

Chapter 7

Revisiting folk therapeutics: ethnopharmacology of *Ceriscoides turgida* (Roxb.) Tirveng. (Rubiaceae)

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ABSTRACT

The increasing global interest in ethnomedicinal plants reflects an urgent need to explore traditional botanical resources for novel therapeutic compounds. Present study investigates the phytochemical composition and antibacterial potential of *Ceriscoides turgida*, member of the Rubiaceae family widely used in traditional medicine by tribal communities across India. Ethnobotanical documentation revealed diverse medicinal uses of the plant which was used as a base to study the preliminary phytochemical profile of *C. turgida* fruits. It revealed a richer profile in the polar extract, revealing the presence of tannins, saponins, flavonoids, alkaloids, terpenoids, phenolic compounds, and reducing sugars, while the non-polar extract exhibited minimal phytochemical diversity. Antibacterial assays against *Escherichia coli* (MTCC 45) demonstrated inhibitory effects of the hydroethanolic extract, suggesting the presence of bioactive metabolites with antimicrobial potential.

Keywords: Ethnomedicine, natural therapeutics, pharamaceuticals

INTRODUCTION

Modern medicine often prides itself on precision, predictability, and progress, the polished outcomes of laboratories and algorithms. Yet, behind many synthetic drugs lies an old story, one rooted in forests, villages, and the quiet knowledge of healers who observed nature long before science named its molecules. Like, aspirin from Willow bark (Desborough and Keeling, 2017), quinine from *Cinchona* (Davies and Hollman, 2002), or artemisinin from sweet wormwood (Krishna *et al.*, 2008) were not accidents of chemistry, but rediscoveries of remedies long known to communities who relied on the

flora around them. Ethnomedicine, built on centuries of lived experience, has guided our understanding of plants as a source of healing and survival (Mahapatra *et al.*, 2019). Often time, folk medicine is understood the same as traditional medicine, while the former is actually a component of the later one. It specifically represents the accumulated wisdom of indigenous and rural communities, developed through generations of observation and experience which is basically passed down orally (Telles *et al.*, 2014). Such traditional practices form the foundation of many modern pharmaceuticals today, as they often reveal plants with significant bioactive potential. In regions where access to formal healthcare is limited, folk medicine plays an essential role in primary healthcare, offering affordable and culturally accepted remedies (Zhang, 2015). Documenting and scientifically validating these traditional uses not only preserves valuable cultural heritage but also helps in the discovery of novel therapeutic compounds. *Ceriscoides turgida* (Figure 1) belonging to the family Rubiaceae, occupies an important place in the ethnomedicinal traditions of India, particularly among the tribal communities of Gujarat, Odisha, and Maharashtra. Known locally as Duduki, Katolmaram, Kharhar, and Pendra (Table 1), this species is an integral component of folk healthcare systems that rely on plant-based remedies for both acute and chronic ailments. The ethnobotanical practices surrounding this species give a deep ecological knowledge and cultural continuity in the use of native flora for healing purposes (Table 2).

Table 1: General information

Scientific Name	<i>Ceriscoides turgida</i> (Roxb.) Tirveng. (syn. <i>Gardenia turgida</i> Roxb.)
Family	Rubiaceae
Local Names	Duduki, Katolmaram, Kharhar, Pendra
Reported ethnic distribution	Commonly used by Bhil, Dhanka and Nayaka tribes: North Gujarat, India (Jain and Srivastava, 2003), and local healers of Chandrapur District, Maharashtra, India (Shukla and Harmukh, 2020)

Among the various plant parts used, the root stands out as the most versatile and frequently used. Traditional healers prepare it in multiple forms like paste, decoction, cold infusion, powder, or juice, either administered alone or in combination with other medicinal species (Table 2). These preparations are used to treat various conditions, including digestive disorders like indigestion, stomachache (Bodele *et al.*, 2017; Jain and Srivastava, 2003), febrile illnesses for *e.g.* fever, malaria, tuberculosis (Shukla and Harmukh, 2020), inflammatory diseases like gout, rheumatism, chest pain and reproductive ailments like leucorrhea, gonorrhea, lactation insufficiency (Zilani *et al.*, 2018). Additionally, the root is applied in the management of poison related conditions such as snakebite, scorpion sting, and dog bite, reflecting its perceived detoxifying and restorative properties.



Figure 1: Fruit of *Ceriscoides turgida*

The fruits and seeds also hold significant ethnomedicinal value. Fruit pulp and extracts are used to relieve headache, eye irritation, and mammary gland inflammation, while seed pastes are used in treatment against food poisoning (Shukla and Harmukh, 2020). Such diverse applications point to the plant's likely antimicrobial, anti-inflammatory, and detoxifying potential. Thus, from an ethnopharmacological perspective, *C. turgida* represents a promising candidate for bioprospecting and drug discovery, as its broad traditional applications suggests the presence of multiple bioactive metabolites. However, despite its widespread folk use, scientific validation remains limited, with few modern pharmacological investigations exploring its phytochemical composition and mechanism of action.

Table 2: Traditional medicinal uses of *Ceriscoides turgida*

Plant part used	Form of preparation	Ailments treated	Additional ingredients (if any)	Mode of administration & duration
Seeds	Ground into paste	Used to treat food poisoning among Bhil, Dhanka, and Nayaka tribes (Jain and Srivastava, 2003)	-	-
Fruits	Fresh fruit, pulp or paste	Applied for eye disorders, fever, mammary gland inflammation. For headache: pulp applied on forehead (Zilani <i>et al.</i> , 2018)	-	Topical (for fever/headache), oral (for internal ailments)
Roots	Decoction, cold infusion, paste, powder, or juice	Leucorrhoea (root boiled with <i>Aloe vera</i> & <i>Smilax zeylanica</i>) (Zilani <i>et al.</i> , 2018)	Commonly combined with <i>Phoenix acaulis</i> , <i>Cyperus rotundus</i> , <i>Euphorbia hirta</i> , <i>Diospyros melanoxylon</i> , <i>Cordia macleodii</i> , <i>Cassia fistula</i> , <i>Abelmoschus moschatus</i> , <i>Thespesia lampas</i> , <i>Blumea</i>	Internal use as decoction or pill; external for headache; usually taken once or twice daily for 2–15 days, depending on ailment
		Indigestion in children, fever, jaundice (Bodele <i>et al.</i> , 2017; Shukla and Harmukh, 2020)		
		Dog bite, scorpion sting, snake bite (Zilani <i>et al.</i> , 2018; Shukla and Harmukh, 2020)		

		For Headache: juice dropped in ear, paste applied externally (Shukla and Harmukh, 2020)	<i>lacera</i> , <i>Piper longum</i>	
		Stomachache, chest pain, gout, tuberculosis		
		Kidney stones, gonorrhoea, diminished lactation, toothache, cough & cold (Shukla and Harmukh, 2020)		
Whole Plant / General Use	Extracts or mixtures with other herbs	Used to treat snake bites, epilepsy, stomachache, rheumatic pain, scorpion sting (Zilani <i>et al.</i> , 2018; Shukla and Harmukh, 2020)	Used singly or in combination with other local herbs	Internal administration (liquid or powder form)

In that light, this study explores its phytochemical profile and potential antibacterial activity through estimating its inhibitory concentration. This may aid as a framework for further pharmacological and therapeutical evaluation and standardization of the species.

METHODOLOGY

Plant collection and identification: Mature fruits of *Ceriscoides turgida* were plucked from naturally growing populations within the Chandaka areas, Odisha, India. The species was taxonomically authenticated by the authors through morphological comparison with standard botanical descriptions (Saxena and Brahmam, 1995).

Preparation of plant material: The freshly collected fruits (Figure 2) were thoroughly washed with running tap water to remove adhering soil and surface contaminants. After cleaning, the fruits were shade dried for a short period to eliminate surface moisture while preserving natural metabolites. The partially dried material was then coarsely chopped and macerated directly for extraction without prior pulverization to minimize the loss of volatile or heat-sensitive constituents (Jena *et al.*, 2025).

Extraction procedure: The extraction of bioactive compounds was carried out by cold maceration using solvents of differing polarity to ensure broad spectrum recovery of phytoconstituents using standard protocol (Devi *et al.*, 2023). Approximately 50 g of fresh fruit material was soaked separately in *n*-hexane (non-polar) and hydroethanol (7:3, polar) in sterile conical flasks. The mixtures were kept for 72 hours at room temperature with occasional stirring to enhance solvent penetration.



Figure 2: Collected fruits of *Ceriscoides turgida* for experimental use

After the extraction period, the mixtures were filtered through Whatman No. 1 filter paper to separate the liquid extracts from plant residues. The filtrates were then air dried at ambient temperature to allow complete solvent

evaporation. The concentrated crude extracts were weighed and stored in airtight, sterile vials under refrigerated conditions (4 °C) until further use.

Phytochemical screening: Both n-hexane and hydroethanolic extracts were subjected to qualitative phytochemical analysis using standard phytochemical assays to identify the presence of key secondary metabolites such as tannins, saponins, terpenoids, phenolics, flavonoids, alkaloids, and reducing sugars. The intensity of coloration or precipitate formation in each reaction was used as an indicator of compound presence (Jena *et al.*, 2025).

Assessment of antibacterial activity: The antibacterial efficacy of the extracts was assessed against *Escherichia coli* (MTCC 45), a standard laboratory strain obtained from the Microbial Type Culture Collection (MTCC), Chandigarh, India. The minimum inhibitory concentration (MIC) was determined using the broth microdilution technique with serial dilutions of the extracts prepared in nutrient broth following standard methods (Jena *et al.*, 2025). Each assay was performed and bacterial growth was monitored visually after incubation at 37°C for 24 hours. The lowest concentration showing complete inhibition of visible growth was recorded as the MIC value, indicating the minimum inhibitory concentration of the extract against *E. coli*.

RESULTS AND DISCUSSION

A clear contrast was observed between the extracts obtained with non-polar and polar solvents (Table 3). The n-hexane extract showed negligible phytochemical content, indicating its ineffectiveness in isolating key constituents from the fruit material. In comparison, the hydroethanolic extract (1:1) displayed a broad spectrum of secondary metabolites, including tannins, saponins, flavonoids, terpenoids, phenolics, reducing sugars, and alkaloids. The substantial recovery of metabolites in the hydroethanolic medium reflected that the solvent has capacity to dissolve compounds of varying polarity, therefore, captured a wider range of bioactive molecules (Figure 3 and 4).

Table 3: Detection of secondary metabolites in fruit extract of *C. turgida*

Solvent Extract	Polarity	Number of metabolites detected	Major phytochemical Classes	Extraction efficiency
n-Hexane	Non-polar	0	None	Poor
Hydroethanolol (1:1)	Polar	7	Tannins, Saponins, Flavonoids, Terpenoids, Phenolics, Reducing sugars, Alkaloids	Good

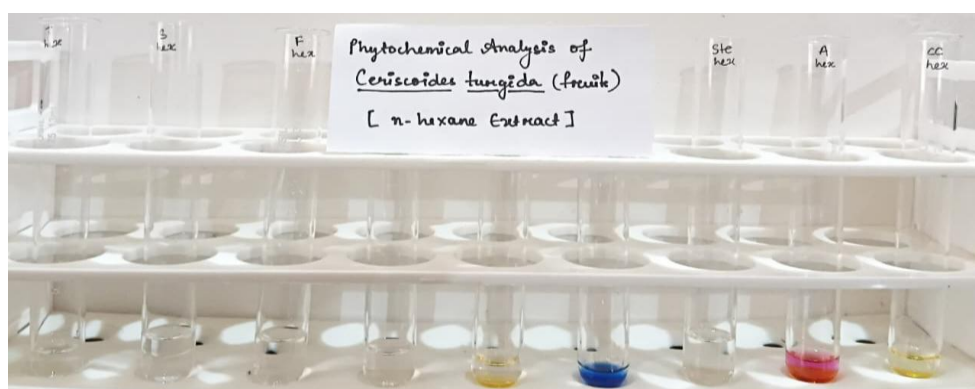


Figure 3: Phytochemical analysis of non-polar extract



Figure 4: Phytochemical analysis in polar extract

The antibacterial potential of the hydroethanolic extract was tested against *Escherichia coli* (MTCC 45) using the broth dilution method (Table 4).

Noticeable inhibition of bacterial growth occurred only at the highest concentration (100 mg/mL), while lower concentrations (50, 25, and 12.5 mg/mL) showed no inhibitory effect (Figure 5).

Table 4: Estimation of Minimum Inhibitory Concentration (MIC)

Hydroethanolic Extract	Concentration (mg/mL)				MIC (mg/mL)
	100	50	25	12.5	
<i>Ceriscoides turgida</i> (fruits)	NG	G	G	G	100
Nutrient broth	NG	NG	NG	NG	-
Microbial broth	G	G	G	G	-
Antibiotics	NG	NG	NG	NG	-

(NG: No growth of bacteria; G: Growth)

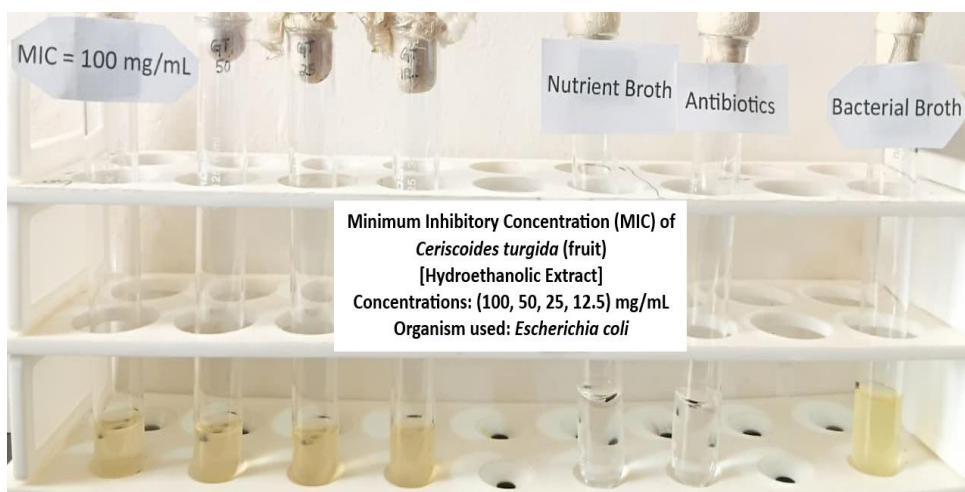


Figure 5: Minimum inhibition concentration (MIC) of fruits of *C. turgida*. Control assays behaved as expected, confirming the validity of the results. The observed inhibition at higher doses suggests that the extract contains compounds with mild antibacterial potential, which may act synergistically at sufficient concentration. Although the activity was modest, it supports the ethnomedicinal relevance of *C. turgida*.

CONCLUSION

Modern drug discovery often focuses on speed and uniform results, sometimes forgetting the long history of traditional healing practices. Ethnomedicine is not just a list of herbal cures; it carries the knowledge and experiences of many generations. By combining this traditional wisdom with modern scientific research, we can develop safer and more sustainable medicines while also protecting valuable plant diversity. The frequent and consistent use of *Ceriscoides turgida* among different tribal communities shows its trusted healing value. In this study, the hydroethanolic fruit extract of this plant showed strong phytochemical richness and a moderate antibacterial activity with minimum inhibitory concentration (MIC) at 100mg/mL, supporting its traditional use. The future of medicine may depend on learning from such traditional systems, turning old knowledge into new discoveries that connect nature with science.

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