Mechanism Of Calcium Oxalate Stone Formation

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Abstract- Coriandrum Sativum family Umbelliferae is used as ayurvedic medicinal tree also known as the Dhanya. It is a glabrous, aromatic, herbaceous annual plant, small sized tree growing throughout India, Italy, Netherlands, Central and Eastern Europe, China and Bangladesh. From different parts of C. sativum essential oil, flavonoids, fatty acids, and sterols have been isolated. This plant contains monoterpenes, α-pinene, limpenene, γ-terpinene, p-cymene, borneol, citronellol, camphor, geraniol, coriandrin, dihydrocoriandrin, coriandrons A-E, flavonoids and essential oils. Seeds, leaves, flower and fruit of dhanya, possess antioxidant activity, anti-diabetic activity, anti-mutagenic activity, anti-helminthic activity, sedative-hypnotic activity, anticonvulsant activity, diuretic activity, cholesterol lowering activity, protective role against lead toxicity, antifungal activity, anti-feeding activity, antitumor activity, anti-cancer activity, anti-microbial activity, hepatoprotective activity, anti-protozoal activity, anti-ulcer activity, post-coital anti-fertility activity, heavy metal detoxification. Various phytopharmacological evaluations have been reported in this literature for the important potential of the Coriandrum sativum.

Keywords: Coriandrum sativum.

I. INTRODUCTION
Coriandrum sativum:
Coriander (botanical name: coriandrum sativum Linn.) also called cilantro, are dried fruits of plant coriandrum sativum, belonging to family Apiceae or Umbelliferae. The whole plant and especially the unripe fruit, is characterized by a strong disagreeable odour, whence the name coriander (from the greek K’opis, a bug) giving characteristic aroma when rubbed (Gruenwalded Joerg. Et al.,2004). All parts of the plant are edible, but the fresh leaves and the dried seeds are the most common parts used in cooking.

VERNICULAR NAMES
Gujarati (Dhana), English (coriander, collender, chinese parsley), Hindi (dhania, dhanya); Sanskrit (dhanayaka,); Kashmiri (Dhaniwal, Dhanawal); Punjabi (Dhania).

Scientific Classification

Kingdom: Plantae
Division : Magnoliophyta
Class : Magnoliophyta
Order : Apiales
Family : Apiceae
Genus : Coriandrum
Species : C.sativum
Botanical Name: Coriandrum sativum

Habitat
Coriander is almost found in all the continents except Antarctica. It is very commonly seen in areas like middle east, Mediterranean, south Asia, Latin America, China, Africa and southeastern Asian island.

Morphology
It is an annual soft shrub that attains a height of 1 to 3 feet. Leaves are in basal cluster varies from 3 to 15 cm in length and are oblong to ovate to round. Flower is of white color which can vary from light purple to creamish in color. These appear in umbles. Fruit is roundish in shape bearing color that varies from yellow to brown. It is tripped and gets divided in to two then crushed with fingers.2

**Phytochemical Constituents:**3,4
Coriander consists of volatile oil (0.3 to 1%), proteins (20%). The volatile of coriander consist of D-linalool(68%), gerniol (10%), pinene (10.5%).It also consist of coriandryl acetate, L-borneol, fixed oil(13%).It is rich in vitamin A content.fruit yields 5-7% ash.

**NUTRITIONAL CONSTITUENTS:** (Bhat S.et.al., 2014)
Coriander consist of Water (7.3g), Food energy (279kcal), Protein (21.83g), Fat (4.76g), Carbohydrates (52.10g), Ash (14.02g), Calcium (1.246mg), Phosphorus (481.00mg), Sodium (211.00mg), Potassium (4.466mg), Iron (42.46mg) Vit –A (566.7mg).

**Pharmacological Studies:**

**Antioxidant Activity:** An aqueous coriander extract obtained through a sequential extraction process identify the phenolic compounds responsible for its antioxidant activity. When considered with the recognized antioxidant ability of phenolic acids, suggest that they are principal components responsible for the antioxidant activity of the aqueous coriander extract. This study is designed to examine the fruit essential oil composition, the total phenolic amounts and the antioxidant activities in methanolic extracts of *Coriandrum sativum*. Five fractions (b-carotene, b-cryptoxanthin epoxide, lutein-5, 6-epoxide, violaxanthin and neoxanthin) were isolated from a coriander ether extract using column chromatography and identified according to their chromatographic and spectral characteristics. Extracts of different polarity from leaves and seeds of coriander and coriander oil were investigated for their antioxidant activity coriander to food will increase the antioxidant content and may have potential as a natural antioxidant and thus inhibit unwanted oxidation processes. Extracts from both leaves and seeds showed a concentration-dependent DPPH scavenging activity respectively. (Misharina T.A et al., 2008; Wangenstein Helle et al.,2004).

**Antidiabetic Activity:** After a single oral dose of CS-extract (20 mg/kg) in sub-chronic administration of an aqueous extract of coriander seeds in OHH-Meriones shawi rats normalized glycemia and decreased the elevated IR (insulin resistant), levels of insulin, total cholesterol, LDL-cholesterol and TG, without a significant effect on BW (body weight), and plasma urea and creatinine. Our results also imply that regular consumption of coriander seeds (which are relatively non-toxic) could decrease hyperglycemia as well as prevent or reduce cardiovascular complications caused by dyslipidemia/hyperlipidemia in pathologies such as pre-diabetes, T2DM, and the metabolic syndrome. (Abderrahmane A et al., 2011)

**Anti-microbial Activity:** Aqueous infusions and aqueous decoctions of coriander against 186 bacterial isolates belonging to 10 different genera of G +ve bacterial population and 2 isolates of Candida albicans isolated from urine specimens 19. The essential oil from leaves of *Coriandrum sativum* L. (Apiaceae), obtained by hydro-distillation was analysed. The major constituents were 2E-decenal (15.9%), decanal (14.3%), 2E-decen-1-ol (14.2%) and n-decanol (13.6%). Other constituents present in fairly good amounts are 2E-tridecen-1-al (6.75%), 2E-dodecanal (6.23%), dodecanal (4.36%), undecanal (3.37%), and undecenal (3.23%). The oil was screened for antimicrobial activity against both Gram positive (*Staphylococcus aureus, Bacillus spp.*) and Gram negative (*Escherichia coli, Salmonella typhi, Klebsiella pneumonia, Proteus mirabilis, Pseudomonas aeruginosae*) bacteria and a pathogenic fungus, *Candida albicans*. (Sabahat saeed perween tariq et al., 2007).

**Anti Mutagenic Activity:** The 4- nitro-o-phenylenedi-amine (NOP) is a well-known direct-acting mutagen whose mutagenic potential can be enhanced by plant metabolism; m-phenylenediamine (m-PDA) is converted to mutagenic products detected by the *Salmonella typhimurium* TA98 strain, and 2-aminofluorene (2-AF) is the plant-activated
promutagen most extensively studied. Plant cells activate both 2- AF and m-PDA into potent mutagens producing DNA frame shift mutations. *Coriandrum sativum* is a common plant included in the Mexican diet, usually consumed uncooked. The antimutagenic activity of coriander juice against the mutagenic activity of 4-nitro o-phenylenediamine, m-phenylenediamine and 2-aminofluorene was investigated using the Ames reversion mutagenicity assay (his + to his−) with the *S. typhimurium* TA98 strain as indicator organism. The plant cell/microbe coincubation assay was used as the activating system for aromatic transformation and plant extract interaction. Aqueous crude coriander juice significantly decreased the mutagenicity of metabolized aromatic amines (AA) in the following order: 2-AF (92.43%) > m-PDA (87.14%) > NOP (83.21%). (Cortes-Esla J et al., 2004)

**Anthelmintic Activity:** *In vitro* anthelmintic activities of crude aqueous and hydro-alcoholic extracts of the seeds of *Coriandrum Sativum* (Apiaceae) were investigated on the egg and adult nematode parasite *Haemonchus contortus*. The aqueous extract of *Coriandrum Sativum* was also investigated for in vivo anthelmintic activity in sheep infected with *Haemonchus contortus*. Both extract types of *Coriandrum Sativum* inhibited hatching of eggs completely at a concentration less than 0.5 mg/ml. ED(50) of aqueous extract of *Coriandrum Sativum* was 0.12 mg/ml while that of hydro-alcoholic extract was 0.18 mg/ml. The hydro-alcoholic extract showed better in vitro activity against adult parasites than the aqueous one. (Pathak Nimish L et al., 2011)

**Sedative Hypnotic Activity:** *Coriandrum sativum* L. has been recommended for relief of insomnia in Iranian traditional medicine. To determine sedative & hypnotic activity Aqueous and hydroalcoholic extract & essential oil administer to rat. The result of experiment shows that aqueous extract prolonged pentobarbital-induced sleeping time at 200, 400 and 600 mg/kg. Hydro-alcoholic extract at doses of 400 and 600 mg/kg increased pentobarbital-induced sleeping time compared to saline-treated group. The essential oil increased pentobarbital induced sleeping time only at 600 mg/kg. The extracts and essential oil of coriander seeds possess sedative-hypnotic activity. (Emamghoreishi M et al., 2006).

**Anticonvulsant activity:** The anti-convulsant effects of aqueous and ethanolic extracts of coriander sativum seeds were studied in two anti-convulsant evaluation test, namely the pentylenetetrazole (PTZ) and the maximal electroshock tests. Aqueous and ethanolic extracts prolonged onset of clonic convulsions and anti convulsant activity of high dose (5mg/kg) were similar to that of phenobarbital at a dose of 20mg/kg in the PTZ test. Both extracts in high doses decreased the duration of tonic seizures and showed a stastically significant anticonvulsant activity in the maximal electroshock test. (Hosseinzadeh H et al., 2005)

**Diuretric:** The aqueous extract of coriander seed possesses diuretic and saluretic activity, thus, validating the use of coriander as a diuretic plant in Moroccan pharmacopoeia aqueous extract of coriander seed was administered by continuous intravenous infusion (120 min) at two doses (40 and 100 mg/kg) to anesthetized Wistar rats. Furosemide (10 mg/kg), a standard diuretic was used as the reference drug. The crude aqueous extract of coriander seeds increased diuresis, excretion of electrolytes, and glomerular filtration rate in a dose-dependent way; furosemide was more potent as a diuretic and saluretic. The mechanism of action of the plant extract appears to be similar to that of furosemide. (Jabeen Q et al., 2009).

**Protective role against Lead Toxicity:** Oxidative stress was induced in mice by a daily dose of lead nitrate (40 mg/kg body weight by oral gavages) for seven days. From day eight, after lead nitrate treatment, experimental animals received an oral dose of coriander extracts (aqueous extract - 300 mg/kg body weight and 600 mg/kg body weight; ethanolic extract - 250 mg/kg body weight and 500 mg/kg body weight) daily. The effect of these treatments in influencing the lead induced changes on hepatic and renal oxidative stress and biochemical changes along with histopathological alterations in soft tissues was studied. The data showed significant increase in liver and kidney LPO levels in animals treated with lead nitrate while the effect was attenuated by the plant extracts. Also, lead caused a significant decrease in antioxidant enzyme activity and this effect was reversed in groups treated with plant extract. Treatment with coriander significantly reduced the adverse effects related to most of biochemical parameters altered in animals treated with lead, related to hepatic and renal oxidative stress. (Leena K et al., 2011).

**Antifungal activity and potential synergism with Amphotericin B:** Present study was to evaluate the antifungal activity of coriander essential oil according to classical bacteriological techniques, as well as with flow cytometry. The effect of the essential oil upon germ tube formation, seen as an important virulence factor, and potential synergism with amphotericin B were also studied. Coriander essential oil has a fungicidal activity against the *Candida* strains tested with MLC values equal to the MIC value and ranging from 0.05 to 0.4% v/v. Also, concentrations bellow the MIC value caused a marked reduction in the percentage of germ tube formation for *C. albicans* strains. A synergetic effect between coriander oil and amphotericin B was also obtained for *C. albicans* strains, while for *C. tropicalis* strain only an additive effect was observed. This study describes the antifungal activity of coriander
essential oil on Candida spp., which could be useful in designing new formulations for candidosis treatment. (Filomena S et al., 2011).

**Antifeedant Activity:** Antifeedant activity against the field slug Deroceras reticulatum by using an electrophysiological recording assay, the olfactory sensory epithelium of the posterior tentacle of the slug was exposed to volatile components of the plant extracts presented in an airstream, and any subsequent activity of the olfactory nerve was recorded. A feeding bioassay was used to measure any change in consumption when extracts were added to a standard food. Statistical analysis of data obtained from both electrophysiological traces and the feeding bioassays identified extracts of Coriandrum sativum and it is most neuroactive as well as the most antifeedant. (Catherine JDet al., 1999).

**Anti-Cancer:** The biochemical effect of coriander seeds on lipid parameters in 1, 2-dimethyl hydrazine (DMH) induced colon cancer in rats were studied. The study shows that the concentrations of cholesterol and cholesterol to phospholipid ratio decreased while the level of phospholipid increased significantly in the DMH control group compared to the spice administered group. Fecal dry weight, fecal neutral sterols and bile acids showed a sharp increase in the coriander-fed group compared with the DMH administered group. Thus, coriander plays a protective role against the deleterious effects in lipid metabolism in experimental colon cancer. This effect can be explained as one of the possible mechanisms by which coriander can inhibit colon tumorgenesis. (Chithra V et al., 2000).

**Anti-Anxiety Activity:** Coriandrum sativum L. has been recommended for relief of anxiety and insomnia in Iranian folk medicine. The anxiolytic effect of aqueous extract (10, 25, 50, 100 mg/kg, i.p.) was examined in male albino mice using elevated plus-maze as an animal model of anxiety. The effects of the extract on spontaneous activity and neuromuscular coordination were assessed using Animex Activity Meter and rotarod, respectively. In the elevated plus-maze, aqueous extract at 100 mg/kg showed an anxiolytic effect by increasing the time spent on open arms and the percentage of open arm entries, compared to control group. Aqueous extract at 50, 100 and 500 mg/kg significantly reduced spontaneous activity and neuromuscular coordination, compared to control group. These results suggest that the aqueous extract of Coriandrum sativum seed has anxiolytic effect and may have potential sedative and muscle relaxant effects. (Masoumeh E et al., 2005).

**Hepatoprotective Activity:** Ethanolic extract was found to be rich in alkaloids, phenolic compounds and flavonoids, isoquercetin and quercetin. C. sativum signifies hepatoprotection against carbon tetrachloride (CCl4), by reducing the liver weight, activities of SGOT, SGPT, and ALP, and direct bilirubin of CCl4 intoxicated animals. Administration of C. sativum extract at 300 mg/kg dose resulted in disappearance of fatty deposit, ballooning degeneration and necrosis, indicating antihepatotoxic activity. (Pandey A et al., 2011).

**Gastric Mucosal Protective Activity:** The effect of Coriander pretreatment on gastric mucosal injuries caused by NaCl, NaOH, ethanol, indomethacin and pylorus ligation accumulated gastric acid secretion was investigated in rats. Pretreatment at oral doses of 250 and 500 mg/kg, body weight was found to provide a dose-dependent protection against the

(i) Ulcerogenic effects of different necrotizing agents;
(ii) Ethanol-induced histopathological lesions;
(iii) Pylorus ligated accumulation of gastric acid secretions and ethanol related decrease of Non-protein Sulphhydryl groups (NP-SH).

Results obtained on the study of gastric mucus and indomethacin induced ulcers demonstrated that the gastro protective activity of Coriander might not be mediated by gastric mucus and/or endogenous stimulation of prostaglandins. The protective effect against ethanol-induced damage of the gastric tissue might be related to the free-radical scavenging property of different antioxidant constituents (linanool, flavonoids, coumarins, catechins, terpenes and polyphenolic compounds) present in Coriander. The inhibition of ulcers might be due to the formation of a protective layer of either one or more than one of these compounds by hydrophobic interactions. (Al-Mofleha A et al., 2006).

**Post-Coital Antifertility Activity:** Effect of the aqueous extract of fresh coriander seeds has been studied on female fertility in rats. Parameters included effects on oestrus cycle, implantation, foetal loss, abortion, teratogenicity and serum progesterone levels on days 5, 12 and 20 of the pregnancy. The extract at doses of 250 and 500 mg/kg orally produced a dose-dependent significant anti-implantation effect, but failed to produce complete infertility. Treatment of animals during day-8, day-12 and day-20 of the pregnancy did not produce any significant abortifacient activity. There was no significant change in the weight and length of the foetuses delivered by rats treated with the extract and no abnormalities were seen in the organs of the off springs. The extracts produced a significant decrease in serum
progesterone levels on day-5 of pregnancy which may be responsible for the anti-implantation effect observed in this study. (Mansoor SA et al.,1987).

**Heavy Metal Detoxification:** Asorbent prepared from the plant coriander was observed to remove inorganic (Hg2+) and methyl mercury (CH3Hg+) from aqueous solutions with good efficiency. The sorption behavior indicates the major role of carboxylic acid groups in binding the mercury. The studies suggest that the sorbent can be used for the decontamination of inorganic and methyl mercury from contaminated waters. (Karunasagar D et al.,2005).

**CONCLUSION:**
Throughout history, humans have found that some plants and herbs can be not only to enhance the flavor of foods but also to restore health. Numerous phytochemical and pharmacological studies have been conducted on different parts of *Coriander sativum*. The present literature supports the potential of *Coriander sativum* as a medicinal tree. In view of the nature of the *Coriander sativum* plant, more research can be done to investigate the undiscovered and undeveloped potential of this plant.

**REFERENCES:**
