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Review Article

PUTRANJIVA- A HERB FOR *PUMSAVANA* (MALE PROGENY FACILITATOR)?

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ABSTRACT

Indian Community is obsessed to have at least one male child since ancient time. *Pumsavana karma* is a procedure performed in ancient India for achieving a progeny of desired sex. In the *Samhitas* herbs like *Lakshmana*, *Vatasunga*, *Gouradanda apamarga*, *Jeevaka*, *Rshabhaka*, *Sairyeyaka* are mentioned in various modalities for performing *Pumsavana karma*. Recently it has become a topic of discussion about *Putrnjivas* role in begetting male child. This review discusses the various activities of *Putranjiva* mentioned in the Ayurvedic classics, the reported modern scientific validations and attempted to focus about the role of the drug in *Pumsavana* procedure. *Putranjiva* has been experimentally evaluated for anti-inflammatory, antipyretic, antinociceptive, antioxidant, aphrodisiac, antimicrobial, hypoglycemic, and cytotoxic activites. Ayurvedic classics have not described male progeny promoting activity of *Putranjiva*, while ethno medicinal practices reported the usage of *Putranjiva* for begetting male child.

Key words: *Putrnjiva roxburghii*, *Pumsavana karma*, Male progeny.

INTRODUCTION

Putranjiva is a small genus of trees distributed in the Indo-Malaysian region. The species commonly seen in India is *Putranjiva roxburghii* Wall which is known as child's amulet tree or child-life tree. *Putranjiva roxburghii* has been the centre of controversy owing to its misleading nomenclature and alleged ability of begetting male child. A concept of changing the sex of a baby post-conceptionally has been documented in ancient Ayurvedic texts. *Pumsavana* is one of the *Shodasha Karmas* (Sixteen rituals) performed in ancient India for begetting the desired progeny. In the Samhithas certain herbs and methods are mentioned for *Pumsavana* karma. Keeping the controversies aside, the medicinal and pharmacological activities reported must be analyzed to confirm about *Putranjivas* activity with regard to male progeny.

MATERIALS AND METHODS

The information related to *Putranjiva roxburghii* described in various Ayurvedic texts (treatises and lexicons), journals, and related websites were consulted to compile and analyze the specific information about the plant.

History and Description of the plant

There is no reference regarding the drug *Putanjivaka* in the Vedas, the foremost ever written document of knowledge. In *Agnipurana Putranjivaka* is mentioned along with a number of drugs, which are advised under *Vajikarana* therapy along with milk and honey, and can also be used locally in the form of *Varti*, *Lepa* etc. In *Charakasamhita* no references regarding *Putranjiva* is traced out, but a drug *Kumarajiva* is mentioned under *Supyasakhavarga*[1]. Two references regarding *Putranjivaka* were traced in *Susrutasamhitha*, one in *Sleepada chikitsa* adhyaya and the other in *Revati pratishedha* chikitsa[2]. There is no reference regarding *Putranjiva* in *Dhanwantari nighantu* and Sodhala nighantu. References about *Putranjiva* are found in the later *Nighantus* like *Madanapalanighantu* (MPN, *Kaiyadevanighantu* (KN), *Rajnighantu* (RN), *Shaligramanighantu* (SGN) *Bhavaprakasanighantu* (BPN), and *Aushadhinighantu* (AN). The drug possess *Madhura*, *Katu, Lavana rasa* and *Seeta veerya*[3]

Table I: Categorization of *Putranjiva* in Various *Nighantus*

S. No.	*Nighantu*	*Varga*
1	*Madanapalanighantu*	*Abhayadivarga*[4]
2	*Kaiyadevanighantu*	*Aushadhivarga*[5]
3	*Rajanighantu*	*Satahvadivarga*[6]
4	*Saligramanighantu*	*Vatadivarga*[7]
5	*Bhavaprakashanighantu*	*Vatadivarga*[8]

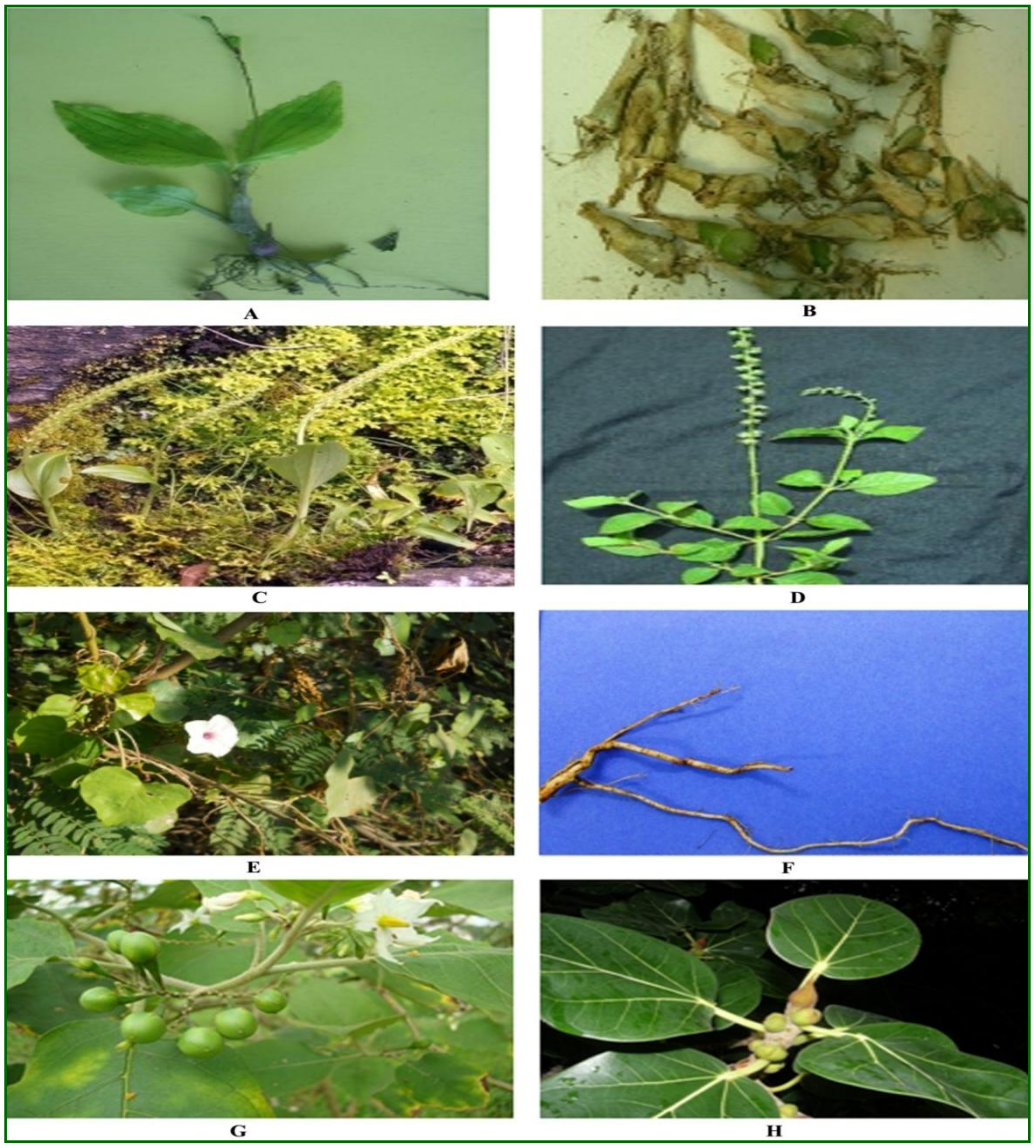

Figure I: Herbs mentioned for *Pumsavanakarma* in the *Samhithas*

Figure: I – Herbs mentioned for *Pumsavanakarma* in the *Samhithas*

Most of the drugs mentioned for *Pumsavana Karma* are either controversial or unidentified.

A&B : *Microstylis wallichii* Lindl with its rhizome (*Jeevaka*)

C : *Microstyllis mucifera* Ridley (*Rshabhaka*)

D : *Pupalia lappacea* Moq (*Gouradanda apamarga*)

E&F : *Ipomea sepiaria* Koen with its root (*Lakshmana*)

G : *Solanum torvum* Swartz. (*Sveta brihati*)

H : *Ficus benghalensis* Linn. (*Vatasunga*)

(Ref. Thakur Balwant Singh, Glossary of Vegetable drugs in Brhattrayi, Choukhambha Amarabharati Prakashan, Varanasi)

Putranjiva is a mostly dioecious, evergreen tree, growing up to 18 m in height belonging to Euphorbiaceae family. It has pendant branches and dark grey bark having horizontal lenticels. Leaves are simple, alternately arranged, dark green, shiny, elliptic-oblong, distantly serrated. Male flowers, with short stalks, in rounded axillary clusters, female flowers 1-3 in leaf axil. Fruits ellipsoid or rounded drupes, white velvety; seed normally one, stone pointed, rugose, very hard. The tree usually grows on alluvial soil along the rivers, or in swamps or evergreen forests and is sometimes gregarious. Natural reproduction takes place through seeds during the rainy season[9].

Chemical Constitution of *Putranjiva Roxburghii*

The seed kernel on steam distillation yield 0. 5% of a sharp-smelling essential oil of the mustard oil type. The oil contains isopropyl and 2-butyl isothio- cyanates as the main constituents and 2-methyl-butyl isothiocyanate as a minor component. The iso-thiocyanates are produced on enzymic hydrolysis of glycosidic progenitors present in the kernels, viz. glucoputranjivin, gluco-cochlearin and glucojiaputin respectively. An additional glucoside, gluco- cleomin has been identified in the seed kernel, it affords a non-volatile mustard oil, cleomin. A glycosidic pattern similar to that in the seed is reported in the shoots and roots. The fruit pulp contains a large proportion of mannitol and small quantities of saponin glucosides and alkaloids. The seed coat gave putranjivoside, putranoside A, B, C and D, beta- sitosterol and tis beta-D-glucoside. The leaves gave amentoflavone and its derivatives, beta-amyrin and its palmite, polyphenols, putranjiva saponin A,B,C, and D and stigmasterol. The bark contains friedelin, friede- lanol, friedelanone, friedelan-3,7-di- one (putranjivadione), 3-alpha-hydro-xy friedelan-7-one (roxburgholone), carboxylic acid, putric acid, putran- jivic acid[9].

Table:II Karmas(Activities) attributed to *Putranjivaka* in Various *Nighantu*

Karma	MPN[4].	KN[5].	RN[6].	SGN[7].	BPN[8].
Vrishya (Aphrodisiac)	✓	✓		✓	✓
Vishtambhi (Bowel binding)		✓			
Srastamutramala (Evacuation of urine and feces)		✓		✓	✓
Garbhaprad (Fertility promoter)	✓	✓	✓	✓	✓
Sramahara (Antifatigue)			✓		
Chakshushya (Eye tonic)				✓	
Trishnanivaran (Thirst suppressant)				✓	

Ethno medicinal claims of *Putranjiva roxburghii*

- Nuts are taken orally by women (Sterile) in villages near Renuka forest division in Himachal to effect conception and attributed with the birth of a male child[10].
- In Bangladesh the leaves and fruits are used as medicine for Rheumatism[11].
- Leaves and seeds are given in decoction for cold and fever.
- In Bihar, Crushed leaves are reported to be applied to swollen throats of cattle[12].
- In Vidarbha region leaf is used to treat viral fever[13].
- In Bijnor district of Uttar Pradesh a decoction of the leaves, fruits and seeds of fruits is used in cold and fever and its seeds are used as anitdysenteric[14].

Pharmacological activities

Antinociceptive activity

The effects of the ether extract from the leaves of *Putranjiva roxburghii* were assessed on nociceptive responses in mice by using writhing, hot plate, and formalin tests. The ether extract (100, 200, and 400 mg/kg, p.o.) of P. *roxburghii* dose-dependently produced analgesic activity in acetic acid-induced writhing in mice. The extract had no significant effect in the hot plate test in mice. At the dose of 400 mg/kg, the extract significantly suppressed the licking activity in the late phase of the formalin test in mice[15].

Antipyretic activity

The ether extract from the leaves of *Putranjiva roxburghii* has shown antipyretic activity in yeast-induced fever in experimental rats[15].

Anti-inflammatory activity

The ether extract from the leaves of *Putranjiva roxburghii* exhibited moderate inhibitory activity of inflammation in carrageenin-induced paw oedema in rats. The extract inhibited croton oil-induced ear oedema in a dose-dependent manner (1. 25, 2. 5, and 5. 0 mg/ear) in mice. The extract decreased anus oedema induced

by croton oil at the high dose of 800 mg/kg in rats[15].

Antioxidant activity

The ethanolic extract of the leaf was analyzed for antioxidant activity by DPPH method at different concentrations. The antioxidant activity was found to be concentration dependent and may be attributed to the presence of high flavonoid content in the leaves of *Putranjiva roxburghii*[16].

Hypoglycemic activity

The hypoglycemic activity of ethanol extracts of leaves of *Putranjiva roxburghii* was assessed in albino rats. Diabetes was induced in albino rat models with alloxan monohydrate. The drug has shown significant antihyperglycemic effect in experimental model of diabetes mellitus[17].

Cytotoxic activity

A study was designed to investigate the cytotoxicity of methanol extract of seeds of *Putranjiva roxburghii*. The extract showed cytotoxicity with LC50 of 427. 74µg/ml in brine shrimp lethality assay[18].

Larvicidal, Anthelmintic and Antimicrobial activity

The larvicidal, anthelmintic and antimicrobial potential of methanolic extract of seeds of *Putranjiva roxburghii* was studied in vitro. A marked antibacterial activity against Gram positive and Gram negative bacteria was observed. Gram positive bacteria were more inhibited than Gram negative bacteria. Among fungi tested, *Aspergillus flavus* was found to be more susceptible followed by *Aspergillus niger* and *Aspergillus nidulans*. The extract was found to cause paralysis and death of worms in a relatively short period of time as compared to standard drug. A dose dependent larvicidal activity was observed. Extract at concentrations 2. 5 and 5mg/ml caused 100% larval mortality[19].

Aphrodisiac activity

An experimental study was carried out to find out the aphrodisiac (Sexual behavior) and spermatogenesis enhancement activity of the seed powder of *Putranjiva roxburghii* in Charles Foster strain male albino rats & male albino mice. The test drug has shown aphrodisiac and sperm count enhancing property in a moderate scale[20].

Clinical study

A clinical study was conducted to assess the *Vrishya karma* of the 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. The trial drug showed no adverse effect on biochemical and haematological values. There was a significant decrease in immotile and abnormal spermatozoa in the trial drug administered group[20].

DISCUSSION

Most of the Nighantukaras attributed *Vrishya* and *Garbhakara* karmas to the plant *Putranjiva*. *Rajanighantukara* uses the synonyms like, *Prajada*, *Putrada*, *Apatyada*, *garbhadatri* for *Putrajivaka*. Due to its nomenclature, the "conception-promoting" property has been attributed to the drug in folk medicine. Various ethno medicinal surveys also project the use of *Putranjiva* as a conception promoting and male progeny promising drug. *Pumsavana* is often misinterpreted as a process for begetting a male progeny. *Acharya Vaghbhata* mentions the use of errhine therapy with *Svetabrihatimoola* (a *Pumsavana karma*) in the right nostril for begetting a male baby and left nostril for female baby. Infact it is a procedure adopted during second and third month of pregnancy to get the desired (male or female) child, while commentators suggest to administer before the commencement of second month. So *Pumsavanakarma* is a procedure to be adopted for achieving progeny of desired sex. It should be done after conception but before organogenesis.

An early embryo has the potential to follow either the male or the female pattern of development because it contains both sets of ducts and primitive gonads that can differentiate into either testis or ovaries. Up to the beginning of the seventh week, male and female embryos appear morphologically identical. In both sexes, germ cells and sex cords are present in the cortical and medullary regions of the undifferentiated gonad, and complete mesonephric and paramesonephric ducts lie side by side. At fertilization, by inheritance of either an X or a Y chromosome from paternal side the sex of a child is decided. These differences begin to unfold during foetal development, when the Y-chromosomal SrY ('sex-determining region Y') gene is activated in males and acts as a switch that

diverts the fate of the undifferentiated gonadal primordia, the genital ridges, towards testis development. This sex-determining event sets in train a cascade of morphological changes, gene regulation, and molecular interactions that directs the differentiation of male characteristics. If this does not occur, alternative molecular cascades and cellular events drive the genital ridges toward ovary development. Once testis or ovary differentiation has occurred, one's sexual fate is further sealed through the action of sex-specific gonadal hormones[21]. It has been clearly mentioned by *Susruta* as predominance of *Sukra* makes the foetus to be a male, predominance of *Artava* makes the foetus to be a female and when both these are equal, it makes the foetus to be a eunuch.

Herbs like *Lakshmana*, *Vatasunga*, *Gouradanda Apamarga*, *Jeevaka*, *Rshabhaka*, *Sairyeyaka* are mentioned in various modalities for performing *Pumsavana Karma* (Fig. I). A thorough review of the *Ayurvedic* classical literature shows that ***Putranjiva* is no where mentioned for *Pumsavana karma***. Very few references are available about *Putranjiva* in the *Samhitas* which shows that it was not a widely used herb during that period. A survey was conducted in North India to determine the use pattern of sex determining drugs in 2003 which revealed that 45. 5% women were aware of sex selection drugs and used them for having a male baby. The drugs used were *Shivalingi* (*Bryonia laciniosa*) and *Majuphal* (*Quercus infectoria*)[22]. This survey shows that such practices are still going on in India. These claims require a proper scientific scrutiny.

Evidence based scientific data are not available on the usefulness of *Pumsavana karma* in determining the sex of a fetus. This is an area which needs systematic scientific researches that can result in revolutionary changes in the field of genetic engineering. The drug *Putranjiva* is reported for its antioxidant, anti-inflammatory, antipyretic, hypoglycemic and aphrodisiac activities. There are ethno medicinal claims which support the use of *Putranjiva* as a sex selection drug. But no scientific evidences are available about the utility of *Putranjiva roxburghii* as a conception promoting and male progeny promising drug.

CONCLUSION

There are several ethno medicinal claims which later on led to novel drug discovery and still so many practices in Ayurvedic system remain scientifically unexplored. Comprehensive scientific researches are needed to peel back the mystery and understand them. Ayurvedic classics have not described male progeny promoting activity of *Putranjiva*, while ethno medicinal practices reported the usage of *Putranjiva* for begetting male child. So far no evidence based studies carried out about the drugs suggested for *Pumsavana* (male progeny facilitator) of both classical as well as ethno medicinal herbal claims.

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