ETHNOBOTANICAL, PHARMACOLOGICAL AND TRADITIONAL USES OF WOOD*FORDIA FRUTICOSA*: A REVIEW

Alia Chishti[1], Abdul Wadood Chishti[1], Jaweria Nisar[1], Sheeraz Siddique[2*]

Abstract: Medicinal plants used all over the world since the dawn of Human civilization. They contain therapeutic phytochemical constituents used in different diseases. Many modern synthetic compounds are used for different ailments but these compounds have many adverse effects on different organ of the body. About 80% of the world population now relies on natural medicine. They have fewer side effects compared to modern synthetic compounds. *Woodford fruticosa* of Lythraceae family is well known medicinal plant used all over the world for therapeutic purposes. This plant is a shrub and grows in many regions of the Asia. This plant is searched for many Pharmacological activities. It possesses immunostimulant, cytotoxic, anticancer, antifertility activities. In the present review its ethnobotanical, traditional and pharmacological properties are discussed.

Keywords: Medicinal plants, Traditional uses, Pharmacological activities

1 University College of Conventional Medicine, Faculty of Pharmacy and Alternative Medicine, The Islamia University Bahawalpur, Pakistan

2. Department of Eastern Medicine, Hamdard University Karachi

Corresponding Author's Email: hbshizi@hotmail.com

INTRODUCTION

Woodfordia fruticosais is a well-known medicinal plant and present in many regions of Asia. It is from Lythraceae family. The well-known botanist E. James Alexander Woodford had given the name *Woodfordia fruticosais*. W. fruticosa is widely present in Asia. Word fordiafruticosais deriving from the Latin word frutexsense "a shrub".

TAXONOMY

Kingdom: Plantae
Phylum Magnoliophyta
Class: Magnoliopsida
Family: Lythraceae
Genus: Woodfordia
Species: W. fruticosa

HABITAT

W. fruticosa is present in South India, Mel ghat, Ravi eastern parts in Himalaya and in the Rajputana areas. However, it is extensively distributed all over north India moderately limited in south India (1).

BOTANICAL DESCRIPTION

This plant is shrub, branched, beautiful, with acrobat stems, long spreading branches, 1-3-meter-tall, only just equal to 7 m. It is occasionally growing in gardens for its attractive flowers. Bark is reddish brown, fibrous bands; leaves are oblong, ovate-lanceolate; the flowers abundant, bright red in color, paniculate-cymose; capsules are ellipsoid, seeds brown, smooth and ovate (2).

PHYTOCHEMICAL CONSTITUENTS

FLOWERS

Polytachoside, anthocyanins pelargonidine-3, myricetin-3-galactoside, Polyphenols-ellagic acid, 5-diglucoside, cyaniding 3, 5-diglucoside; beta-sitosterol, glucopyranoside, octacosanol, mesoinositol, hecogenin, flavone i.e. glycosides, rhamnoside, naringenin, quercetin, kaempferol.

Dimeric hydolyzable tannins, trimeric tannins woodfordin d and oenotheina and b. A new tannin monomer, h and i have also been isolated. Malvidin, quercetin, pentose, glycosides, carotene, carbohydrates, kaempferol-3-glycoside, punicaline, hecogenin, insulin, 3 mannitol, riboflavin, protein, citric acid, lawsone, estrone, aspartic acid etc. were separated from flower. Cyaniding-3, b sterol, 5-diglucoside, octosanol, and chrysaphanol-8-o-b-d-glucopyranoside derived from flowers.

LEAVES

Oenothein-b,myrecetein-3-0 arabinopyranoside Quercertain-3-o-α-l-arabinoside, quercertain3-o-6''-β-d-galactopyranoside, Ellagic acid, polystachoside, pelargonidine-3, 5-diglucoside myricetin-3- galactoside, woodfruticosin (woodfordin C). Octacosonol and sitosterol (3).

Fire Flame Bush, Hindi: Dhawai, Urdu: Jetiko, Sanskrit: Parvati, Bahupuspika.

PARTS USED

Leaves, fruits, flowers and gum (2).

TEMPERAMENT:

Cold 2° and Dry 2°
Cold 2° and Dry 3° (4)

TRADITIONAL AND THERAPEUTIC USES

Flowers are astringent, desiccative, refrigerant, anthelminthic, haemostatic and improve healing of wounds. Dried flowers have astringent, stimulant, antidysentric styptic, constipating, antibacterial, febrifuge, uterine sedative effects (3). Bark has anthelmintic, uterine sedative, antidysentric, refrigerant properties.

Flowers have anthelmintic property. They boost appetite and used in premature ejaculation. It alleviates thirst; cleanse blood, positive effects in menorrhagia and haemorrhoids. It is recommended in stomach problems and pediatric diarrhea. It possesses curative property in burn healing wounds. It is used in leucorrhoea. Its fruit is used in indigestion, normalizes safraa (bile) and balgham (phlegm) (2).

ADVERSE EFFECT

It increases the phlegm production (3).

Corrective
Zingiber officinale,
Punica granatumjuice
Substitute
Pistaciavera
Important compounds
Safooe -sailan, Jawarishzanjabeel

TRADITIONAL USES

Flowers are astringent, anthelminthic, refrigerant, dessicative, haemostatic, improve wound healing etc. It is utilized to treat diarrhea, hemorrhoids and menorrhagia, etc. Sitz bath with the flower decoction is considered beneficial for the anus prolapse and leucorrhoea.

Bark is toxic, acrid, alexatric, bitter, cooling, antidysentric, anthelmintic, uterine sedative and beneficial for the leprosy, erysipelas, dysentery and blood disease treatments (2).

PHARMACOLOGICAL ACTIVITIES

W. fruticosa different parts are known for its several pharmacological activities.

ANTITUMOR ACTIVITY

Woodfordiafruticosa possesses antitumor activity. Its constituent woodfruticosin exhibited inhibitory effect against DNA topo-II compound. It has inhibitory effect on intracellular DNA synthesis. Moreover, Kuramochi-Motegi et al determined it's in vivo growth inhibitory activity (5). Nobotanin G and H, a macrocyclic dimer also possesses antitumor activities (6).

DNA INHIBITORY ACTIVITY

Woodfruticosin a cyclic dimeric hydrolyzable tannin showed inhibitory activity against deoxyribonucleic acid (DNA) topoisomerase II, (7).

IMMUNOMODULATORY ACTIVITY

Shah et al., assessed the effectiveness of W. fruticosa flowers extract prepared in ethanol in mice and in vitro immunomodulatory effect on peritoneal macrophage and on division of bone marrow cells, while in case of in vivo activity on tissues macrophages and cells of bone marrow. Result demonstrated substantial raise of myeloperoxidase, superoxide and nitric oxide lysosomal enzymes from macrophages beside with considerable raise in the phagocytic index in carbon clearance test showed extract's provoking action on the macrophages. The extract also showed 60% raise in bone marrow cell division and illustrate defense towards cyclophosphamide-induced myelosuppression (8).

ANTIOXIDANT ACTIVITIES

The methanol extract of the *Woodfordia fruticosa* flowers demonstrate

considerable hindrance and reverse of raised point of serum alanine aminotransferase, aspartate aminotransferase, lactate dehydrogenase, alkaline phosphatase, and tissue malondialdehyde levels in animals (9). *W. fruticosa* flowers extract with dissimilar polarity solvents; chloroform, methanol and petroleum ether also showed DPPH free radical scavenging activity (10).

ANTIPROLIFERATIVE ACTIVITY

Anand et al., evaluated the efficacy of flowers of *W. fruticosa* methanol extract on hepatocellular carcinoma by MTT assay. 5-flurouracil (5-fu) used as positive control. The extract possesses the potential chemo-preventive efficacy.

ANTIHYPERGLYCEMIC ACTIVITY

*W. fruticosa*flowers ethanol extract significantly lessen fasting blood glucose and the raised insulin level and also raised glutathione, catalase, peroxidase, glutathione reductase, glutathione peroxidase and superoxide dismutase actions considerably and reduced lipid peroxidation in the experimental animals (11).

Anti-INFLAMMATORY AND ANALGESIC PROPERTY

Methanol extract of flower of *Woodfordiafruticosa* holds anti-inflammatory potential causing considerable ($p<0.05$) reduction in paw volume in various models of the paw edema (12).

CYTOTOXIC ACTIVITY

The cytotoxic activity of Woodfordiafruticosa flowers methanol extract of was evaluated by artemia salinabioassay. The extract caused the 73% mortality of the brine shrimp larvae after 24 h at concentration 1000µg/ml (13).

ANTIMICROBIAL ACTIVITY

W. fruticosa showed considerable antibacterial activity against human pathogenic bacteria i.e. Salmonella typhimurium, Klebsiella pneumonia, Escherichia coli, Pseudomonas aeruginos, S. paratyphi A, Proteus mirabilis, S. typhi, Streptococcus faecalis, S. sonnei, S. flexneri, Staphylococcus aureus, and isolates of Salmonella paratyphi B, Shigella boydii., and Citrobacter sp.

HEPATOPROTECTIVE ACTIVITY

Woodfordiafruticosa flowers methanolic extract significantly reduced the raised levels of the alkaline phosphatase, as partate aminotransferase, serum alanine aminotransferase, and blood urea nitrogen and increased reduced total protein, albumin along with catalase, hepatic glutathione, glutathione peroxidase activity. The histopathological study suggested that extract reduced the liver fibrosis induced by the diclofenac (14).

ANTI-FERTILITY ACTIVITY

Various extract of dried flowers of *Woodfordiafruticosa* has been reported for the anti-fertility activity on female albino rats. The powder of the dried flowers was used to make ethanolic extract by extracting with benzene, petroleum ether, ethanol and chloroform and also extracted individually with 50% aqueous alcohol as well as water. The alcoholic, individual aqueous and individual hydroalcoholic extracts was studied in female albino rats for anti-fertility activity. The results showed that the aqueous and hydroalcoholic extracts hold moderate activity whereas alcoholic extract possess significant abortifacient property as differentiated to the control. Thus, the succeeding alcoholic extract has positive abortifacient property at 100 mg/kg
body weight.(15)

WOUND HEALING PROPERTY

A recent study indicated that oral administration of the ethanolic extract of dried W. fruticosa flowers show effective wound healing property(16)

ANTI-BACTERIAL ACTIVITY

The methanolic extract of Woodfordia fruticosa was used to check

antibacterial activity on both gram positive and gram-negative bacterial strains. The result proved that methanolic extract of Woodfordia fruticosa is more effective against gram positive bacteria as compared to gram negative bacteria (17).

ANTI-HELMINTHIC ACTIVITY

In 2013, Sengupta et al performed anthelminthic activity by using different concentration (50100µg/ml) of methanolic extract and ether petroleum extract of dried flowers of Woodfordia fruticosa against pheritimaposthuma earth worm which is closely resemble with roundworm present in human intestine. Piperazine citrate 10mg/ml and Albendazole 20mg/ml were used as a reference standard. Experiments showed that methanolic extract play significant role against Pheritimaposthuma as compared to petroleum ether extract (18,19).

CONCLUSION

In modern era, patients with serious diseases start their treatment with herbal medicines. The present review describes the important and safe therapeutic plant Woodfordia fruticosa. The review concluded that the plant has number of therapeutic effects including antibacterial, antitumor, antioxidant, antihyperglycemic and many more. Thus, it can be used to cure the different diseases including cancer, diabetes, different bacterial infections, to heal wounds and immunosuppressive diseases.

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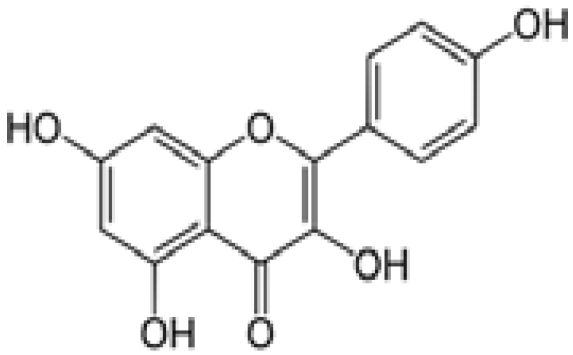
Figure 1: *Woodfordia fruticosa* Flowers, Leaves, Stem



Kaemferol