

**HARIDRA VARIETIES USED IN AYURVEDA FORMULATION-AN OVERVIEW****<sup>1</sup>Bishnupriya Mohanty, <sup>2</sup>Shreeya Shailesh Kumbhar, <sup>3</sup>Vishlesha Haldankar, <sup>4</sup>Sangram Keshari Das.**<sup>1</sup>MD, PhD. Professor & Head, Department of Sanskrit Samhita and Siddhanta<sup>2</sup>IV B.A.M.S. Student.<sup>3</sup>IV B.A.M.S. Student.<sup>4</sup>Professor & Head, Dept. of Dravyaguna Vijnana, Gomantak Ayurveda Mahavidyalaya & Research Centre, At/Po- Shiroda, Dist.- North Goa, Goa, India-403103**Corresponding Author:** [drbishnupriyadas@gmail.com](mailto:drbishnupriyadas@gmail.com)<https://doi.org/10.46607/iamj3313022025>**(Published Online: February 2025)****Open Access**

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**Article Received:**06/01/2025 - **Peer Reviewed:** 30/01/2025 - **Accepted for Publication:** 09/02/2025.**ABSTRACT**

Haridra, encompassing several species within the genus *Curcuma* (Zingiberaceae family), is a vital component of traditional Ayurvedic medicine. This research focuses on a comparative analysis of four species of Haridra: *Curcuma longa* (turmeric), *Curcuma aromatica* (wild turmeric), *Curcuma caesia* (black turmeric) and *Curcuma zedoaria* (zedoary). These species, while sharing specific common characteristics, display distinct differences in their morphology, chemical composition, and therapeutic applications. The study investigates the morphological features of each species, including the rhizome colour, texture and aroma, which are essential for their identification and use in traditional formulations. Additionally, each species' chemical composition is analysed, focusing on curcuminoids, essential oils, and other phytochemicals known for their anti-inflammatory, antioxidant, antimicrobial, and digestive properties. The aim is to establish a correlation between the chemical profiles of each species and their traditional Ayurvedic uses, such as promoting skin health, enhancing digestion, and providing pain relief.

**Keywords:** Haridra, *Curcuma* species, *Curcuma longa*, *Curcuma aromatica*, *Curcuma caesia*, *Curcuma zedoaria*, morphology.

## INTRODUCTION

The genus *Curcuma*, belonging to the Zingiberaceae family, includes several species used for centuries in traditional medicine, particularly in Ayurveda. These species are well-known for their diverse therapeutic properties and are commonly called “Haridra.” Among the most studied species are *Curcuma longa* (commonly known as turmeric), *Curcuma aromatica* (wild turmeric), *Curcuma caesia* (black turmeric) and *Curcuma zedoaria* (zedoary). While all these species share some common characteristics, they exhibit significant differences in morphology, chemical composition, and medicinal applications.

*Curcuma longa* is the most widely recognised and utilised species, primarily for its bright yellow rhizome rich in curcumin, a bioactive compound with anti-inflammatory, antioxidant and antimicrobial properties. On the other hand, *Curcuma aromatica* is noted for its fragrant rhizome, often used in cosmetic formulations and traditional medicine for skin care. *Curcuma caesia* stands out due to its dark, bluish-black rhizome, containing unique phytochemicals. At the same time, *Curcuma zedoaria* is characterised by its white rhizome and distinct bitter flavour, making it valuable for digestive and anti-inflammatory applications.

This research paper aims to comprehensively compare these **four** *Curcuma* species, focusing on their morphological differences, chemical compositions and traditional medicinal uses. By exploring these aspects, the study seeks to highlight each species' commonalities and unique features, contributing to a deeper understanding of their potential therapeutic applications.

### 1. *Curcuma longa*:

#### Morphology

Root initials emerge from the diffuse meristem, a narrow cell zone dividing the inner and outer ground tissues. This outgrowth of the primary elongating meristem is seen below the second or third node. The diffuse meristem gives rise to the root meristem. Turmeric's root apex has three sets of initials growing from the diffuse meristem: one for the root cap, one

for the plerome, and a shared zone of dermatogens and plerome.

With a pale yellow and reddish border, the flower is smaller than the bracts. Calyx: 10-15 mm in length, obtuse with three teeth. Long tubular corolla with pale yellow lip - 3-lobed semi-elliptic. The flowers are around 5 cm long, thin-textured and fugacious. The calyx is small, tubular and toothed, with a break almost midway down one side. The corolla is tubular at the base and cup-shaped in the upper part, with three unequal lobes inserted on the cup lip. It is pale, slender and translucent with a hooded dorsal lobe.

The ripe fruit, which is white in colouration, resembles a little garlic bulb. Immature seeds range from white to light brown, while mature seeds are brownish black. Different seeds originating from the same fruit occasionally revealed embryos at various stages of development. The embryos were monocotyledonary, like cardamom embryos in structure. The nucleus was still present in the mature seed.

The leaves are borne in tufts and are alternating, obliquely erect or sessile, with long leaf stalks or sheaths forming a pseudo stem or aerial shoot. The leafy shoots are erect and rarely reach 1 m in height. A leafy sprout will typically have 6-10 leaves. The slender petiole broadens abruptly to the sheath. The ligule lobes are tiny, and the sheaths surrounding the ligules have ciliate margins. The lamina is lanceolate, acuminate, and thin, with dark green above and pale green beneath with pellucid spots. It can grow up to 30 cm long and 7-8 cm wide and seldom grows to be more than 50 cm long.

#### Distribution

*Curcuma longa* is a wild plant commonly found in the Western Ghats and the Himalayan regions. It belongs to the Zingiberaceae family, with the genus *Curcuma*. There are 120 species. The plant is widely spread in the region, mainly Kerala and West Bengal. Bhavamishra acknowledged this in the Bhavaprakasha Nighantu. This plant is indigenous to South and Southeast Asia and has now been cultivated in tropical areas like Central America and Asia.

### Chemical Composition

Turmeric's chemical composition is diverse. Turmeric's qualitative and quantitative components vary greatly depending on variety, region, source, and cultivation conditions. This spice has yielded approximately 235 chemicals, most of which are phenolic compounds and terpenoids. There are 22 diarylheptanoids and diarylpentanoids among these chemicals as well as phenylpropene and other phenolic compounds, sesquiterpenes, diterpenes, triterpenoids, sterols, monoterpenes, alkaloids and other compounds. Turmeric's main bioactive components are curcuminoids, which belong to the diarylheptanoids group. Curcumin, the most common curcuminoid found in turmeric, has been used medicinally for thousands of years. Curcumin (71.5%), demethoxycurcumin (19.4%), and bisdemethoxycurcumin (9.1%) are the three curcuminoids often found in commercial curcumin.

Turmeric has also yielded three diarylpentanoids with a five-carbon chain between two phenyl groups. Other phenylpropene and phenolic substances discovered from turmeric include calebin-A, vanillic acid and vanillin. Monoterpenes are commonly found in essential oils extracted from plants and flowers. Turmeric contains the following monoterpenes: p-cymene, -phellandrene, terpinolene (terpenoline), p-cymen-8-ol, cineole and myrcene. Dried turmeric rhizomes typically yield 1.5-5% essential oils, most of which are sesquiterpenes, responsible for the fragrant flavour and smell. Turmeric's most frequent sesquiterpenes are -turmerone, turmeronol A and turmeronol B.

### Rasa-Panchaka

Dravya – Haridra.

Guna - Laghu, Ruksha.

Rasa - Katu, Tikta.

Virya – Ushna.

Vipaka – Katu.

Doshagnata – Kapha Pittaghna (Bhavprakasha Nighantu), Kapha Vatahara (Raja Nighantu).

### Application

In Rakta :

It is Raktadhatu Shodhana . It clears the toxin present in the blood.

It is used in Kaphaja Panduroga; it increases Ranjaka pitta.

It does the Kleda Shoshana from Rakta, so as it increases Varna.

One should take Haridra mixed with Triphala, Ghee and honey (in Panduroga)

In Kushta:

It is used in Pama, Kandu, and Arunshika, with Nimba Twak and Haridra Kwatha.

Lepa of Haridra, Nimba Patrakala used for Kandu in Kushta

It does the Vrana Shodhana(by absorbing the Kleda )

In Shopha :

Haridra, Rakta chandana, Sphatika lepa are useful in Agantuja Shopha.

In Mukhapaka:

Gandusha is done with Haridra Kwatha and Haridra Siddha Taila.

In Shweta Pradara/Yoniroga.

Haridra Kwath is used with honey.

In Prameha:

It is used along with Dhatri Rasa given with honey.

In Shwasa (Bronchial asthma):

The patient should inhale the smoke from the wick made of Haridra, Patra, Eranda root, lac, Realgar, Devadaru, Orpiment, and Mamsi pounded together.

In Visha:

Ghee should be cooked separately with the Haridra, Nakuli and Jati paste. It is efficacious in poisoning.

In Arsha

Paste of Haridra powder mixed with latex of Snuhi or Pippali pounded with ox-bile, and Haridra should be applied.

It is also used as a disinfectant.

### 2. *Curcuma caesia*:

Morphological characteristics

Black zedoary is an erect, rhizomatous herb, about 1.0–1.5 m high.

The rhizomes are ovoid in shape and acute at the tip, but they are not as thick as in other species of *Curcuma*.

The leaves are about 30–60 cm long and up to 15 cm broad. They are broadly lanceolate or oblong, glabrous, and have a deep ferruginous purple cloud down the middle that penetrates to the lower surface.

Leaves arise from the underground rhizome.

Inflorescence is a spike, about 15 cm long or about 30 cm high, on the basal peduncle.

Flowers are pale yellow, reddish at the outer border and shorter than their bracts.

The petiole and sheath are about as long as the blade.

Spikes appear before the leaves.

Flowers appear in June and July, while fruits mature in September and October.

### Distribution

The species occurs in moist deciduous forests, mainly in Bengal, Northeast, and Central India, within the 200–1000 m altitudinal range. It grows as the ground cover of forest areas in subtropical to temperate regions. It is a rare species and is mostly under cultivation.

### Chemical Composition

Camphor, 1,3,5-trimethyl benzene, 1,2,3,5 tetramethyl-benzene, 2,4-bis(1,1-dimethylethyl)-phenol, (E) 5 octadecene, n-Hexadecanoic acid, Oleic acid, N-(4-bromo-n-butyl)-2-Piperidinone, Eicosanoic acid, (Z)-9-octadecenal, 1,5-dimethyl-7-oxabicyclo(4,1,0)heptane, Docosanoic acid, C-tridecene.

### Application

The fresh and dried rhizomes of *Curcuma caesia* are used for treatment of various diseases.

1. Dried rhizomes and leaves of *Curcuma caesia* Roxb. are used for piles, leprosy, asthma, cancer, wounds, allergies, toothache, and vomiting.

2. Fresh rhizome decoction is used as an anti-diarrhoea to relieve stomach aches. The fresh thome paste of *Curcuma caesia* was applied during snake and scorpion bites. The dried powder was mixed with seed powder of *Andrographis paniculata* Wall ex—nees and applied during insect and snake bites.

3. The rhizome treats cough, fever, dysentery, and worm infections.

4. The paste (fresh) of *Curcuma cassia* is used in rheumatoid arthritis.

### 3. *Curcuma zedoaria*:

#### Morphology

Zedoary is an annual or biennial, aromatic, rhizomatous, tall herb. It attains a height of 1.8 m. Rhizomes are large, pale yellow or whitish inside. Roots are aromatic and end in ellipsoid tubers.

The edible root of zedoary has a white interior and a fragrance reminiscent of mango; however, its flavour is more similar to ginger, except for the fact that it leaves a very bitter aftertaste.

There is no distinct aerial stem, but the shoot has a pseudo stem formed of long and closely overlapping four to six sheathing leaf bases.

The leaves are large, reaching up to 1 m in length. They are oblong and deeply veined, often coloured purplish in the centre.

Inflorescence is a spathe arising from the rhizome. Flowers are whitish or pale yellow with bright reddish-green bracts. The Corolla tube is pinkish, and funnel shaped. Calyx is whitish and obtusely toothed. Flowering occurs in May–June, but fruiting occurs rarely. Fruit is an ovoid capsule.

#### Distribution

The species is semi-domesticated and found in the forests of the eastern Himalayas, Bengal, and Kerala. It is cultivated in Kerala, Karnataka, Tamil Nadu, and other places with congenial climatic conditions.

#### Chemical Composition

*C. zedoaria* is a rich source of essential oils: starch, curcumin, arabin, gums, etc. furanodiene, furanodienone, zedorone, curzerenone, curzeone, germacrone, 13-hydroxy germacrone, dihydrocurdione, curcumenone, and zedoaronediol.

#### Application:

Leaf juice is helpful in leprosy.

Oil of rhizome is beneficial in menstrual hematometra and stomachache.

### 4. *Curcuma aromatic*:

#### Morphology

During the summer monsoon season, it grows quickly and fiercely. Wild turmeric is a fragrant and attractive

ginger with a strong subterranean rhizome. The foliage fades off in late autumn, and the rhizome stays dormant during the winter. The inflorescence grows at the base of the rhizome in early spring, bearing white blooms with orange leaves. The blooming stalks (approximately 20-25 cm long) are capped with more prominent colourful bracts pinned at the tips. When fully grown, the plant may reach a height of around 90cm. The leaves are oval, 1-1.2 m long and 20 cm wide with a leaf stalk as long as the rhizomes are occasionally used in villages to flavour curries. The flowering stem with or without leafy stem, is 3.8-5 cm long.

### Distribution

*C. aromatica* is a wild plant in the Western Ghats and the Himalayan regions. It belongs to the Zingiberaceae family with the genus *Curcuma*. There are including 120 species.

The plant is widely spread in the region, mainly in Kerala and West Bengal. Bhamishra acknowledged this in the Bhavaprakasha Nighantu. This plant is indigenous to South and Southeast Asia and is now cultivated in tropical areas like Central America and Asia.

### CONCLUSION

The comparative study of *Curcuma longa*, *Curcuma caesia*, *Curcuma zedoaria*, and *Curcuma aromatica* highlights their diverse morphology, chemical composition, and wide-ranging applications. The findings of this research can be summarised as follows:

#### 1. Better Identification:

A detailed morphological and chemical analysis aids in accurately identifying and differentiating these *Curcuma* species. This is crucial for ensuring their appropriate use in medicinal, cosmetic, and culinary

applications, as identification can lead to suboptimal outcomes or adverse effects.

#### 2. Wide Applications:

The study underscores the broad spectrum of applications for these species, ranging from traditional medicine and pharmacology to modern industries like cosmetics and food technology. Their bioactive compounds, particularly curcuminoids and essential oils, have significant potential for therapeutic and commercial purposes.

#### 3. Conservation and Cultivation Potential:

The growing demand for these species, particularly in herbal medicine and global markets, necessitates sustainable cultivation practices. Special attention should be given to conserving less commonly used species, such as *Curcuma caesia* and *Curcuma zedoaria*, which may be at risk due to overharvesting.

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