

MEDICINAL USES AND PHARMACOLOGICAL ACTIVITIES OF PARPATAK (FUMARIA PARVIFLORA LAM.)-A REVIEW

¹*Priyanka K. Tayade and ²Mangala Jadhav

¹3rd Year M.D. Scholar, ²Associate Professor

Department of Rasashastra and Bhaishajya Kalpana, R.A. Podar Ayu. Medical College,
Worli, Mumbai 18.

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*Corresponding Author

Priyanka K. Tayade

3rd Year M.D. Scholar,

Department of Rasashastra
and Bhaishajya Kalpana,

R.A. Podar Ayu. Medical

College, Worli, Mumbai 18.

ABSTRACT

Parpatak (*Fumaria parviflora* Lam.) is an herbocebaseous plant that grows in a wide variety parts of Iran, Indo-Pakistan subcontinent and Turkey. Many previous studies showed Parpatak (*Fumaria Parviflora*) contained major alkaloids protopine and adlumidiceine and minor alkaloids like parfumine, fumariline, dihydrofumariline, cryptopine, stylopine, saponin, tannin, and atropine. The previous works also showed that the plant exerted protective activity against hepatotoxicity, testicular toxicity, anti-diabetic, anti-inflammatory, anti-bacterial, antipyretic, antidiarrheal, antispasmodic and antihelmintic activity. It also shows effect on eczema, reproductive parameters, anti-inflammatory, laxative and spasmodic effect, testicular injury. This

paper provides review on medicinal uses and various pharmacological properties of *Fumaria parviflora*. For this study I reffered article on google scholar from 1982-2018.

KEYWORDS: *Fumaria parviflora*, phytochemistry, Pharmacological action, uses.

INTRODUCTION

Hebal medicine is a major component in all traditional medical systems, and a common element in Siddha, Ayurvedic, Homeopathic, Naturopathic, Traditional Chinese medicine and Native American medicine. Plant materials are used throughout developed and developing countries as home remedies. A perfect example of medicinal plant credited with innumerable medicinal qualities validated by modern science and used since ancient times is Parpatak (*Fumaria parviflora* Lam).

Parpatak (*Fumaria parviflora*) is a species of flowering plant known by the common names of fineleaf fumitory, fine-leaved fumitory and Indian fumitory. This plant is native of Europe. Commonly found over the greater parts of India in a winter season weed, mostly in wheat field. The small flowers are dull white with purple tips. The fruit is a rounded nutlet with a central crest. Part used is whole plant of this.^[1]

Names of parpatak is as follows

Ayurvedic name- Pittapapra

Unani name- Shahtaraa

Hindi name- Shahatra, Pitpapra

English name- Fumitory

Trade name- Pitpapra

Common names- Parpat, Vartikta, Parpatak, Panshuparyay, Kavachnamak.

Classification of parpatak is as follows

Species- *Fumaria parviflora*

Botanical name-*Fumaria parviflora* Lam.

Kingdom-Plantae

Clade-Angiosperms

Order-Renunculales

Family-Fumariaceae

Genus-*Fumaria*

Chemical Constituents

Major alkaloids are Protopine and adlumidicein. And Cryptopine, parfumin, fumariline, fumaramine, stylophine, 8-oxocoptisine, sanguinarine and oxysanguinarined-hydrastine are the chief alkaloids.^[2]

Therapeutic Uses

The plant is bitter in taste, cooling, expectorant. due to tikta rasa it decrease pitta and kapha too. It increase 'Vata', improves indigestion, fever, burning of the body, fatigue, urinary discharges, vomiting, thirst, enriches the blood.

The leaves are bitter and cooling. They cure bilious fever, blood disease, allay thirst, raktapitta, mada, atisara. The dried plant is regarded as efficacious in low fever and is also

used as anti-helminthic, diuretic, diaphoretic and asperients and to purify the blood in skin disease.^[3]

A number of pharmacological and biological activities including anti-pyretic, anti-bacterial, anti-diabetic, anti-inflammatory, anti-diarrheal, anti-spasmodic, antihelminthic, have been reported for this plant.

Pharmacological Activities

antipyretic activity

Pyresis was induced by subcutaneous yeast injections. Parpatak(*Fumaria parviflora*) shows prominent effect on Pyrexia. No obvious toxic effects were noted for the plant.^[4]

Selective Protective Effect of an Extract From *Fumaria Parviflora* on Paracetamol Induced Hepato-Toxicity

The hepatoprotective effect of an aqueous methalonic extract of Parpatak(*Fumaria parviflora*) was investigated against paracetamol and CCl₄-induced hepatic damage. Paracetamol (1 g/kg orally) produced 100% mortality in mice. pretreatment of animals with the plant extract (500 mg/kg orally) reduced the death rate to 50%. Pretreatment of rats with plant extract (500 mg/kg, orally twice daily for 2 days) prevented($p < 0.001$) the paracetamol (640 mg/kg) induced rise in serum enzymes alkaline phosphatase (ALP) and transaminases (GOT and GPT), whereas same dose of the extract was unable to prevent ($p > 0.05$) the CCl₄ induced rise in serum enzyme levels. Post treatment with 3 successive doses of extract (500 mg/kg, 6 hourly) also restricted the paracetamol induced hepatic damage.

It is conceivable therefore that Parpatak(*Fumaria parviflora*) extract exhibits a selective protective effect against paracetamol- induced hepatotoxicity, probably mediated through microsomal drug metabolizing enzymes.^[5]

Prokinetic, laxative and spasmodic effect of parpatak(*fumaria parviflora*)

This study was designed to provide pharmacological basis for the medicinal use of Parpatak(*Fumaria parviflora*) in gut motility disorders. The in vivo prokinetic and laxative conducted in mice. Isolated intestinal preparations (ileum and jejunum) from different animal species(mouse, guinea pig, and rabbit) were separately suspended in tissue baths containing Tyrode's solution bubbled with carbogen and maintained at 37 degree celcius. Parpatak (*Fumaria parviflora*) shows prokinetic and laxative activities in the in-vivo in mice at 30 and

100 mg/kg. Parpatak(0.01-1 mg/ml) caused a concentration dependent atropine-sensitive stimulatory effect in both mouse tissue(jejunum and ileum) and rabbit jejunum but had no effect in rabbit ileum. In guinea pig (ileum and jejunum) the crude extract showed concentration dependent stimulatory effect with higher efficacy in ileum and the effect was partially blocked by atropine, indicating the involvement of more than one type of gut stimulant component.^[6]

hypoglycemic effect

Administration of Parpatak(*Fumaria parviflora*) extract showed a potent glucose lowering effect only on streptozotocin(STZ) induced diabetic rats. This study indicated that Parpatak (*Fumaria parviflora*) has significant hypoglycemic effect on STZ- induced diabetic rats with no effects on blood glucose level of normal rats.^[7]

Effects on reproductive parameters in adult male rats

In this study the body weight was not affected, while the weight of testis and epididymis were significantly enhanced in rats treated with 200 and 400 mg/kg/day of Parpatak (*Fumaria parviflora*) extract. No significant changes were observed in seminal vesicle and ventral prostate weight between experimental groups. significant increase was found in epididymal sperm density and percent of morphologically normal sperm in extract treated rats. serum testosterone levels were significantly higher in rats received 200 and 400 mg/kg/day. The result indicated that Parpatak(*Fumaria parviflora*) levels have potential to improve reproductive parameters and enhance fertility.^[8]

Effect on eczema

In a randomized double-blind, placebo-controlled study, 44 patients with hand eczema were randomly assigned to apply 4% cream of Parpatak (*Fumaria parviflora*) or vehicle cream to hand twice daily for 4 weeks. It shows the reduction of eczema area and severity index score before and 2 weeks after therapy was statistically significant between vehicle treated and in treated group. so conclusion is that Parpatak(*Fumaria parviflora*) is considered as an effective agent for treatment of chronic hand eczema.^[9]

Antimicrobial activity

Disc diffusion and broth micro dilution method were used to study the antimicrobial (gram+ staphylococcus epidermidis and bacillus subtilis, gram-Escherichia coli and salmonella typhimurium) and antifungal (candida albicans and aspergillus niger) potential in vitro. The

available evidence of compound suggested that it may be used as antimicrobial agent in future and may provide new platform for drug discovery programmes for leishmaniasis.^[10]

Protective Effect of Parpatak(*Fumaria Parviflora*) on Lead-Induced Testicular Toxicity In Male Rats

Oxidative stress has been proposed as a possible mechanism involved in lead toxicity that cause reproductive system failure in both human and animals. In this adult wistar rats were treated with 0.1% lead acetate in drinking water with or without 200 mg/kg/day. Parpatak(*Fumaria parviflora*) extract via gavage for 70 days. lead acetate treatment resulted in significant reduction in testis weight, seminiferous tubules diameter, epididymal sperm count, serum testosterone level. The result indicated that ethanolic extract of Parpatak(*Fumaria parviflora*) leaves has a potential to restore the suppressed reproduction associated with lead exposure and prevented lead induced testicular toxicity in male wistar rats.^[11]

Protective activity on testicular injury

This study was designed to determine the effects of daily oral administration(250 mg/kg) of the hydroalcoholic extract of Parpatak(*Fumaria parviflora*) for 14 days on the sperm parameters, oxidative stress parameters, serum testosterone levels, expression of Bax and Bcl-2 genes and apoptosis index of germ cells. after testicular torsion-detorsion injury model in rats. testicular torsion was created by rotating the left testis 720 degree in a counterclockwise direction, then after 4 hr direction was performed. there are 3 groups torsion-detorsion(TD), TD plus hydroalcoholic extract of *Fumaria parviflora* (TDFP) and only *Fumaria parviflora* without TD application. this study shows significantly increase in height of seminiferous tubules in TDFP and Parpatak(*Fumaria parviflora*) group than in TD group. Parpatak(*Fumaria parviflora*) decrease oxidative stress induced by testicular torsion and detorsion.^[12]

Anthelmintic Activity

In vitro studies revealed that aqueous and ethanolic extracts at the concentration of 3.12, 6.3, 12.3, 25.0, and 50.0 mg/ml exhibited ovicidal and larvicidal effects ($p < 0.05$) against eggs and larvae of gastrointestinal nematodes. The highest effective dose (ED 50) value of Parpatak(*Fumaria parviflora*) extract was recorded on the eggs of *chabertia ovina* (14.45 mg/ml) with aqueous extract, whereas lower value was recorded on the eggs of *haemonchus contortus* (9.12 mg/ml) with ethanolic extract. similarly higher LC 50 value of

Parpatak(*Fumaria parviflora*) against larvae of *H. contortus* (10.23 mg/ml) with aqueous and ethanolic extract respectively. In experimental study animal groups treated with dose of 200 mg/kg of either aqueous or ethanolic extract of Parpatak (*Fumaria parviflora*) exhibited higher ($p < 0.05$) reduction rate on faecal egg counts as compared to untreated groups.^[13]

Anti-Inflammatory Activity

The anti-inflammatory activity was studied using carrageenan induced paw edema method and cotton pellet granuloma method. Levels of cytokines such as TNF- α , IL-6 and IL-1 and activity of antioxidant enzymes including catalase (CAT) and glutathione peroxidase (GPx) were estimated. Leaves of Parpatak(*Fumaria parviflora*) demonstrated significant ($p < 0.001$) decrease in paw edema in carrageenan induced paw edema method. It diminished the serum tumour necrosis factor α (TNF- α), IL-6 and IL-1 level and also significantly attenuated the malondialdehyde (MDA) levels. The activity of CAT and GPx was increased in paw tissue. It also demonstrated significant decrease in granuloma formation in cotton pellet-induced granuloma method. So this study concluded that levels of Parpatak(*Fumaria parviflora*) possess anti-inflammatory activity as they inhibit various cytokines and have antioxidant effects and free radical scavenging activity.^[14]

Sun Protective Activity

According to previous studies the plant flavonoids are suitable absorbents for UV rays. These plants have high percent of flavonoids. The SPF value was determined in 2 mg/ml of plotting MPF against Ln C. In another procedure gel bases containing the extracts were prepared. The SPF of the gel was determined by use of transpore tape method and transmittance reading between 290-400 nm. Finally, the result shows that plant extract can be used in sun protection preparations as potent UV absorbents with more safety and efficacy than chemicals and also with anti-inflammatory properties.^[15]

DISCUSSION AND CONCLUSION

Parpatak(*Fumaria parviflora*) commonly known as Pittapapada. It has a tikta rasa prominently hence it is also called as "Vartikta".^[1] This drug is mostly available in Iran, so we have to buy it from Iran, because of its less availability in India it becomes very costly. It is said to possess hypoglycemic, antimicrobial, anti-helminthic, anti-inflammatory, antipyretic activity. The whole plant is used in Ayurvedic medicine and has been mentioned in ancient texts for samgrahi, pittahar, kaphahar, raktdoshahar actions.^[3] It is used in diseases like chardi, raktpitta (bleeding disorder), mada, bhrama, jwara, daha, glani, trushna, atisara.^[3] Some studies have

been reported antipyretic activity of Parpatak(*Fumaria parviflora*) in yeast induced pyrexia in animal models. It shows protective activity on testicular injury. It also shows protective effect on paracetamol induced hepatotoxicity and lead induced testicular toxicity. It contains major alkaloids protopine and adlumidicine and minor alkaloids parfumine, fumariline, dihydrofumariline, cryptopine, stylophine, s-oxocoptisine, sanguinarine and oxysanguinarine. The therapeutic effects are excellent and no adverse reaction was observed. From this study we can say that Parpatak(*Fumaria parviflora*) is a promising herbal drug because of its safety and effectiveness.

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