

A Comparative Physicochemical Analysis of Seed of *Cassia Auriculata* and *Cassia Tora*

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Abstract: *The present study is about to the scientific evaluation of Cassia auriculata and Cassia tora collected from the Western Ghats of Maharashtra state. The selected plant species has some applications in traditional medicine for the treatment of various diseases. The present study was focused to screen the physicochemical analysis of C. auriculata and C. tora seeds and seed oil and to confirm - provide a scientific basis for its use in traditional medicine. The physical parameters of the seed of C.tora and C.auriculata are studied respectively, Density, hydration capacity, hydration index, swelling capacity, swelling index, etc.*

Keywords: Cassia Auricularia & Cassia Tora Seed, Seed Oil, Diseases, Traditional Medicine, Comparative Physicochemical Analysis.

I. INTRODUCTION

The population of the planet is increasing day by day, the world's population numbered nearly 7. The 6 billion as of mid-2017, showing the rise in one billion inhabitants over the twelve years. 60% of the world's people board Asia (4.5 billion), 17 percent in Africa (1.3 billion), 10 percent in Europe (742 million), 9 percent in the geographic region and therefore the Caribbean (646 million), and therefore the remaining 6 percent in Northern America (361 million) and Oceania (41 million). India (1.3 billion) remains the second-most populous country within the world after China (1.4 billion), comprising 17% of the world total. There are 29 states in India. Their populations range massively in size-the largest, Uttar Pradesh, holds almost 200 million people, the littlest, Sikkim, just over half 1,000,000. India's largest state is the province which, with a population of 199,581,520 in 2011, is larger than most countries within the world. If it were rustic in its claim it'd be the fifth-largest within the world, falling just behind China, India, the US, and Indonesia. Two other Indian states are home to over 100 million people-Maharashtra (112.4 million) and Bihar (103.8 million). While India's growth has Slowed remarkably, over the previous few years, it's still growing faster than China (World Population Prospects, 2017). Malnutrition could be a major problem in developing countries like India. 7.5% you look after children between 0-59 months were tormented it in 2015-16, which was the expansion in children than 2013-14(4.6%) (WHO, 2017).

Research has shown that the majority of the bioactive compounds in possess antioxidant properties, which play a task in the prevention of some chronic diseases like disorder heart diseases, osteoporosis, and other degenerative diseases, diabetes mellitus, and cancer. Furthermore, legumes are attractive to health-conscious consumers, celiac and diabetic patients, similarly consumers concerned with weight management. Legumes could be a basis for the event of many functional foods to market human health. It is, therefore, claimed that including legumes in an exceedingly health-promoting diet is vital in meeting the key dietary recommendations to boost the nutritional status of undernourished likewise as over-nourished individuals. Pharmaceutical and nutraceutical industries are showing in interest in such plants. Isolation and categorization of nutraceutically important phytochemicals present in such plants is in interest in the present-day (Gebrelibanos et al, 2013; Graham and Vance, 2003).

Based on the present studies, we've selected *C. auriculata* (Fabaceae) seed from Western Ghats of Maharashtra, India, to evaluate physicochemical properties of seed oil and physical properties of seed to prove the importance of *C. auriculata* and *C. tora*; the Legume.

II. MATERIAL AND METHOD

Plant Description: Selected *Cassia* sp. (sub-family: Caesalpinioideae; Family: Leguminosae/Fabaceae) could be a small shrub that grows up in warm moist soil throughout the tropical parts of Asia and African countries. The seeds of *cassia* sp. are brown in colour. *Cassia* gets flowers in the rainy season and fruits in the winter season.

Cassia auriculata Linn. - Family: Caesalpinaceae

The leaves are alternate, stipulate, paripinnate compound, very numerous, closely placed, narrowly furrowed, slender, pubescent, with an erect linear gland between the leaflets of every pair, leaflets very shortly stalked. Its flowers are irregular, bisexual, bright yellow and large, the pedicels glabrous. The racemes are few-flowered, short, erect, crowded in axils of upper leaves so as to form an oversized terminal inflorescence. The 5 sepals are distinct, imbricate, glabrous, concave, membranous, and unequal, with the two outer ones much larger than the inner ones. The petals 5, are free, imbricate, crisped along the margin, bright yellow veined with orange. The anthers number 10 verification needed and are separate, with the three upper stamens barren. The ovary is superior, unilocular, with marginal ovules. The fruit could be a short legume, 7.5–11 cm long, 1.5 cm broad, oblong, obtuse, tipped with long style base, flat, thin, papery, undulated crimped, pilose, pale brown. 12-20 seeds per fruit are carried each in its separate cavity (Anonymous, 2012).

Cassia tora Linn -Family: Leguminosae

It is an annual herb, 30–90 cm high. Leaves are green in colour, pinnate, up to 6-8cm long, leaflets are in 3 pairs, distinctly petiole, opposite, conical at one end, ovate, oblong, and base oblique. Flowers are pale yellow in colour, nearly sessile. 5 petals, upper one are very crowded. Pods are subterete or 4 angled, very slender, 6- 12inch long, incompletely septate, membranous with numerous brown oblong, rhombohedral seeds.

III. AIMS AND OBJECTIVE

Based on the existing studies, we have selected *Cassia auriculata* and *Cassia tora* (Fabaceae) seed from Western Ghats of Maharashtra, India, to evaluate physicochemical properties of seed oil and physical properties of seed to prove their importance.

- To collect and identify the plant species from the Sangamner region of (M.S) India.
- To collect, dry, and powder seeds of *Cassia* species.
- To extract the seed oil of plant species in petroleum ether to isolate seed oil.
- To evaluate the physical properties of seed and physicochemical properties of seed oil.

IV. EXPERIMENTAL RESULT

4.1 Seeds Collection

Collection of seeds was done from the local area of Sangamner tehsil. Identification was done at the Department of Botany at Sangamner college Sangamner.

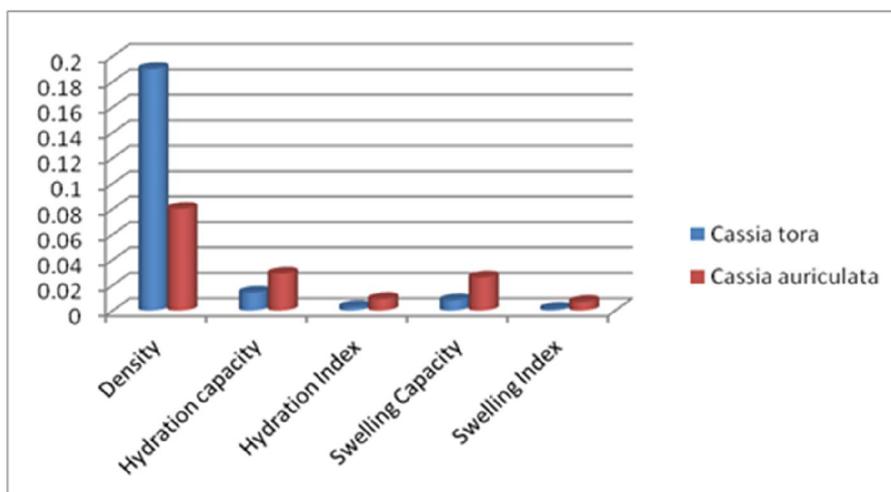
A. Physical Analysis of Seed Powder

- **Density:** Density (g.ml⁻¹) was determined by the ratio of the weight of seeds to the volume of displaced water.
- **Hydration Capacity:** To determine hydration capacity, the Seed Number (SN) in 100 g of each seed (WS) was determined, The grains were soaked at room temperature (25±°C). After 15 hours, the seeds were drained; superfluous water was removed with filter paper and the swollen seeds were separated and reweighed (HSW). calculated as $HC = (HSW-WS)/ SN$.
- **Hydration Index:** The hydration index was calculated as $HI = HC/W$. In addition, the volume of 100 g seeds was measured on a test tube in mL (SV). After 15 hours in distilled water, the volume of soaked seeds (HSV) was measured.
- **Swelling Capacity:** Swelling capacity per seed was determined as follows: $SC = (HSV-SV)/SN$
- **Swelling Index:** Swelling index as $SI = SC/SV$, where V is the volume of a seed (mL).

V. COMPARATIVE PHYSICAL ANALYSIS OF SEED

Table I

Test	<i>Cassia tora</i>	<i>Cassia auriculata</i>
Density	0.19g/ml	0.08g/ml
Hydration capacity	0.0141	0.029
Hydration Index	0.0028	0.009
Swelling Capacity	0.0081	0.026
Swelling Index	0.0014	0.0068



Traditional uses of *Cassia auriculata* L.

The shrub is especially famous for its attractive yellow flowers which are used in the treatment of skin disorders and body odour. It is widely used in traditional medicine for rheumatism, conjunctivitis, and diabetes. It has many medicinal properties. Its bark is used as an astringent, leaves and fruits anthelmintic, seeds used to treat eye troubles, and roots employed in skin diseases (Siva and Krishnamurthy, 2005).

Antioxidant

The ethanol and methanol extracts of *Cassia auriculata* flowers were screened for antioxidant activity (Kumaran and Karunakaran, 2007). The antioxidant activity was determined by an improved assay based on the decolorization of the radical monocation of 2,2'-azinobis-(3-ethylbenzothiazoline-6-sulfonic acid) (ABTS) and 1,1-diphenyl-2-picrylhydrazyl (DPPH) radical scavenging method. The ethanol and methanol extracts of *C. auriculata* flowers showed antioxidant activity in both assays.

Diuretic Activity

The study was carried out to determine the antioxidant activity of *Cassia auriculata* by inhibition of lipid peroxidation technique (Kumar et al, 2008). The highest inhibition of lipid peroxidation activity was observed in *C.auriculata* (89%). The potency of the protective effect of *C.auriculata* was about 3 times greater than the synthetic antioxidant butyrate hydroxytoluene (BHT). The total alkaloid content varied from 24.6 ± 0.18 to 72.6 ± 2 mg g⁻¹ in the extracts. Flavonoid contents were between 23.15 ± 0.2 and 63.3 ± 0.6 mg g⁻¹ in the methanolic extracts of these plants. Our study indicates that the antioxidant activity of *C.auriculata* could be harnessed as a drug formulation. leaf extract in rats with alcoholic injury (Kumar et al, 2003).

Antiulcer Activity

The present study was carried out to evaluate the anti-ulcer activity of *C. auriculata* leaf extract against pylorus ligation-induced gastric ulcers. The methanolic leaf extract of *C. auriculata* at the dose of 300 mg/kg p.o. markedly decrease the incidence of ulcers in pyloric ligated rats. In pyloric ligated rats, there was an increase in the gastric volume, free and total acidity, and ulcerative index as compared to the control group. The methanolic leaf extract of *C. auriculata* at the dose of, 300 mg/kg showed a significant reduction in the above parameters which was comparable to the standard drug famotidine (10 mg/kg). *C. auriculata* extract showed a protection index of 79.4 %, whereas standard drug famotidine showed a protection index.

Toxicity Studies

The present investigation was carried out to evaluate the safety of the aqueous extract of *C. auriculata* seeds by determining its potential toxicity after acute and subacute administration in rats. For the acute study, an aqueous extract of *C. auriculata* seeds was administered to rats in a single dose of 0-5000 mg/kg given by the gavage and Monitored behavioral changes, adverse effects, body weight changes and mortality were determined for up to 14 days. At the end of the observation, period animals were sacrificed and subjected to gross necropsy study. In the sub-acute dose study, the extract was administered orally at doses of 0, 1000, and 2000mg/kg daily for 28days to rats, and biochemical, hematological parameters, and histopathological studies were carried out after 28 days of oral administration. The acute study of aqueous extract of *C. auriculata* seeds did not show any behavioral changes signs of adverse effects or deaths extract of *C. auriculata* seeds did not show any behavioral changes signs of adverse effects or deaths (Ahmed et al, 2010). Other reported medicinal values: It also possesses medicinal properties: the bark is astringent, leaves and fruits anthelmintic, seeds used in eye troubles, and roots employed in skin diseases. It has been used for the treatment of ulcers, leprosy, and liver disease (Kumar et al, 2002).

Biological Importance of *Cassia tora*

Sharma et al (2010), first time demonstrated the antibacterial activity of ethanolic and aqueous extracts of *C. tora* leaves. Both the extracts exhibited significantly. Hatano et al (1999), isolated thirteen phenolic glycosides from seeds of *C. tora* and examined anti-microbial activity on *Escherichia coli*; *Pseudomonas aeruginosa*, and *Staphylococcus aureus*. They found that among them, torachryson, toralactone, aloe-emodin (18), rhein (19) and emodin (20) showed noticeable antibacterial effects on *Staphylococcus aureus* (MIC 2-64 µg/ml). but no antibacterial effects of phenolic compounds tested show strong *E. coli* and *P. aeruginosa*.

Lee et al (2013), evaluated antimicrobial activities of emodin and its derivatives against foodborne bacteria (*Bacillus cereus*, *Listeria monocytogenes*, *Staphylococcus intermedius*, *Salmonella typhimurium* and *Shigella sonnei*). Emodin shows strong MIC against *Bacillus cereus*, followed by alizarin-3-methyliminodiacetic acid (13.0±2.5 mm) and alizarin (11.5±1.2 mm) and also shows antimicrobial activity against *S. sonnei* and *S. typhimurium*.

Cassia tora possesses significant anti-oxidant scavenging activity (Yen and Chuang, 1999, 2000; Liu et al, 2008; Kim et al 1998).

VI. RESULT AND DISCUSSION

According to Table I

Density, hydration capacity, hydration index, swelling capacity, swelling index etc. physical parameter are studied. Density of *C.tora* is 0.19g/ml and *C.auriculata* is 0.08g/ml. Hydration capacity of *C.tora* is 0.014g/ml and *C.auriculata* is 0.029g/ml. Hydration index of *C.tora* is 0.028g/ml and *C.auriculata* is 0.009g/ml. Swelling capacity of *C.tora* is 0.0081g/ml and *C.auriculata* is 0.026g/ml and swelling index of *C.tora* is 0.0014g/ml and *C.auriculata* is 0.0068g/ml.

Density and hydration index of *C.tora* is greater than *C.auriculata* and hydration capacity, swelling capacity and swelling index of *C.auriculata* is greater than *C.tora*.

VII. DISCUSSION

Physical properties of material are very important for formulation purposes. Density of seed, hydration index of *C. tora* was found to be greater as compared to *C. auriculata*.

VIII. CONCLUSION

Many consumers are looking for variety in their diets and aware of the health benefits of fresh fruits and vegetables and of special interest are food sources rich in antioxidant Physical properties are the visible, bodily properties of a plant measurable objectively, without personal bias or subjectively based on individuals opinion. The determination of seed physical properties gives data on the size and shape of seed for separating the seeds from other foreign materials and to know the most likely pattern of motion of seed, a useful index in it handling for industrial processing.

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