



Review on the Pharmacognostical & Pharmacological Characterization of *Apium Graveolens* Linn

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ABSTRACT: Pharmacological properties of medicinal plants and various natural products of plant origin lie in the chemical constituents they contain. Thus, in most cases, the principal aim of phytochemical analysis of plants and natural products is to detect, isolate, characterize and identify these chemical substances. *Apium graveolens*(Celery plant) is an indigenous plant belongs to family Apiaceae. According to ayurveda, the plant is having a broad spectrum of use as an aphrodisiac, anthelmintic, antispasmodic, carminative, diuretic, emmenagogue, laxative, sedative, stimulant, and toxic. Celery is known as mild diuretic and urinary antiseptic and has been in the relief of flatulence and griping pains. Literature data revealed that *A graveolens* have many pharmacological properties as antifungal, antihypertensive and hypolipidemic, diuretic, anticancer and many more. Currently review article tried to critically cover all the necessary aspects related of *A graveolens*.© 2011 IGJPS. All rights reserved.

KEYWORDS: *Apium graveolens*; Celery Seeds; Apiaceae; Medicinal Plants.

INTRODUCTION

Medicinal plants defined medicines are widely used in traditional culture all over world and they are becoming increasingly popular in modern society as naturally alternative to synthetic chemicals. The most majority of people on earth still early on their traditional material Medicine for every day health care minerals. "A medicinal plant is any plant which in one or more of its organs containing substances that can be used for therapeutic properties or which are precious for synthesis of useful drugs". [1-4]

The dry food of *Apium graveolens* family Apiaceae is known as celery. This is popularly known as karnaulli or ajmod.

There are four known horticultural type of celery:-

Apium graveolens

Apium rapaceum

Apium secalinum

Apium smallege

Commercially celery is available as celery seed, celery flaks, vegetable, celery seed, and celery seed oleoresin. Celery seed is one of the lesser known herbs in western herbal medicine. It has been used for thousands of years.[4-6]

Ayurvedic physician (Vaidyas) used celery seed to treat people with cold, flu, water retention, poor digestion, various type of arthritis and certain disease of liver and spleen.

Scientific Classification:-

Division	Spermatophytes.
Sub-division	Angiospermae
Class	Magnoliopsida
Sub-class	Rosidales
Order	Apiales
Family	Apiaceae
Genus	<i>Apium</i>
Species	<i>graveolens</i>

Origin and Geographical Distribution:

The native habitat of celery is the lowland of Italy from where it spread to Sweden, Egypt, Algeria and Ethiopia in Asia to India. Celery firstly cultivated food plant in France in 1623. In India it is cultivated in north –western Himalayas, Punjab, Haryana, and western Uttar Pradesh in an area of about 5000 ha. Punjab produces about 90% of the total Indian production. India exported celery seed worth rupees 46 crore during the period of 1991-92.

Plant Description:

Celery is an herbaceous annual or biennial herb growing to a height of 60 to 90 cm. It has a shallow tap root system the stem is branched succulent and ridged. The leaflets are ovate to sub orbicular three lobed 2 -4.5cm. Long. The inflorescence is a compound umbel. The flowers are small and white the calyx teeth are absent. There are five petals ovate acute with inflexed tips. The carpels are semi-triangular sub-pentagonal the primary ridges are distinct and filiform. The fruit is a schizocarp, with two mericarps, sub-orbicular, to ellipsoid, 1-2mm in diameter, aromatic, and slightly bitter celery is naturally cross-pollinated but not self-incompatible.[9-11]

Soil: Celery can be successfully, cultivated on all soils, except saline, alkaline, and water logged once, loamy soils are the best. Celery is sensitive to the extremes of soil reaction. A soil PH is around 5-7.

Climate: A combination of 12-15 and 22-25 degree c, day-night temperature gives 80% seed germination with in two week period so cold and dry climate is suitable climate. The seed are sown in march-April and seed are transplanted in may and the crop ready to harvest in November.

Fertilizers: Before planting the seeding about 30-50ha of FYM is added. On medium soil about 80-200 kg nitrogen, 30 -40 kg phosphorus, 20 kg /ha potassium is applied to the crop. A full dose of nitrogen, a full dose of phosphorus and potassium are applied in at the time of planting and remaining nitrogen is given as a top-dressing after one month.[12-13]

The crop required 10-12 irrigation during the crop period.

Pests and Disease: Trichoplusia and Spodoptera exigua are two major insect pests of celery. Some disease is reported to celery crop. These are like Septoria peronosarum cause late blight and Phyllosticta Apia cause leaf-spot disease. They may be treated by spraying fenitrothion hydroxide at two week interval. The crop is harvested when about 80% of the seed begin to turn light brown. The harvested crop is stacked in the field for a few days and threshed to obtain the seed.

The average yield of celery is about 1000-1500 kg/ha. Celery seed yield 2-3% of pale yellow volatile oil with a persistent odor. The volatile oil or essential oil contained in the seed is isolated by steam distillation.

CHEMICAL CONSTITUENTS

The celery seeds having following constituent(**Table 1**):

Composition	Percentage Present in Celery Seeds
Moisture content	5-11%
Protein	0.8%
Volatile oil	1.5-3%
Non volatile oil	5.8-14.2%
Cold water extract	5.9-12.9%
Total ash content	6.9-11.0%
Ash insoluble in acid	0.5-4.0%

Table 1 Composition of Celery Seeds

The seed on steam distillation yield oil which content limonene (80%), as major constituent. Other than that it contain: a-p-dimethyl styrene, N-pertyl benzene, caryophyllene, a-selinene, N-butyl phthalide, Sedanolide along with sablnene, b-elemne, trans-1 2- epoxy limonene, linalool, isovaleric acid, cis-dihydrocarvone, trans-dihydrocarvone, trepinene-4-ol, 1-cis -p-menth-2,8-diene-1-ol, trans-p-menth-2,8-diene-1-ol, alpha-terpineol, carvone, trans-8-diene 1-ol, perialdehyde, and thymol. The seed are also rich in vitamin B.[14-17]

Other than this celery leaves and stalk contain(**Table 2**):

Composition	Percentage Present in Celery leaves & Stalks
Moisture	80.30-93.5%
Protein	0-0.8%
Fat	0.6-0.1%
Fibers	1.4-1.2%
Mineral matter	2.1-0.9%
Calcium	0.23-0.3%
Phosphorous	0.14-0.4%
Iron	0.06-0.05%
Vitamin A	5800-7500 IV
Vitamin B	TRACE
Vitamin C	62.6 mg/100gm

Table 2 Composition of Celery Leaves and Stalks

Calorific value is 64 at 18 calories per 100g respectively.

The characteristics celery flavor is mainly by two lactones i.e. 3-n- Butylphthalide and 3-Butyl 4, 5 dihydrophthalide (sedanolide). Celery is rich in beta-carotene, folic acid, vitamin C, magnesium, potassium, silica, sodium, chlorophyll and fiber. It contains 95% water. Celery consist of essential oil contain delta limonene, salience, various sesquiterpene, and characteristics flavor found in celery.[18]

NUTRITIONAL CONSTITUENTS OF CELERY (Table 3):

Constituents	Petioles	Stem	Leaves	Seeds
Energy	29	34	64	392
Water	96	95	81	6
Protein	0.7	0.9	6	18.1
Fat	0.1	0.1	0.6	3
Carbohydrate	1.2	1.2	8.6	41.4
Vitamin	90	120	80	52
Thiamine	0.03	0.03	Trace	Trace
Riboflavin	0.02	0.04	Trace	Trace
Niacin	0.3	0.3	Trace	Trace
Calcium	25	10	6.3	17
Iron	0.3	0.5	23	1767
Magnesium	10	14	6	45
Potassium	27	34	14	547

Table 3 Nutritional Values of Celery Plants

USES OF APIUM GRAVEOLENS

Celery has been used as an aphrodisiac, anthelmintic, antispasmodic, carminative, diuretic, emmenagogue, laxative, sedative, stimulant, and toxic. Celery is known as mild diuretic and urinary antiseptic and has been in the relief of flatulence and griping pains.

In the medicinal –herbal market, celery oil or oil extract as well as ground seed or root are touted as herbal and dietary supplement that “promote and regulate” healthy blood pressure, joint health and uric acid levels.[24-26] Root tinctures have been used as a diuretic in hypertension and urinary disorder.

Anti fungal activity:

Apium show anti fungal activity against Bacteria, like –*Staphylococcus aureus*, *Staphylococcus album*, *Shigella dysenteries*, *Salmonella typhi*.

Lowers blood pressure and cholesterol:

A daily dose of a compound extracts from celery seed experimental a 12% reduction in their blood pressure over a four week period.

Healthy joints:

Celery has been used and suggested as an alternative therapy for arthritis, rheumatism, and gout. Celery has been found to have anti inflammatory properties that reduce swelling and pain around the joints.

Anti septic properties:-

Celery seed has an antiseptic property that makes it useful to the health of urinary tract and a diuretic propriety to help relevance fluid retention. It is aid in the elimination of uric acid.

Acts as diuretic:

It is also benefits arthritis and gout patient, as it help to flush away the uric acid crystals that build up around the joints, celery helps shed water weight.

Menstrual discomfort:

Celery may promote the onset of menstruation.

Cancer agents:

Contain eight different families of anti cancer compound, such as phthalide, and polyacetylenes, that detoxify carcinogenic in cigarette smoke.

Anxiety:

Celery seed help smooth nerves and relieve pain.

Medicinal virtues:

The roots provoke the urine and are affected where there is stop age or for removing stone and gravel. They also open obstruction of the liver and spleen help dropsy and jaundice and remove female obstruction.

Genitourinary condition:

Celery seed diuretic action combined with its antibacterial compound make it useful herb in the genitourinary condition.

Reproduction condition:

Aphrodisiac with damiana and kola nut restore sexual potency imperial by illness.

Other condition:

Clear up skin problems deficiency disease prevention of cancer, prevent tumor, spleen, swelling in body charities, tendency towards over weight.

APPLICATIONS OF CELERY SEED EXTRACT

Celery has been widely used as both a food and a medication since middle ages. Medicinal preparation begins to emerge in the late 19th century and these generally contained the juice of celery seed in food also aid in the digestion of protein. Commonly celery used as primary and secondary as:-

Primary used as- arthritis, back pain, nervousness, rheumatism.

Secondary used as- Bright's disease, post nasal, edema, headaches, insomnia.

Nutrition drink celery and organic carrot juice make nutrition cleaning drink is good for many chronic illness. Glue ear celery seed are beneficial for chest problems such as asthma and bronchitis. It also used in combination with other drugs which help to reduce blood pressure. Celery seed extract is used as emmenagogue, an agent that promotes menstrual flow.

It is also used as nervine, an agent that act on the nervous system to reduce distress and irritation. Celery seed extract may be helped to improve digestion, can help improve the efficiency of the kidney function. It useful in treating gout can help to combat infection of bladder, suggestive dosage -20mg. Celery seed help in disease of chemical imbalance and act as an anti oxidant. Both stem and seed of celery have been reported to help balance acidity in the body. Celery seed also promote perspiration which may help with weight loss when water retention is a problem.

Celery seed has a stimulating effect on the kidney to promote urine flow. They help the kidney dispose of ureates and other unwanted waste product, as well as working to reduce activity in the body as a whole.

Celery seed has been found to help regulate nervous system by producing a combing effect. Celery is also known as marsh water parsley. It stimulates sees drives and produce sedative effect.

RESEARCH UPDATES ON *APIUM GRAVEOLENS*(CELERY)

Apium Graveolens Modulate Sodium Valproate Induced Reproductive Toxicity in Rats: Sodium valproate (VPA), a common treatment of epilepsy and other disease is known to have severe toxic effect on testis both in animal and humans. [27-29]

Effect of Celery Extracts on Some Biochemical Parameter of Oxidative Stress in Mice Treated With Carbon Tetrachloride: The potential protective action of the celery extract was assumed by the in vitro and in vivo test. In the in vitro experiment crude menthol extract were tested and in vivo experiment concerned with antioxidant system.

Crude Seed Extracts of Celery Against the Mosquito Aedes Aegypti: Celery seed extract was investigated for anti-mosquito potential, including herbicidal, adulticidal and repellent activities against *Aedes aegypti* the vector of dengue hemorrhagic fever.

Antioxidant, Cyclooxygenase and Topoisomerase Inhibitory Effect of Celery Seed Extracts: Cyclooxygenase inhibitory and antioxidant bioassay directed extraction and purification of celery yield – Sedanenolide, senkynolide-n, 1- tryptophan.[30]

Bio-active Compound 1,3-Glycerol from Celery Seed Extracts: Bioassay diverted isolation and purification of hexane extract of celery seed to the characterization of three compounds these are Beta –selinene, 3-n-Butyl 4, 5 dihydroxy phthalide, 5-alkyl 2methoxyphenol.

Biosynthesis of Sucrose and Mannitol as a Function of Leaf AGA of Celery: In celery two major translocated carbohydrates are sucrose and the acyclic polyol manitol. Their specific functions are uncertain.

Inhibitory Effect of Celery Seed Extracts on Chemically Induced Hepatocarcinogenesis- Modulation of Cell Proliferation Metabolism and Altered Hepaticfoci Development: Methanolic extract of celery seed's has been investigated against salt fiber protocol of hepatocarcinogenesis oxidative stress induction of positive foci of gamma-gt in the liver of Wistar rat.

Combination of Anti-inflammatory Therapy: Synergism in rat of NSAID'S / corticosteroids with some herbal / animal product.

Extract of celery seed and the green –lipped mussel are powerful nutraceuticals that amplify the potency of salicylates and prednisone for treating pre established chronic inflammation.

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