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Review Article

A STUDY ON MEDICINAL HERB *SPINACIA OLERACEAE LINN:* AMARANTHACEAE

Sunita Verma

Assistant Professor, Department of Botany, Rakesh P.G. College, Pilani, Rajasthan, India

ABSTRACT

Spinacia oleracea is an edible green vegetable plant; belong to the family of Amaranthaceae. *Spinacia oleracea* have various pharmacological activities such as anti-oxidant, anti-proliferative, anti-inflammatory, anti-histaminic and hepatoprotective. The present paper is an attempt to provide a detailed botanical description, classification, nutrient contents, traditional uses and pharmacological properties of this medicinal herb.

Keywords: Medicinal Plant, Hepatoprotective, Natural drug, Non-toxic

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*Address for Correspondence:

Sunita Verma, Assistant Professor, Department of Botany, Rakesh P.G. College, Pilani, Rajasthan, India

INTRODUCTION

Nowadays, the whole world is turning toward natural drugs and excipients. Natural materials do hold advantages over synthetic materials, because they are non-toxic, less expensive, and freely available. Furthermore, they can be modified to obtain tailor-made materials for the drug delivery system and they can compete with the synthetic agents available in the market¹. Plants are one of the most important sources of medicines. The medicinal plants are rich in secondary metabolites (which are potential sources of drugs) and essential oils of therapeutic importance. The important advantages claimed for therapeutic uses of medicinal plants in various ailments are their safety besides being economical, effective and their easy availability². Medicinal plants have been used since prehistoric period for the cure of various diseases. Since these are in common use by the local people and are of great importance that's why a lot of people are engaged in the trade of important medicinal herbs throughout the world³. Especially, people living in villages have been using indigenous plants as medicines since ages because this knowledge transfers from generation to generation and is based on lifelong experiences. Besides, the villages are far away from cities and mostly lack proper health facilities⁴.

Spinacia oleracea is an edible flowering plant in the family of Amaranthaceae. *S. oleracea*, was long considered to be in the family Chenopodiaceae, but in 2003, that family was merged into the family Amaranthaceae in the order Caryophyllales. In Hindi it is known as "Paalak" and in english as "Spinach". It is native to central and SouthWestern Asia. It is cultivated for the sake of its succulent leaves. It has the largest consumption as favourite food in winter season of India⁵. It is a rich source of vit-A, vit-C, vit-E, vit-K, vit-B₆, vit-B₂, magnesium, manganese, folate, betaine, iron, calcium, potassium, folic acid, copper, protein, phosphorous, zinc, niacin, selenium and omega-3 fatty acids. Spinach cultivars are poor source of fat that make them good food for obese and diabetic people. Spinach also packed with a number of anti-oxidants like polyphenols, flavonoids and carotinoids which are shown to possess anti-inflammatory effects, anti-mutagenic potential, anti neoplastic effects as well as chemo-preventive activites^{6,7}. Various pharmacological activities of *Spinacia oleracea* such as, anti-oxidant, antiproliferative, antiinflammatory, antihistaminic, CNS depressant, protection against gamma radiation, hepatoprotective have been reported. Various secondary metabolites like flavonoids, carotinoids, phenolic compounds have been reported from this plant⁸.

Spinach leaves are cooling, emollient, wholesome, antipyretic, diuretic, maturant, laxative, digestible, anthelmintic, useful in urinary concretion, inflammation of the lungs and the bowels, sore throat, pain in joints, thirst, lumbago, cold and sneezing, sore eye, ring worm scabies, leucoderma, soalding urine, arrest vomiting, biliary, flatulence. And have been used in the treatment of febrile conditions⁹.

CLASSIFICATION

Kingdom : Plantae
 Superdivision : Spermatophyta
 Division : Magnoliophyta
 Class : Magnoliopsida
 Order : Caryophyllales
 Family : Amaranthaceae
 Subfamily : Chenopodoioideae
 Genus : Spinacia
 Species : *Spinacia oleracea*

VERNACULAR NAME

English : Spinach
 Hindi : Paalak
 Gujarati : Paalak

PLANT MORPHOLOGY¹⁰

Stem: Erect from 30-60 cm high, round, smooth, piped, succulent, sometime reddish.

Leaves: Alternative, the lower ones very long petioled, variously lobed with lobes of an acute triangular shape smooth on both sides.

Flowers Male: Flowers on long terminal glomerate spikes and on short ones from the axil, very numerous, sessile, calyx-4 parted, stamen-4, anther twin, very large.

Female: Flowers axillary, sessile, crowded. Calyx-2 tipped with a projecting horn in each side, growing into spines when the seed is ripe styles generally-4, while tapering. Capsule 1- celled, 1- valved, armed with 2 opposite short horns and crowned with the small remaining calyx.



Figure 1: Plant of *Spinacia oleracea* (Paalak)

NUTRIENT CONTENTS

Spinach is a mineral-rich vegetable. An earlier study on the edible portion (87%) of spinach records (in %): moisture, 94.3; protein, 2.2; fat, 0.7; fiber, 0.6; mineral matter, 1.7; carbohydrate, 2.9; and oxalic acid, 658 (mg/100g). Mineral composition includes (mg/100g): calcium, 73; magnesium, 84; potassium, 206; iron, 10.9; phosphorus, 21; sodium, 58.5; copper, 0.01; sulphur, 30; nickel, 0.42; manganese, 9.61; molybdenum, 0.08; zinc, 13.53; and strontium, 0.077. Spinach is a good source of the vitamin B complex, ascorbic acid, vitamin A and carotene. It is also a natural source of vitamin K¹¹. Spinach shows presence of different carotenoids like lutein, β-carotene, violaxanthin and 9'- (Z)-neoxanthin¹².

TRADITIONAL USES

The plant is sweet, cooling, carminative, laxative, alexipharmac; useful in diseases of blood and brain, asthma, leprosy, biliary; causes "kapha" (Ayurveda). It has been used in the treatment of urinary calculi. In experiments it has been shown to have hypoglycemic properties. The leaves are cooling, emollient, wholesome, antipyretic, diuretic, maturant, laxative, digestible, anthelmintic, useful in urinary concretion, inflammation of the lungs and the bowels, sore throat, pain in joints, thirst, lumbago, cold and sneezing, sore eye, ring worm scabies, leucoderma, soalding urine, arrest vomiting, biliaryness, flatulence. They have been used in the treatment of febrile conditions. The seeds are useful in fevers, leucorrhoea, urinary discharges, lumbago, diseases of the brain and of the heart (Yunani). Seeds are laxative and cooling. They have been used in the treatment of difficulty in breathing, inflammation of the liver and jaundice. The green plant is given for the urinary calculi⁵.

PHARMACOLOGICAL ACTIVITY

Anticancer Activity

This concluded that the spinach glycoglycerolipid fraction can inhibit mammalian pol activity, human cultured cancer cell growth, and in vivo solid tumor proliferation with oral administration. This fraction could help to prevent cancer and be a functional food with anticancer activity¹³.

Anthelmintic Activity

Dave et al., 2009 evaluated the anthelmintic activity of crude extract of *Spinacia oleracea* Linn. and different extract namely fresh juice extract and methanolic extract using *Pheretima posthuma* as test worms. Different concentrations 10 mg/ml, 20 mg/ml, 30 mg/ml, 40 mg/ml and 50 mg/ml of fresh juice extract and methanolic extract of *Spinacia oleracea* Linn (MSO) were studied to determine the time of paralysis and time of death of worms. Both the extract performed *in-vitro* anthelmintic activity¹⁴.

Antioxidant property

The chemical fraction of natural antioxidant (NAO) components in *Spinacia oleracea* was reported by Grossman. The study demonstrated the presence of both

flavonoids and pcoumaric acid derivatives as antioxidant components of the aqueous extract of spinach leaves¹⁰.

CNS Depressant Effect

Treatment with *Spinacia oleracea* extract decreased the locomotor activity, grip strength, increased pentobarbitone induced sleeping time and also markedly altered pentylenetetrazole induced seizure status in Holtzman strain adult male albino rats. *S. oleracea* increased serotonin level and decreased both norepinephrine and dopamine levels in cerebral cortex, cerebellum, caudate nucleus, midbrain and pons and medulla¹².

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CONCLUSION

Traditional and folklore medicines play an important role in health services around the world. A large numbers of Indian medicinal plants are attributed with various pharmacological activities because they contain a diversified class of phytochemicals. The Spinach is nutritious food that provide sufficient amount of nutrients needed for normal body function, maintenance and reproduction. Spinach is regarded as a valuable dietary source of vitamin A, nonheme iron, folate, and lutein. Spinach also contains oxalates and nitrates that may have potential negative effects. This review will serve the purpose of aiding in future Research work on this plant.