Oxalis corniculata Linn. (Amrul): The Magical Plant

Soma Saha
Assistant professor
Hiralal Majumder Memorial College for Women,
Jadunath Sarbohousa Road, Dakshineswar, Near Kali Temple,
Kolkata, West Bengal 700035, INDIA.

Abstract: Oxalis corniculata Linn. is a medicinally important plant indigenous to tropical and subtropical regions of the world. The plant Oxalis corniculata Linn. has been used in different system of traditional medication for the treatment of diseases and ailments of human beings. The review reveals that wide ranges of phytochemical constituents have been isolated from the plant like flavanoids, tannins, phytosterols, phenol, glycosides, fatty acids, galacto-glycerolipid and volatile oil. The leaves contain flavonoids, iso vitexine and vitexine-2”- O- beta – D- glucopyranoside. It is rich source of essential fatty acids like palmitic acid, oleic, linoleic, linolenic and stearic acids. studies revealed that this underutilized plant possess anti-inflammatory, antioxidant, anti-microbial, antifungal, anti scurbutic,anti diarrhoeal, anti-cancer, anti-ulcer, anti-septic, anti-diabetic, hypolipidaemic, wound healing properties. Awareness should be created among people about this underutilized miracle tree due to its full nutritional and therapeutic value so that more people learn about its benefits and demand it

Keywords: Oxalis corniculata Linn Phytochemicals, Pharmacology, Traditional medication, underutilized miracle tree.

I. Introduction

Herbal medicine has a very significant role in treatment of many diseases and their curative roles were also recorded in ancient manuscripts, ayurveda and unani medicine. In many developing countries people depends on herbal medicine due to their easy availability, low cost, and no unpleasant side effects. India is a versatile emporium of such medicinal plant where herbal medicines have been the basis of treatment and cure for various diseases.

Oxalis corniculata commonly known as yellow wood sorrel is a very common and useful medicinal plant which has been used since ages for the treatment of various ailments and as an emergency food. It is a delicate-appearing, low growing, herbaceous plant and abundantly distributed in damp shady places, roadsides, plantations, lawns, nearly all regions throughout the warmer parts of India, especially in the Himalayas up to 8,000 ft- cosmopolitan [1]. This review attempts to cover all available literature on the Oxalis corniculata with respect to its phytochemical properties, nutritive value, and medicinal use.

II. Aims and Objective

➢ To study the scientific literature on amrul (Oxalis corniculata).
➢ To provide information about the nutritive value and phytochemical properties of amrul to people.
➢ To get idea about its medicinal and therapeutic benefits.
➢ To list out its culinary uses.
➢ To create awareness and promote the consumption of amrul among consumer.

III. Discussion

PLANT PROFILE:-

TAXONOMIC CLASSIFICATION [2]

Kingdom : Plantae
Division : Magnoliophyta
Class : Magnoliopsida
Order : Oxalidales
Family : Oxalidaceae

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Genus : *Oxalis*
Species : *corniculata*

**VERNACULAR NAMES [2]**

**Sanskrit**: Ambashta, Amlalonika, Amlapatrika, Amlika,
**Hindi**: Seh-patti, Tinpatiya, Anboti, Chuka tripati, Bhilmori, Khatari
**English**: Indian sorrel
**Urdu**: Khatti-buti
**Assamese**: Changeritenga, Saru tengesi
**Bengali**: Amrul-sak, Amrul shak, Amrul, Tandi chatom arak, Amrool

**BOTANICAL DESCRIPTION**:
They are tap rooted herbs, bushy or mat forming, and 0.1 tall. Branching from the base and often rooted at the nodes, the upper portions are ascending or weakly erect smooth or hairy [3].

**a) Stem**: The stem is slender, terete and pubescent, 0.4 to 1.5 cm long. The internodes vary from 4.5 to 8.5 cm in length. Acidic odour, taste sour when fresh [4].

**b) Leaves**: The trifoliate leaves are alternate, with thin, heart shaped, leaflet blades having a distinct apical indentation. Leaflets 0.5 to 1 cm long with reticulate venation. The blades are smooth on the upper surface, slightly folded upward lengthwise along the major vein, and have a few appressed hairs along the veins on the lower surface and along the lower portion of the margins. The leaves are arranged alternately along the stems. A single long stalk arises from the axils of the leaf, from which extend three flower stalks, each with a single flower.

**c) Flowers**: The flowers are 7-11 mm wide and have 5 yellow petals. [3]

**d) Fruit**: The fruit is a capsule, 1-1.5 cm long, cylindrical, pointed apically, and 5-ridged in cross section.

**e) Seeds**: The seeds are oval in outline, apically rounded, basally pointed, flattened in cross section, light brown, and have a surface distinctly transversely ridged. *corniculata* will have stolons. [3]

**PHYTOCHEMICAL CONSTITUENT**:-
Oxalis corniculata have a wide ranges of phytochemical constituents have been isolated from the plant like flavanoids, tannins, phytosterols, phenol, glycosides, fatty acids, galacto glycerolipid and volatile oil. The leaves contain flavonoids, iso vitexine and vitexine-2"- O- beta – D-glucopyranoside. It is rich source of essential fatty acids like palmitic acid, oleic, linoleic, linolenic and stearic acids. [2] This herb is well known to have an acid taste due to the high content of oxalate in its leaves and stems. Study revealed the presence of three glycosylflavones in the leaves namely 6-C-glucosyl luteolin (isorientin), 6-C-glucosylapigenin (isovitexin) and isovitexin 7-methylether (sertisin) [5]

![Chemical Structure](image)

**ANTIOXIDANT ACTIVITY**:-
The study revealed that ethanolic extract of *Oxalis corniculata* at different doses level showed significant antioxidant activity . Methanolic extract of *oxalis corniculata* showed potent antioxidant activity compare to reference standard ascorbic acid.[2]

**NUTRITIVE VALUE OF O. CORNICULATA**:-
The leaves have been found to be rich in moisture, total carbohydrate, crude protein, crude lipid hence it can be alternative vegetable during emergency. Fresh 100g leaves contain 60 kcal energy, 84.2% moisture, 3.75g protein, 5.6g total carbohydrate, 2.5g fat, 12.08 mg iron, and 3050 ug beta carotene. The leaves of *Oxalis corniculata* exhibit rich in mineral contents like Sodium (1.12+0.02%), Potassium (2.17+0.31%), Calcium (2.510.08%),
Nitrogen (3.56±0.70%) and Magnesium (0.25±0.03%), these mineral components are vital in regulating various metabolic pathways in human body. [2]. Another study on *Oxalis corniculata* revealed the mineral content of its fresh leaves. 100g of fresh leaves contains 207.9mg calcium, 0.225mg copper, 14.929 mg iron, 77.64mg magnesium, 0.06mg phosphorus, 2.043mg zinc.[6]

**PHARMACOLOGICAL ACTIVITIES OF OXALIS CORNICULATA LINN.**

*Oxalis Corniculata* plant is anti-inflammatory, analgesic, astringent, diuretic, relaxant, lithontripic. It is used in the treatment of influenza, fever, urinary tract infections, enteritis, diarrhoea, traumatic injuries, sprains and poisonous snake bites. An infusion can be used as a wash to rid children of hookworms. The plant is used as an antiscorbutic in the treatment of scurvy. The leaves are used as an antidote to poisoning by the seeds of Datura, arsenic and mercury. The leaf juice is applied to insect bites, burns and skin eruptions. It has an antibacterial activity. An infusion of leaves is used to remove opacities of the cornea and is dropped into the eyes for itching lids. leaves is used as a gargle.[2]

**ANTIBACTERIAL ACTIVITY :-**

Methanolic and ethanolic extracts of *Oxalis corniculata* Linn. plant showed significant antibacterial activity against *Xanthomonas* and fourteen human pathogenic bacteria. Interestingly, among the extracts, Methanol extract showed highly significant activity as compared to K-cycline and Bact-805 against plant pathogenic bacteria. In case of human pathogenic bacteria methanol extract showed moderately significant antibacterial activity when compared with standard streptomycin.[7]

**ANTI FUNGAL ACTIVITY :-**

*Oxalis corniculata* showed the significant antifungal activity against *A. niger* by suppressed the fungal mycelial growth by 71 to 86% after three days of incubation [36]. The aqueous extract of *Oxalis corniculata* showed the 31 % antifungal potency against *A. niger* and 10.7% against *P. theae*. [8]

**WOUND-HEALING ACTIVITY:**

The alcoholic and petroleum ether extract of whole plant of *Oxalis corniculata* has been evaluated for its wound healing activity by using excision, resutured incision and dead space wound models in rats. Both the extracts at the dose of 300 and 500 mg per kg. The result showed significant wound healing activity by producing an increase in wound contraction rate, wound breaking and significant decreases in epithelization period [9]

**ANTI CANCER ACTIVITY:**

Ethanolic extract of *Oxalis corniculata* Linn. evaluated for its anticancer activity in Ehrlich acsites carcinoma (EAC) induced in swiss albino mice. Results conclude that the ethanolic extract of *Oxalis corniculata* Linn. was effective in inhibiting the tumor growth in ascitic and solid tumor models [10].

**CARDIO RELAXANT ACTIVITY:**

A methanol extract of *Oxalis corniculata* showed relaxant activity on isolated rabbit’s ileum . The plant extract was also showed cardio relaxant activity on isolated rabbit heart. In anaesthetized rats, a fall in diastolic pressure, with a lesser fall in systolic pressure, was also observed [11].

**ANTI-DIABETIC ACTIVITY**

The aqueous extract of the *Oxalis corniculata*. Linn plant has been tested for the inhibitory potential against procaine pancreatic amylase. At a concentration of 100μg/ml exhibited a maximum inhibition of 89.27% . The organic extracts did not show any significant inhibition in this study which might suggest that the active principle possessing amylase inhibitory potential is extracted only in the aqueous extract [12].

**ANTI-DIARRHOEAL ACTIVITY :-**

The anti-diarrhoeal activity of aqueous and methanolic extracts of *Oxalis corniculata* Linn. was evaluated on castor oil induced diarrhea in rats and on small muscle intestinal transit. At orally administered doses of 160,320 and 640 mg/kg of body weight. The two plant extracts significantly (p<0.05) prolonged the time of onset of diarrhoea and inhibited the frequency of defecation. At all doses the aqueous extract appeared to be more effective than the methanolic extract [13].

**HYPOLIPIDEMIC ACTIVITY:-**

The hypolipidemic and antioxidant activities of leaves of *Phlogacanthus thyrsiflorus, Oxalis corniculata* Linn. and *Fragaria vesca* were evaluated in the study. Hyperlipidemia was induced in rats by giving high fat diet consisting of coconut oil and vanaspati ghee, in a ratio of 2: 3 v/v at a dose of 10 ml/Kg body weight. The extracts showed a significant decrease in total cholesterol, triglycerides, LDL and MDA in blood. On the other hand, HDL, CAT and SOD were increased significantly [14].
ANTIGUSCUL RCTIVITY :

The aqueous and ethanolic extract of Oxalis corniculata Linn. leaves at a doses of 200 and 400mg/kg body weight were screened for anti-ulcer activity by using ethanol induced gastric mucosal ulcers and pylorus ligated ulcers. There was a decrease in gastric volume and reduction in free and total acidity treated with both extracts and the catalase and SOD levels was increased and lipid peroxide was decreased in both extracts [15]

IV. Conclusion

This article briefly reviews the botany, photochemistry, biochemistry, traditional knowledge, pharmacological and therapeutic application of the plant Oxalis corniculata Linn. This is an attempt to compile and document information on different aspects of Oxalis corniculata, though edible but being unfamiliar it is neglected. Poverty and lack of purchasing power have been identified as two major factors responsible for low dietary intake. Therefore O. corniculata Linn. may be used as a supplementary food source because it has high nutritive value, easily available, cheap, does not require special care for farming and has medicinal properties to prevent various diseases. It should be promoted as a cheap food source with high nutritive value and therapeutic benefits in a poor country like India to improve the nutritional and health scenario.

References