluated to assess their quality in respect of identity, purity and strength. The authentic samples were collected from different agro-climatic forests and commercial samples were resourced from Delhi, Hardwar and Cochin herbs markets. Evaluation is based on specific parameters and limits prescribed in Ayurvedic, Unani and Siddha Pharmacopoeia and as well in other literature.

**Key-words:** Pharmacognostic evaluation, Commercial herbal drugs, Quality assessment.

## Introduction

*Pongamia pinnata* (L.) Pierre (Family : Leguminosae) is extensively used in the preparation of many Ayurvedic, Unani and Siddha formulations under the name 'Karanj' (trade/popular name). *Pongamia pinnata* (L.) Pierre is a moderate sized semi ever green tree grows up to 20 meters in height. Leaves pinnately compound, leaflets 5-7, ovate, elliptic, acuminate; flowers pinkish white, fragrant, arises from axillary racemes; fruits pale green colored, thick and hard, compressed, turns dark grey when ripe, containing 1-2 seed per pods. Plant contains alkaloids demethoxy-kanugin, gamatay, glabrin, glabrosaponin, kaempferol, kankone, kanugin, karangin, neoglabrin, pinnatin, pongamol, pongapin, quercitin, saponin,  $\beta$ -sitosterol and tannin. Seeds have 19.0% moisture, 27.5% fatty oil, 17.4% protein, 6.6% starch, 7.3% crude fibre and 2.4% ash (Sangwan, 2010).

The drug consists of dried seeds which are credited for anti-inflammatory, anti-plasmodial, anti-nociceptive, anti-hyperglycemic, anti-lipidperoxidative, anti-diarrhoeal, anti-ulcer, anti-hyperammonic and antioxidant activity. Seeds are white marbled with brownish lines seeds yield 27 to 36% of oil containing harayin, pangenol and glabrin.

In the trade channel, maximum seeds are procured from the wild sources viz. forest areas, open land, non-cultivated sources etc. The seeds collected from wild sources remain questionable for their quality especially when they have been procured from trade channels owing to fair chances of adulteration, substitution and inappropriate storage condition which lead to deterioration in quality. At times mere look alike species are used as a substitute, which may not even contain the active ingredients available through the main plants nor

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the effects of the end product is the same as that obtained from that of original plant (Rai *et al.*, 2011, 2012a&b and Padmakumar *et al.*, 2012). Commercial samples are always subject to quality control for their authenticity to ensure identity, purity and strength as per pharmacopoeial and other quality standards before their use to formulate the medicine. This quality evaluation practice may also ensure the safety and efficacy of medicine up to larger extent. Present investigation entails the extent of genuineness of market samples available in different parts of countries.

### Materials and Methods

The seeds were collected from natural habitats (Lucknow) and authenticated with references to pharmacopoeial standards and other literature. The commercial samples sold under the trade names purported to be prescribed species were drawn from the different market sources (Hardwar, Delhi and Cochin). Standard protocols/methods prescribed in pharmacopoeia were followed for pharmacognostical, physico-chemical and phytochemical values prescribed in Ayurvedic, Unani and Siddha Pharmacopoeia of India were taken as standards values (Anonymous, 1986, 1998, 1999, 2007a,b and 2008).



Fig. 1: Seeds of *Pongamia pinnata* (L.) Pierre in Pod

### Observations and Results

All the authenticated and commercial samples of the drugs were evaluated as per the specifications laid in Pharmacopoeia and other literature and present in separate headings.

1. Pharmacognostical evaluation of genuine and authenticated crude drug samples
  - A. Macro-morphological characteristics: Drug available as seed one or rarely two, elliptic or reniform in shape, wrinkled with reddish leathery testa; 1.7 to 2 cm long and 1.2 to 1.8 cm broad with slightly depressed micropylar end of cotyledon, while other side is semicircular in shape.
  - B. Micro-morphological characteristics: Transverse section of seed shows, testa composed of a layer of palisade like outer epidermis, filled with brown pigment, covered externally with a thick cuticle, a layer of large, thin-walled, somewhat rectangular cells, 2 to 4 layers of thick-walled parenchyma cells, a few rows of cells with small intercellular spaces, 2 or 3 layers of thick-walled elongated cells; a few layers of spongy parenchyma having large intercellular spaces, a number of parenchyma cells containing brown pigment; cotyledons composed of outer layer of epidermis with cylindrical cells, externally covered with thin cuticle; epidermis followed by rectangular to polygonal cells of mesophyll, filled with globules, also present scattered in this region.
  - C. Powdered Drug: Powder under microscope shows fragments of columnar palisade cells, few thick walled parenchymatous cells. Starch grains are rounded with abundant oil globules. Irregular shaped resinuous masses and vessels segments are also found in the macerate. Maceration of the powder shows parenchymatous cells of varying shapes and sizes with brown content, groups of palisade cells and vessels with scalariform thickening are commonly met with yellow oil globules. Crystals of calcium oxalate are also found in the macerate.
2. Phyto-chemical and physico-chemical specifications of genuine and authenticated samples

Specifications	Observation and Results
A. Major organic groups	
(i) Alkaloids	Absent
(ii) Tannins	Absent
(iii) Glycosides	Absent
(iv) Sterols	Absent
(v) Volatile Oil	Absent
(vi) Flavonoids	Present
(vii) Anthraquinone	Absent
(viii) Resins	Absent
(ix) Fixed oil	Present
(x) Poly phenolic compounds	Absent

B. Physico-chemical characteristics	
(i) Moisture Content %	4.00
(ii) Total ash %	3.00
(iii) Acid insoluble ash %	0.10
(iv) Water soluble extractives	13.00
(v) Alcohol soluble extractives %	22.00
C. Foreign matter %	1.00

### 3. Pharmacognostical evaluation of commercial samples

Specifications	Market Sample		
	Delhi	Haridwar	Cochin
A. Macro-morphological characteristics	Conforms	Conforms	Varies
B. Micro-morphological characteristics	Slightly varies	Conforms	Conforms
C. Powdered drug	Conforms	Conforms	Conforms

### 4. Phyto-chemical and physico-chemical evaluation of commercial samples

Sl. No.	Specifications	Market Sample		
		Delhi	Haridwar	Cochin
A.	Major organic groups			
	(i) Alkaloids	-	-	-
	(ii) Tannins	-	-	-
	(iii) Glycosides	-	-	-
	(iv) Sterols	-	-	-
	(v) Volatile Oil	-	-	-
	(vi) Flavonoids	✓	✓	✓
	(vii) Anthraquinone	-	-	-
	(viii) Resins	-	-	-
	(ix) Fixed oil	✓	-	✓
	(x) Poly phenolic compounds	-	-	-
B.	Physico-Chemical Characteristics	2.80	4.56	6.70
	(i) Moisture Content %	3.50	3.00	2.20
	(ii) Total ash %	0.14	0.11	0.15
	(iii) Acid insoluble ash %	17.20	13.25	15.20
	(iv) Water soluble extractives	28.80	22.90	28.00
	(v) Alcohol soluble extractives %			
C.	Foreign Matter %	0.80	0.30	0.80

## Conclusion

Drug available in market are elliptical or reniform in shape, wrinkled, reddish with leathery testa. Epidermal cells of the testa filled with brown pigment. The parenchyma cells also contain the brown pigment. Powder shows fragments of columnar palisade cells. Starch grains are rounded with abundant oil globules. Also seen are irregular shaped resinuous masses and vessels segments. Maceration of the powder shows parenchymatous cells of varying shapes and sizes with brown content, vessels with scalariform thickening, yellow oil globules, calcium oxalate crystals etc. Active chemical constituents are essential oils, flavonoids, fixed oil, etc. All the collected commercial samples conform to the values of authentic sample. However, micromorphological characteristics of Delhi sample slightly varies. Moisture content varies from 2.8% to 6.7%. Foreign matter 0.30% to 0.80% only.

In a conclusive statement “It is decisive that quality is paramount aspect in herbal products which can be only addressed by adopting quality parameters in quality assessment process of raw material (s) used in the preparation of herbal medicine and herbal commodities”.

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