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Ethnomedicinal, phytochemical and pharmacological review of *Capparis zeylanica* Linn.

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ABSTRACT

Capparis zeylanica Linn. (Capparidaceae) has been used as a (Rasayan) drug in the Ayurvedic system of medicines. *Capparis zeylanica* Linn. is reported to possess anti oxidant, antipyretic, analgesic, anti-inflammatory, antimicrobial and immunostimulant activity. In India *Capparis zeylanica* L. is used as "Rasayan" in traditional ayurvedic system of medicine. Phytochemical screening of the plant has shown the presence of fatty acids, flavonoids, tannins, alkaloids, vanillic acid, ferulic acid and p-coumaric acid. Recently a new compound E-octadec-7en-5-ynoic acid has been reported from root part of this plant. The present study is based on the work done till date regarding the phytoconstituents and pharmacological activity of *Capparis zeylanica* Lin.

Keywords: Capparidaceae, Fatty acids, Analgesics, Anti-pyretics.

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INTRODUCTION

Capparis zeylanica Linn. (*C. horrida* Linn., *Capparis brevispina* DC.) is known as Indian caper belonging to family Capparidaceae. In Sanskrit it is known as Vyakhranaki, kinkani, tapasapriya, granthila, karambha [1]. It is a rigid, wiry and much branched shrub and is widely distributed in Bangladesh, India, Sri Lanka and Malaysia [2]. It grows in moist habitat and is found throughout the major parts of India. In different parts of India it is known with different names like Asadhua in Orissa, Kathotti in tamil etc [3]. Almost all the parts ie. Root, bark, fruits, leaves, fruits, seeds are used for different purposes. Despite its wide range of folk medicinal uses in India sub-continent, there is very little documentation on its pharmacological and biological activities as well as its chemical constituents.

MATERIAL AND METHODS

TAXONOMICAL CLASSIFICATION

| | |
|---------------|--------------------------------|
| Kingdom | Plants |
| Subkingdom | Tracheobionta, Vascular plants |
| Superdivision | Spermatophyta, Seed plants |
| Division | Anthophyta |
| Class | Magnoliopsida |
| Subclass | Dilleniidae |
| Order | Capparidales |
| Family | Capparidaceae |

Botanical description

Large climbing shrubs with hooked spines, stems woody, rough, young parts green, rusty tomentose with pungent smell, leaves ovate or elliptic, 3.5-6.5x2.5-4 cm, rusty -tomentose when young, glabrous at maturity, base cuneate, entire, tip mucronate, flowers yellowish-white or white in supra-axillary, solitary, 2-3 pedunculate, berries globose, scarlet red, seeds many [4, 5].

GEOGRAPHICAL DISTRIBUTION

Rigid, wiry, and much branched shrub is widely distributed in East of line of Mumbai, Delhi and Dehradun, South of Himalayas and Andamans [6, 7].

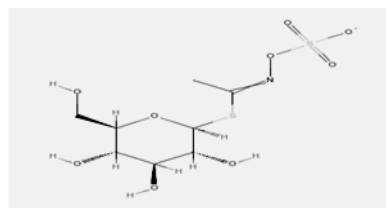
TRADITIONAL USES

Traditionally *Capparis zeylanica* L. was first reported as vegetable [7]. Leaf extract of *Capparis zeylanica* L. with black pepper powder is taken twice daily for treatment of dysentery [8]. Leaf juice of CZ taken orally with cup of fresh goat milk for curing cough and cold [9]. For the treatment of diabetes ripe fruits are consumed twice for fortnight and during ingestion,

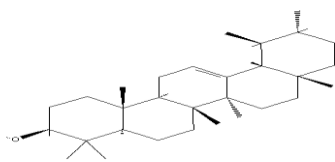
stem bark extract is administered thrice daily [10]. *Capparis zeylanica* plant is also served as an appetizer prepared as a dipping paste with pepper, tamarind and garlic [11]. Handful fresh roots, 50 gm. Onions, 50gm. Jiggery grinded altogether in form of bolus is recommended twice daily for cure of convulsive seizures [12]. In Ayurveda called Vyakhranakhi; the root bark of *C.zeylanica* is used for cooling, cholagogue and as a bitter. It removes 'Kapha'. The root bark of *C.zeylanica* is used traditionally as stomachic, sedative, antihydrotic and also in cholera, neuralgia, hemiplegia and rheumatism. The fruits are used to remove 'Tridosha', bitter removes 'Kapha' and 'Vata'. The seeds and fruits are used in urinary purulent discharges and dysentery [13, 14] In Northern India, the leaves are used as a rubefacient [4], counterirritant and as a cataplasm in boils, swellings and piles [5]. *Capparis zeylanica* fruit has been considered as an anti dot for snake bite[15- 17]. Traditionally it is used to cure swelling of testicle, small pox, boils, cholera, colic, hemiplagia, neuralgia, sores, pneumonic & Pleurisy [15, 18-20]. *Capparis zeylanica* root bark was used in small pox and swelling of testicles [21].

PHYTOCONSTUENTS

The plant s of *Capparis zeylanica* Linn. was found to have variety of chemical constituents. Preliminary phytochemical screening of the leaf extracts show the presence of alkaloids, flavonoids, saponins glycosides, terpenoids, tannins, proteins and carbohydrates [22, 23]. The roots of *C. zeylanica* contain alkaloid, phytosterol, acids and mucilage etc. A new fatty acid E-Octadec-7-en-5-yonic acid has been isolated from the roots of chloroform extract of *C. zeylanica*. The structure of this compound was established by 1D and 2d-NMR spectroscopy [24]. Carotene has also been isolated from the petroleum ether extract of leaves. +-amyrin, n-triacontane, fixed oil and thioglucoside glucocapparin were identified from seeds and leaves. Fatty acids like Ricinolenic acid, Malvalic acid, Sterculic acid, linoeic acid etc has also been identified identified [25]. The elemental analysis was performed by EDX and found that it contains c, o, amg. Al, Si, Cl, K, Ca, Fe, Cu, Zn [26]. Few important constirtuents reported are as follows:



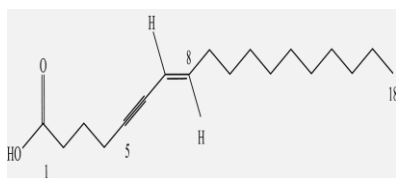
Glucocapparin



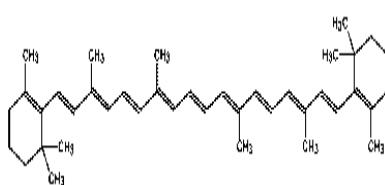
Alpha-amyrin



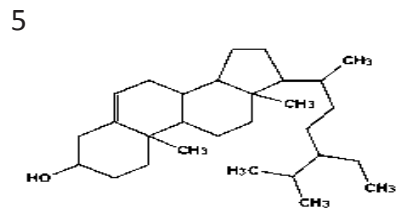
n-triacontane



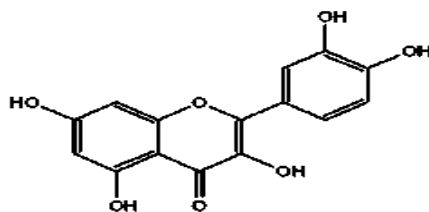
E-octadec-7-en-5-ynoic acid



Beta carotene



Beta-Sitosterol



Quercetin

PHARMACOLOGICAL PROPERTY

The roots of *C. zeylanica* were reported to have antibacterial, antioxidant activities; it also found to act as endothelin receptor antagonists [27]. The root bark paste is used on boils and swellings of testicles. The fruit and root part of *Capparis zeylanica* has also been reported to possess anti-allergic, anti-gout, anti-diabetic and astringent property [28]. The seeds and fruits are reported to have anthelmintic activity. Significant anti-inflammatory and analgesic activity was exhibited by the successive petroleum ether, methanol and aqueous root extracts of *C. zeylanica* at doses of 30 and 60mg/kg; in both cases, the methanol extract exhibited the best activity [29, 30].

The crude extract of plant was reported to have CNS depressant activity. The steam volatile fraction of flowers and seeds were highly antimicrobial. The 50% alcoholic extract of aerial parts reported as spasmolytic [14]. The leaves of *C. zeylanica* were found to exhibit immune stimulant activity. Oral administration of ethanolic and water extracts at doses of 150 and 300 mg/kg in mice, dose dependently potentiated the delayed type hypersensitivity reaction induced by sheep red blood cells. The extracts also prevented myelosuppression in mice treated with cyclophosphamide drug [31]. The ethanol and water extracts of *Capparis zeylanica* leaves showed dose-dependent and significant ($P < 0.05$) increases in pain threshold in tail-immersion test. Moreover, both the extracts (100-200 mg/kg) exhibited a dose-dependent inhibition of writhing and also showed a significant ($P < 0.001$) inhibition of both phases of the formalin pain test. The water extract (200 mg/kg) significantly ($P < 0.01$) reversed yeast-induced fever [32] in rodents. The aqueous extract from total aerial parts of the plant has been used for its antifungal, anti-inflammatory, antidiabetic, and antihyperlipidemic activities and is among the constituents of polyherbal formulations to treat liver ailments [33-37]. *Capparis zeylanica* plant extracts were evaluated for *in vitro* antioxidant activities. Antioxidant properties of methanolic extracts of raw floral buds have been shown in various *in-vitro* models and the potential use in oxidative stress-based pathological conditions has been suggested [38-40]. *Capparis zeylanica* constituents flavonoids have been known to possess anti-oxidant, anti-neoplastic, anti-ulcer, anti-inflammatory and anti-microbial activities.

CONCLUSION

Capparis zeylanica has been ethnomedicinally used as a therapeutic agent for a variety of diseases, as we have illustrated in this article. Moreover, numerous research works have proven its uses beyond the ethnomedicinal ones in experimental animals. Various compounds which were isolated from this plant may be responsible for its pharmacological activities. The road ahead is to establish specific bioactive molecules, which might be responsible for these actions. Being such an important medicinal plant it require more exploration in all the pharmaceutical aspect.

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