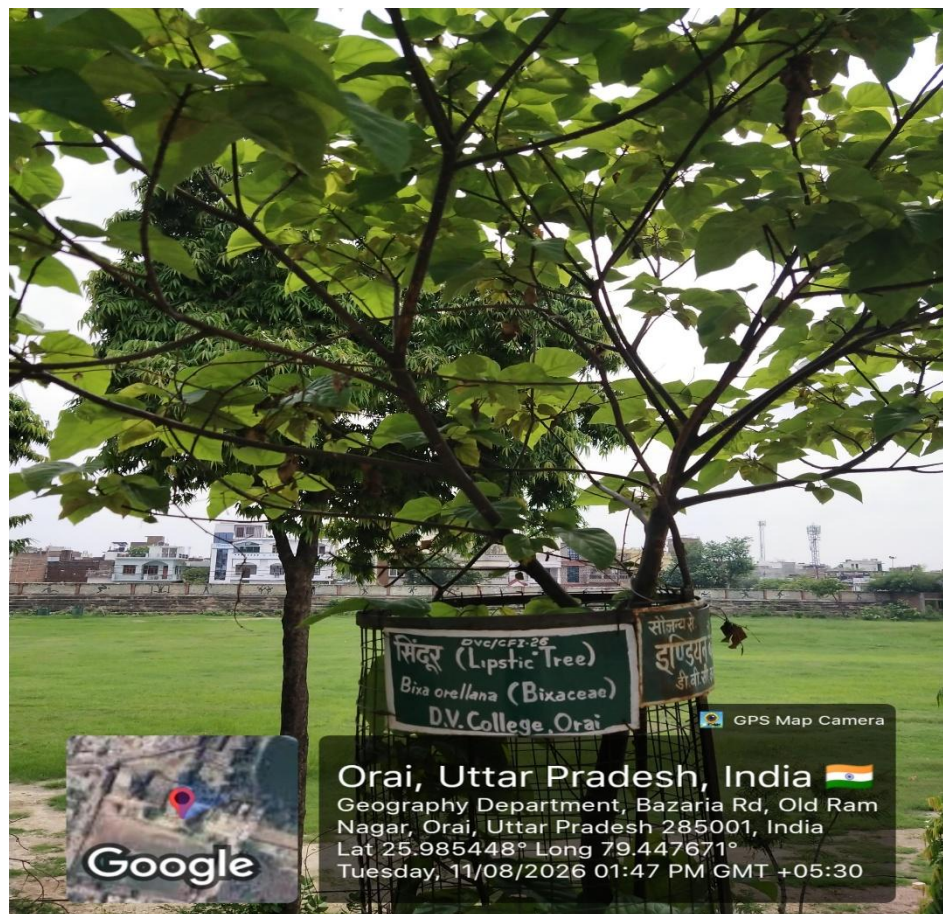


The Lipstick Tree or Sindoor Tree (*Bixa orellana* L.)

The Lipstick Tree or Sindoor Tree (*Bixa orellana* L.), commonly known as Annatto, is a small evergreen tree belonging to the family Bixaceae. Native to tropical America, it is now widely cultivated in India and other tropical countries for its bright red seeds, which are the natural source of the pigments bixin and norbixin. These pigments are extensively used as natural food colorants, cosmetics, pharmaceuticals, and textile dyes.



Botanical Details

Scientific name: *Bixa orellana* L.

Family: Bixaceae

Common names: Lipstick Tree, Sindoor Tree, Annatto, Achiote

Origin: Tropical Central and South America

Chromosome number: $2n = 14$

Habit

Small evergreen tree or large shrub.

Height: 3–10 m.

Rounded crown with many spreading branches.

Root System

Well-developed taproot with numerous lateral roots.

Adapted to well-drained tropical soils.

Stem

Slender trunk with smooth grayish-brown bark.

Young branches are green and slightly hairy.

Wood is light and soft.

Leaves

Simple, alternate, broadly ovate to heart-shaped (cordate).

8–20 cm long with long petioles.

Bright green with prominent veins and entire margins.

Flowers

Large, attractive flowers with five pink to white petals and numerous yellow or purple stamens.

Arranged in terminal clusters (panicles).

Flowering usually occurs during spring and summer.

Pollinated by bees and other insects.

Fruit

A heart-shaped or ovoid capsule covered with soft reddish or brown spines.

Splits open when mature to expose numerous bright red seeds.

Seeds

30–50 seeds per capsule.

Covered with a bright red-orange waxy coating rich in bixin and norbixin.

These pigments are extracted as natural colorants.



Ecological Importance

Carbon Sequestration

Contributes to carbon storage through woody biomass.

Suitable for mixed plantations and agroforestry systems.

Biodiversity Support

Flowers provide nectar and pollen for bees, butterflies, and other pollinators.

Supports insect diversity and improves pollination services.

Soil Conservation

Root system stabilizes soil and reduces erosion.

Suitable for plantation on slopes and degraded lands.

Agroforestry

Commonly grown with spices, fruit trees, and plantation crops.

Provides additional income while increasing farm biodiversity.

Climate Adaptation

Thrives in warm, humid tropical climates.

Moderately tolerant of drought after establishment.

Nutrient Cycling

Leaf litter contributes organic matter, improving soil fertility and microbial activity.

Economic Importance

Natural Food Colour

Seeds are the world's major source of annatto dye.

Bixin (oil-soluble) and norbixin (water-soluble) are widely used as natural food colorants.

Used to color:

Cheese

Butter

Margarine

Ice cream

Bakery products

Snacks

Beverages

Cosmetic Industry

Traditionally used as sindoor and natural lipstick.

Used in lipsticks, soaps, creams, hair products, and herbal cosmetics.

Medicinal Value

Various parts are used in traditional medicine.

Leaves: Used for treating fever, burns, skin infections, and digestive disorders.

Seeds: Possess antioxidant and antimicrobial properties.

Roots: Used in folk medicine for digestive and respiratory ailments.

Phytochemicals: Rich in carotenoids, flavonoids, tocotrienols, and phenolic compounds.

Textile and Dye Industry

Natural dye for:

Cotton

Silk

Wool

Traditional handicrafts

Body paints

Ornamental Value

Attractive flowers and colorful fruits make it an excellent ornamental garden tree.

Income Generation

Commercial cultivation for pigment extraction.

Export of annatto seeds and natural dyes.

Nursery production and ornamental landscaping.

Botanical Applications in Sustainability

Promotes the use of natural, biodegradable colorants, reducing dependence on synthetic dyes.

Suitable for organic farming and agroforestry systems.

Supports pollinator conservation through nectar-rich flowers.

Leaf litter improves soil fertility.

Provides sustainable raw material for the food, cosmetic, pharmaceutical, and textile industries.

Conclusion

The Lipstick Tree (Sindoor Tree) (*Bixa orellana*) is a valuable multipurpose species with significant botanical, ecological, and economic importance. It is globally recognized as the principal natural source of annatto pigments, making it indispensable to the food, cosmetic, pharmaceutical, and textile industries. In addition to its commercial value, the tree supports biodiversity, improves soil health, and contributes to sustainable agriculture and environmentally friendly production systems, making it an important species for tropical horticulture and green industries.