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## The therapeutic uses of *Putranjiva roxburghii*: Review Article

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### Abstract

*Putranjiva roxburghii* wall (Putranjivaceae) commonly known as Putranjiva is an evergreen tree of the Euphorbiaceae family, found in tropical Asia. *Putranjiva roxburghii* is an evergreen tree with drooping branches, corky bark coriaceous leaves and dioeciously flowers. Plant parts such as leaves, bark, roots, flowers, fruits and seeds have an effect on living organisms; the bioactive components present in the plant can be utilized in a number of ways and play a significant role in our everyday life. Its bark is mainly used for making decorative items. The bark and the seeds are used as an antidote in the treatment of snake bites. The paste of seeds of *Putranjiva roxburghii* is applied on the forehead to check pain. Besides, seed paste can be used in the treatment of various diseases like elephantiasis, constipation, ophthalmic, semen disorders, infertility and diseases of the female genital. The leaves are used in treating illness, phlegm, skin ailment, aridity and are also helpful in curing rheumatism. The leaf extracts and bio-oil extracted from seeds are mostly utilized in Ayurveda, herbal and Unani medications. *Putranjiva roxburghii* possess anti-oxidant, antipyretic, and anti-inflammatory activities.

**Aim of the study:** *Putranjiva roxburghii*, Wall is herbal medicine is an ancient form of medicine that has been used *Putranjiva roxburghii*, Wall is a traditional herbal remedy that has been used by humans for thousands of years. The plant, seed, root bark, and leaves have various traditional medicinal values. The main aim of the study is to discuss about the various activities of *Putranjiva roxburghii*, Wall mentioned in Ayurvedic classic. The present paper focus on the beneficial role of Puranjevak drug in daily life of human beings.

**Keywords:** *Putranjiva roxburghii* wall, therapeutic, anti-oxidant, anti-inflammatory, aphrodisiac

### Introduction

*Putranjiva roxburghii*, Wall is a traditional herbal remedy that has been used by humans for thousands of years. It is a member of the family Putranjivaceae. *Putranjiva roxburghii* (*P. roxburghii*) has been described as an important plant in the Ayurvedic and Unani medicine system. Various parts of *Putranjiva roxburghii* are used for the treatment of different diseases. [1, 2] This plant is native to Southeast Asia the Indian Subcontinent, Japan, southern China, and New Guinea. It is widely grown all over Asia, particularly in Indochina, India, Nepal, Thailand, Bangladesh, Indochina, Myanmar and Sri Lanka [3]. It is known as “Putranjiv” in Bangladesh and putrajeevak in India. “Pootranjeeva” pootra means a son and jeeva means life. Its English name in India is child life tree. Other popular names of *Putranjiva roxburghii* are Kudrajuvi, Patravanti, Jivputrak and Nageia. In Sanskrit it is termed as Jivanputra, Putranjiva, Kumarajiva, Mava, Pavitra and Putrajiva and Karupali or Irukolli in siddha system of medicine.

*Putranjiva roxburghii* is an evergreen tree and grows to a height of 18m and a girth of 2m. The bark is a shiny grey and dark green, leaves are 5-10cm long. Male flowers are yellowish, small and dense and in rounded clusters but female flowers are solitary [4].

Medicinal plants play a vital role in the development of human culture around the world. Herbal medicines reduce the use of chemical remedies because they possesses low side effects [5]. Most frequently recorded folk remedy claims of *Putranjiva roxburghii*, Wall mentioned that the plant leaf, bark, seed, and nuts are medicinally useful. *Putranjiva roxburghii* (child life tree) has been the center of controversy because of its misleading nomenclature of the ability

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to be get a male child. A concept behind this was an alteration in the sex of the baby post-conceptionally.

It is reported to be effective for infertility, fever and liver diseases. *Putranjiva roxburghii* attributes anthelmintic, anticancer, anti-inflammatory, antioxidant, aphrodisiac, diuretic and laxative. Leaves and seed paste are used to treat burning sensation, filarial, inflammatory and eye diseases [6].

The methanol extract obtained from the seeds of *Putranjiva roxburghii* was investigated in order to screen the treatment role of the plant against some deadly diseases like cancer and it also shown some cyclotoxic properties. *Putranjiva roxburghii* leaves are reported to have more medicinal values. Plant seeds have potentially consumable activities like RNase, DNase, anti-fungal and ex-vivo translational repressive nature [7].

The methanolic extract of seeds of *Putranjiva roxburghii* found to cause paralysis and death of worms in a relatively short period of time as compared to standard drugs. The used seed powder of *Putranjiva roxburghii* there was a significant increase in the sexual desire, penile erection, penile rigidity, ejaculation time, orgasm score, duration of sexual act and frequency of sexual act in the trial drug administered group, but the trial drug showed no adverse effect on biochemical and hematological values [1]. There are various secondary metabolites and bio-molecules that have been isolated from different vegetal parts of this species and their structures were determined. The main constituents (Terpenoids compounds mustard oils Flavonoids and glycosides) and it's Therapeutic Uses of the *Putranjiva roxburghii* species are described in this paper [8].

### Taxonomy of *Putranjiva roxburghii*

*Putranjiva* is a famous tree usually 12 m in height grows on alluvial soil along the rivers, or in swamps or evergreen forests [1]. The branches of the tree are generally pendulous; sprigs are cylindrical and tapering with brown color, slim and flossy [7] (Fig 1).



**Fig 1:** Plant of *Putranjiva roxburghii*

Leaves are simple, alternately arranged, dark green, shiny, with leaf stalk is of 0.2 to 0.3 inch long, lean glossy; plates of

2x21 inch, ovoid and elongated in shape, the apex is a little sharp, base sloping, dense tip, Jagged like a saw with teeth pointing toward the apex, smooth, dusky, green, smooth, dusky green coriaceous (Fig. 2).

*Putranjiva* Flowers have only one type of sexual organ; not hermaphroditic [9]. The fruits of *Putranjiva* trees are rounded or ellipsoid, and drupes with a single seed of 1.18 inches, A small stalk bearing a single flower of an inflorescence 0.2-1 inch long [10] (Fig3).



**Fig 2:** Leaves of *Putranjiva roxburghii*

### Utilization of *Putranjiva roxburghii*

*Putranjiva roxburghii*, Wall is one of the important plant species for human beings, the plant parts such as bark, leaves, fruits and seeds are used as a folk remedy. The medicinal and therapeutic property of different parts of *Putranjiva roxburghii* is discussed here under.

#### Bark

A ray of studies has suggested that *Putranjiva roxburghii* is an excellent source of photochemical including steroids and triterpenoids [11, 12]. Besides, hydroxy ketone (putranjivanonol) hydroxyl acid (puranic acid), friedelin and putranjiva dione were isolated from the trunk bark of *Putranjiva roxburghii* [1]. The detailed phytochemical analysis of the bark reveals that it contains adequate amount of tannins, saponins, steroids and terpenoids, which shows tremendous pharmacological potential of further studies.

The main components of the root bark were triterpenoids, friedelin, putranjivadione, roxburgholone, methyl putrate and saponins derived from oleanolic acid [13]. Chemical investigation of the bark of stem and leaves of *Putranjiva* glycosides, glucoputranjivin, glucocochlearin, glucojiaputin and glucocleomin. The seed coat yields putranjivoside,  $\beta$ -sitosterol triterpene saponins, and its glucoside, saponins and pyranosides A-D [9].

#### Leaves

The leaves of *Putranjiva roxburghii*, Wall are reported to have good medicinal values, may be due to the presence of various phytochemicals. The ethanolic extract of *Putranjiva roxburghii* has valuable effects in reducing the blood glucose levels, stem bark as the extracts may have an extraordinary medicinal or commercial value within these traditionally used for medicinal purpose. Fresh juice of leaves of *Putranjiva roxburghii* is given in a dose of 10-15 ml to treat

elephantiasis. The leaves of the plant can be used for, the curing of diseases leukorrhea, infertility, menstrual problems, and also used for female genital systems. The use of Putrajeevak has been associated with many beliefs and practices. It is said to increase fertility in women, it aids and facilitates [14]. The leaf of the plant contains mainly anthracene, cardiac and flavonoid glycosides along with phenolic compounds. Rajagopal, *et al.* reported that ethanolic extract of *P. roxburghii* leaves contains concentration-dependent anti-inflammatory activity, adding that anti-inflammatory potential of ethanolic extract is because of steroids and flavonoids presence in the extract [1, 14]. In Ayurvedic texts it was reported for its antipyretic, anti-inflammatory & anti rheumatic and fertility ailments properties. Its preliminary phytochemical profiling showed the presence of glycosides, saponins, triterpenes and flavonoids.

### Fruit

Powered (de-seeded) fruits are used against cough, cold and sprue. Rosaries of hard stones are used for protecting children from infections. Due to misleading nomenclature, the “conception-promoting” property has been attributed to the drug in folk medicine. Its use is possible in vaginal infections and genitourinary diseases, or skin eruptions during pre-conception stag [15]. The fruit pulp contains a large quantity of mannitol, a saponin glucoside and an alkaloid, while the seeds contain fatty oil, while its dried fruits are used in a garland to cure skin allergies and itching and fruits are worn in the form of a necklace by pregnant women to prevent miscarriage [1, 10].



**Fig 3:** Fruit of *Putranjiva roxburghii*

### Seeds

The seeds are sweet, acrid, refrigerant, laxative, anti-inflammatory, aphrodisiac, and diuretic [10]. The seed of this plant is a good source of well stable and potent trypsin inhibitor [5]. The seed paste is useful against headaches and powdered seed is used for knee pain. A glycosidic pattern similar to that in the seed is reported in the shoots and roots [1]. The seeds of its fruits are strung together to form rosaries and used as a necklace to protect children from diseases and persons suffering from acute cough and cold. Seeds are orally consumed in the powder form for various diseases like elephantiasis, constipation, dysuria, ophthalmic, aphrodisiac, and semen disorders [8]. The seeds of Putranjivaka is made into a paste and applied as collyrium to treat eye diseases. The seed coat of *Putranjiva roxburghii* was examined and a triterpenoid saponin named putranjivoside and two sterol

components  $\beta$ sitosterol and its glucoside,  $\beta$ -D-glucoside were isolated [16].

*Putranjiva roxburghii* seeds are mainly used for the extraction of oil. The seed oil was found to be the highest for n-Hexane, a non-polar solvent. The oil from *Putranjiva roxburghii* (Putrajeevak) seeds extracted using the super-critical fluid extraction process was analyzed for its constituent fatty acids and sterols. The Putrajeeva oil was used for assessing its properties in reversing the fertility impairment. Presence of chemical compounds like phenols, alkaloids, saponins, steroids, flavonoids and glycosides in the seeds of *Putranjiva roxburghii*. Such type of active phytochemical compounds in the plant indicate its efficient protection and treatment roles against various diseases including cancer. The methanolic extract of the seeds of *Putranjiva roxburghii* indicated cytotoxicity due to the presence of chemical compounds [2]. The seeds are consumed but not much is known about the fatty acids and other constituents of the oil present in the seeds. First time that the fatty acids and phytosterol constituents of *Putranjiva roxburghii* seeds were extracted and identified [17]. Paste of seeds of *Putranjiva roxburghii* applied on forehead to check pain. The seeds of this plant species are given daily for one month to women for conception [18].

### Conclusions

*Putranjiva roxburghii* plants belong to the family euphorbiaceae that are cultivated in mostly Asian tropical regions. The plant can be utilized in a number of ways but is still unnoticed as the likes of some famous plant materials like Eucalyptus, Jatropha etc. The detailed pharmacognosy and pharmacological evaluation of *Putranjiva roxburghii* revealed the presence of many active compounds which could be responsible for its various therapeutic and medicinal properties. The discussion among the scientific community is required more to ascertain the quality of the *Putranjiva roxburghii* tree parts.

### Conflict of interest statement

We declare that we have no conflict of interest.

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