Podophyllum hexandrum Rayle syn P. emodi wall. ex Hook f. Thomas is an endangered and valuable medicinal plant, distributed in the lower elevation of Himalayan zone at an attitudes ranging from 2200-4200m above sea level. It is an herbaceous and rhizomatous perennial plant. Its rhizomes and roots contain 8% of podophyloresin and podophyllotoxin which has cytotoxic and antitumor properties and also used in the treatment of certain forms of cancer plants has also got importance in various traditional system of medicine because of its extensive therapeutic potential. Due to overuse of medicinal plant along with Podophyllum hexandrum going to decline. So it is essential to conserve all medicinal plants and taken precautionary measures for it.

Keywords: Podophyllum hexandrum, Mayapple, Podophyllotoxin, Medicinal plants.

I. INTRODUCTION

The term Podophyllum is derived from ancient Greek words ‘Podos’ a foot and ‘Phyllos’ a leaf. Name refers to the resemblance of leaves to duck’s foot. Plant is also known as Mayapple because of its fruits ripen in spring.

The Podophyllum is represented by three species P. hexandrum, P. Peltatum and P. Sikkimensis but Podophyllum generally represented by two species. P. hexandrum is commonly found in the Himalayan regions of the Asian continent and the Podophyllum Peltatum is commonly found in the Atlantic North America.

P. hexandrum is an important medicinal plant known for valuable drug Podophyllotoxin which has three semi synthetic derivatives etoposide, teniposide and etophos. Podophyllotoxin is most important for its use in the synthesis of anti-cancer drugs.

II. DISTRIBUTION

Podophyllum hexandrum is distributed from Indian Himalayas to Bhutan, Pakistan, Nepal, Taiwan and China. In India, it is grow in Himalayan region between 2400-4400m above sea level. In India it is commonly found in Uttarakhand, Assam, Arunachal Pradesh, Manipur and Jammu-Kashmir. In Himachal Pradesh, it is found sporadically in Rohru, Kangra, Chamba and Lahaul-Spiti. It is also present in the hilly areas of Tosh, Malana, Kheer Ganga and Rohtang regions of district Kullu.

MORPHOLOGY

Podophyllum hexandrum is an erect, glabrous, succulent herb 35-60cm tall with creeping, perennial, knotted rhizomes bearing numerous roots.
A. Leaves are rounded in outline and deeply cut into three ovate and length of leaves is approximately 10-20cm long.

B. The length of Stem is approximately 30-90cm. 2-3 umbrella like, lobed leaves arise on its few stiff branches, they completely unfurl after the plant has bloomed and dark green splotched with brown.

C. Flowers: Podophyllum hexandrum flowering period ranges from May to August and it produces white or pale pink flowers during this period flowers are borne at the ends of stout stem and flowers has six petals and six stamens, which inspired its species, name hexandrum meaning six stamens.

D. Fruit is n oblong, elliptic berry, 2.5cm to 5.0cm in diameter fruits is red on ripening and containing many seeds embedded in the red pulp.

Common Names: Podophyllum hexandrum has various local names in various languages.

- India : Bankakari, Giriparpat
- Nepal : Laghu Patra
- Pakistan : Kakhri
- Ayurveda : Bantrapushi

Constituents of Podophyllum Hexandrum: Podophyllum hexandrum contain a number of compounds with significant pharmacological properties. e.g., epipodophyllotoxin, Podophyllotoxin, aryltetrahydroraphthalene lignans, flavonoids such as quercetin-3-glycoside, podophyllotoxin glycoside, kaemperol and kaemperol-3-glucoside. Root of the plant has been reported to possess 56% Podophyllotoxin content. Podophyllotoxin was podophyllin by Podwyssotzki and was obtained in a pure state in 1880.

Podophyllotoxin is most important for its use in the synthesis of anti-cancer drugs etoposide teniposide and etophos. These compounds have been used for the treatment of lung and testicular cancers as well a certain leukemia’s.

The mechanism of the action of Podophyllum and its active constituents on tumors in completely understood. It has been found that the necrosis is a direct consequence of cytotoxic effect on tumor tissue, a rapidand marked reduction of the cytochorme oxidase was observed in tumor homogenates from animal treated with the Podophyllum derivates.

Pharmacological Activities: Methanolic, hydro-alcoholic and chloroform extracts of P. Hexandrum have been reported to render approximately 70-95% radioprotection in mice when administered 1-2 hours before lethal whole body, 10 Gy radiation (Goel et al., 2000; Goel et al., 2001; Goel et al., 2007) P. hexandrum contains podophyllin, which has antimiotic effect. It is used in the treatment of cancer, and especially in the treatment of ovarian cancer Howes, 2001; Board, 2003; Farkya et al., 2004). 4-demethyl-picropodophyllotoxin 7-O-D- glucopyranoside (4DPG) effectively inhibit the proliferation of cancer cells and blocked the cell cycle in the mitotic phase. The cytotoxicity of 4DPG is due to its inhibition of the microtubules assembly of cancer cells at a low concentration, thus including apoptosis. These properties qualify 4DPG to be a potential antitumor drug (Qi et al., 2005).

Podophyllotoxin is natural plant Secondary metabolites mainly existed in the root of P. hexandrum and as well as its congeners and derivatives has pronounced biological activity mainly anticancer, antineoplastic and anti HIV drugs, etc (Airi et al., 1997; Archana and Lakshmi, 2000; chen et al., 2007).

Deoxy podophyllotoxin is the main responsible compound for lethal activity on a number of different insect larvae e.g., culex pipiens, Epilachna spara and adult insects such as Blatella germanica.

III. ETHENOMEDICINAL USES

1) The Rhizome powder is used as a poultice to treat warts and tumorous growth on the skin.
2) P. hexandrum is used in the treatment of colds, constipation, septic wounds, burning sensation, erysipelas, mental disorders plague, allergic and inflammatory conditions of the skin, cancer of brain, bladder and lung, venereal warts, monocyctoid leukemia.

3) Root paste is applied on ulcers, cuts wounds and used to treat vaginal warts.

4) Fruits and decoction of grounded roots with sugar are eaten by Gaddis as medicine against constipation persisting for long also used for stomach problems in Animals.

5) Fruit of plant is edible but these must be eaten when fully ripe.

6) Podophyllum Peltatum rhizomes have a long medicinal history among native North American tribes who used a rhizome powder as a laxative or an agent that expels worms (anthelmintic).

IV. CONCULSION

P. hexandrum is an endangered but high value medicinal plant from temperature and cold climatic zone of world. It’s over exploitation poses serious threat toward its extinction. It is the need of the hour to save this highly important medicinal plant. If proper initiatives are not taken in time, there will not be a single P. hexandrum plant left in the temperate and cold climatic zone.

Scientists, conservationists, researchers, NGO’s and other bodies are urged to come forward and take step to protect this important medicinal plant. In situ and ex situ conservation method should be used to avoid the extinction of supreme plant species by protecting plants in their habitats and by cultivating them and again reestablish them in the natural environment.

BIBLIOGRAPHY


