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Comparative phytochemical screening of Vatashunga, Shatavari and Shatapushpa claimed for *Prajasthapana* activity

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ABSTRACT

The aim of the present study was to find out phytochemicals present in various extracts of Ficus bengalensis, Anethum sowa and Asparagus racemosus. The plant material was successively extracted with five solvents namely petroleum ether, benzene, chloroform, ethyl alcohol and distilled water in a soxhlet extractor. TLC profiling was done for various extracts using different mobile phases and R_f values were calculated for respective extracts. Ficus, Anethum and Asparagus showed the presence of steroids/ triterpenoids, carbohydrates and lactones. Ficus and Anethum indicate the presence of flavonoids, tannins and resins. Ficus and Asparagus indicate the presence of saponins while Asparagus indicates the presence of alkaloids. This study revealed various attributes for three drugs to act as prajasthapana either through rajo rodhahara, deepana pachana, rasavardhana or garbhashaya shodhaka. All the drugs showed the presence of steroids/ triterpenoids which play a major role in functional deviations responsible for infertility. In conclusion, the presence of steroids in three drugs along with other phytochemicals, plays a possible synergistic role, are important for fertility. Future prospects especially in case of vata include study of tip of prop roots and clinical studies on these plants and their formulations.

INTRODUCTION

Nature always stands as a golden mark to exemplify the outstanding phenomenon of symbiosis. The biotic and abiotic elements of nature are all interdependent. The quest for long, healthy and happy life is as old as man himself. Nature has provided a complete storehouse of remedies to relieve the ailments of mankind. The consistent effects have resulted in many effective means of ensuring health care.

The seers of Ayurveda were able to understand and record the various aspects regarding the drugs that even today are difficult to understand with modern available parameters [1, 2]. A single drug is attributed to posses multiple activities and many drugs to have single similar activity. Examples of one drug possessing many activities are [3]:

a. Amalaki: *Tridosha hara, Swethapradarahara, Rasayana.*
b. Vasa: Kasa, Shwasa, Rakthapittahara.
c. Harithaki: *Jwaragna, Chakshushya, Mrudurechaka, Kushtagna*.
d. Eranda: *Vathahara, Shoolapashamana, Virechana, Shothagana*.

Examples for many drugs possess single activity are:
a. Guduchi, Vathsanabha, Kirathahtiktha- *Jwaragna.*
b. Ashwagandha, Shatavari, Pippali- *Rasayana*.
c. Brahmi, Shankhapushpi, Vacha- *Medhya.*
d. Kanthkari, Taleesa, Tulasi- *Kasa*.

These drugs when chemically analyzed will apparently show some phytochemicals which are responsible for the activity. Thus, it becomes essential to assess the component/s or the cumulative effect of all the components or in combination for the particular therapeutic effect.

Similarly, the management of female sterility would need manifold therapeutic activities namely [4, 5]:

- *Garbhashaya uttejaka*- Uterine stimulants
- *Garbhashaya balya*- Uterine tonics
- *Garbhashaya shodhaka*- Uterine cleansers
- *Garbhadharaka*- Ensures fertilization
- *Arthavajanaka*- Emmenagogue
- *Arthavadoshahara*- Rectifies any pathology of altered menstruation.
- *Raktha sthambaka* or *shonitha sthapana*- Haemostatics.
- *Prajasthapana*- Ensures progeny action.

About 40 drugs have been attributed with the action of *prajasthapana* activity of which vata (*F. bengalensis*), shathapushpa (*A. sowa*), and shatavari (*A. racemosus*) are highlighted by various Acharyas [6]. The aim of present study was to perform phytochemical screening of vatashunga, shatavari and shathapushpa for *prajasthapana* activity and to find out similarities and dissimilarities in the phytoconstituents by TLC.

Details, Collection and identification of plant material

The following plants were freshly collected from field in the month of July 2010 and were used for preliminary phytochemical analysis after extraction with suitable solvent.

1. *Ficus bengalensis* L.: *Ficus* is a large green tree 20 to 30 feet in height usually growing on rocky ravines. It has antibacterial and antifungal activity [7]. The leaf buds were collected from Mysore University pavilion grounds and Manasagangotri campus. The leaf buds were cut first at the base mark and dried in bright sunlight for one day. Later the plant material was dried in

shade for 5 days and before using for extraction the buds were kept in hot air oven at 45°C, 20 hours for complete loss of moisture. The leaf buds were removed and immediately made into powder in an electronic device and stored in airtight containers till further use.

2. *Asparagus racemosus*: The roots were collected from Mysore. The roots were cut into small pieces and dried in bright sunlight for 6 hours. Then further dried for 16 days. Before using for further use it was kept in incubator for 20hours, 45°C for complete loss of moisture, so that it could be crushed up easily. It was removed and immediately made into coarse powder with the help of electronic device and stored in air tight container till further use.

3. *Anethum sowa: Anethum sowa* fruits were procured from local trader, M/s Oxon Life Care, Kalyana Nagar, Banglore. The fruits were cut into small pieces and dried in bright sunlight for 6 hours. Before using for further use it was kept in incubator for 20hours, 45°C for complete loss of moisture, so that it could be crushed up easily. It was removed and immediately made into coarse powder with the help of electronic device and stored in air tight container till further use.
Regional Research Institute, Bangalore, established the authenticity of plant material.

Method of extraction

The coarsely powdered crude drugs, leaf buds of *Ficus bengalensis* L., roots of *Asparagus racemosus* and fruits of *Anethum sowa*, were successively extracted with five solvents namely petroleum ether, benzene, chloroform, ethyl alcohol and distilled water in a soxhlet extractor. The complete extraction was confirmed by taking (about 5 ml) the solvent from the thimble and evaporated to check for the absence of residue and solvent in siphon was colorless. The powder was completely dried before proceeding to the next solvent. The extracts were concentrated using Rotary evaporator under reduced pressure below 40°C for each solvent. The obtained mass for each crude drug was weighed and kept in vacuum desiccators till further use.

Preliminary phytochemical screening

A systematic and complete study of crude drugs includes a complete investigation of both primary and secondary metabolites derived from plant metabolism. Different qualitative test were performed for establishing profiles of various extracts for their nature of chemical composition. The extracts obtained were subjected to following chemical tests for identification of various phytoconstituents as per the methods given by Harborne [8]. There were no previously isolated compounds.

1. **Test for Sterols** [9]

Different extracts/ fractions were dissolved in chloroform, filtered and the filtrate was tested for sterols and triterpenes.

a. **Salkowski test:** Few drops of concentrated sulphuric acid was added to the chloroform solution, shaken and allowed to stand, appearance of red color in lower layer indicates the presence of sterols.

b. **Liebermann-Burchard test:** To the chloroform solution, few drops of acetic anhydride was added and mixed well. 1 mL of concentrated sulphuric acid was added from the sides of the test tube, appearance of reddish brown ring indicates the presence of sterols.

2. **Test for Tri-terpenes** [10]
a. **Salkowski test:** Few drops of concentrated sulphuric acid was added to the chloroform solution, shaken and allowed to stand, appearance of golden yellow color indicates the presence of triterpenes.
b. **Liebermann-Burchard test:** To the chloroform solution, few drops of acetic anhydride was added and mixed well. 1 mL of concentrated sulphuric acid was added from the sides of the test tube, appearance of deep red color indicates the presence of triterpenes.

3. **Test for Saponins** [10, 11]
a. **Foam test:** Small amount of extract/ fraction was shaken with little quantity of water, if foam produced persists for 10 minutes; it indicates the presence of saponins.
b. **Haemolysis test:** To 2 mL of 1.8% sodium chloride solution in two test tubes, 2 mL distilled water was added to one of the test tube and to other 2 mL of 1% sample extract/ fraction was added. 5 drops of blood was added to each test tube and gently mixed the contents. Haemolysis was observed under the microscope on glass slide, indicates the presence of saponins in the extract.
c. **Froth test:** To 5 mL of extract of the drug added a drop of sodium bicarbonate solution. Shaken the mixture vigorously and left for 3 minutes. Honey comb like froth is formed.

4. **Test for Alkaloids**: The various extract/ fractions were basified with ammonia and extracted with chloroform. The chloroform solution was acidified with dilute hydrochloric acid. The acid layer was used for testing the alkaloids.
a. **Wagner's test** (Iodine in Potassium iodide): The acid layer was treated with few drops of Wagner's reagent. Formation of reddish brown precipitate indicates the presence of alkaloids.
b. **Mayer's test** (Potassium Mercuric Iodine solution): The acid layer was treated with few drops of Mayer's reagent. Formation of creamy white precipitate indicates the presence of alkaloids.
c. **Dragendorff's reagent** (Potassium Bismuth Iodide): The acid layer was treated with few drops of Dragendorff's reagent. Formation of reddish brown precipitate indicates the presence of alkaloids.
d. **Hager's test**: The acid layer was treated with few drops of Hager's reagent. Formation of yellow precipitate indicates the presence of alkaloids [11].

5. **Test for Carbohydrates:** Small amount of extracts/ fractions were dissolved in little quantity of distilled water and filtered separately. The filtrates were used to test presence of carbohydrates.
a. **Molisch's test:** The extract was treated with Molisch reagent and concentrated sulphuric acid was added from the sides of the test tube to form a layer. A reddish violet ring shows the presence of carbohydrates.
b. **Fehling's test:** Filtrates were hydrolyzed with dilute hydrochloric acid, neutralized with alkali and heated with equal amount of Fehling's A and B solutions. Formation of green to yellow to red precipitate indicated the presence of reducing sugars.
c. Barfoed's test: To the filtrate few drops of Barfoed's reagent was added and boiled in water bath. Brick red precipitate formation shows the presence of carbohydrates.

d. Benedict's test: to the filtrate added 2 mL Benedict's reagentand boiled in water bath. Green reddish brown precipitate is formed.

6. **Test for Tannins** [12]
a. **Ferric chloride test:** To extracts a few drops of 1% neutral ferric chloride solution was added, formation of blackish blue color indicates the presence of tannins.
b. **Gelatin test:** To the extracts added 1% solution of gelatin containing 10% sodium chloride. Formation of white precipitate indicates the presence of tannins.

7. **Test for Flavonoids** [13, 14]
a. **Shinoda test:** To the alcoholic solution of extract a few fragments of magnesium ribbon and concentrated hydrochloric acid was added. Appearance of red to pink color after few minutes indicates the presence of Flavonoids.
b. **Ferric chloride test:** Few drops of neutral ferric chloride solution were added to little quantity of alcoholic extract. Formation of blackish green color indicates the presence of phenolic nucleus.
c. **Lead acetate test:** To the extract, a few drops of aqueous basic lead acetate solution were added. Formation of yellow precipitate indicates presence of flavonoids.
d. **Zinc-hydrochloric acid reduction test:** The alcoholic solution was treated with a pinch of zinc dust and few drops of concentrated hydrochloric acid. Formation of magenta color after few minutes indicates the presence of flavonoids.
e. **Alkaline reagent test/ NaOH test:** To alcoholic solution added few drops of sodium hydroxide solution. Intense yellow color which disappeared after adding dilute HCl indicates the presence of flavonoids.

8. **Test for Lactones**
a. **Legal test:** The extract was dissolved in pyridine and a mixture of sodium nitroprusside and sodium hydroxide was added. Deep red color indicates the presence of lactones.
b. **Baljet test:** To the extract, sodium picrate solution was added. Formation of yellow color indicates the presence of lactones.

9. **Test for Amino acid/ Protein**
a. **Ninhydrin test:** Heated the 3 mL of extract and 3 drops of ninhydrin solution in boiling water bath for 10 minutes. Appearance of purple color shows the presence of amino acids.
b. **Biuret test:** To 3 mL of extract added 4% NaOH and few drops of 1% cooper sulphate solution. Formation of violet color confirms the presence of protein.
c. **Millon's reagent test:** Mixed the extract with millon's reagent. Formation of brick red precipitate indicates the presence of protein.
d. **Xanthoproteic test:** To 1 mL of concentrated nitric acid was added boiled for 1 minute and liquid ammonia was added. Precipitate is formed.

10. **Test for Resins [9]:** Dissolved the extract in acetone and pour the solution in to distilled water. Turbidity indicates the presence of resins.

11. **Test for starch:** dissolved 0.015 gm of iodine and 0.075 gm of potassium iodide in 5 mL of distilled water and add 2-3 mL of an aqueous extract of drug, blue color is produced.

TLC profile

Thin layer chromatography was performed for each of the extract of all three drugs by using precoated Silica gel 60 F_{254} (Merck. Mumbai) plates and suitable spray reagent for detection. R_f value of spots were calculated by using the formula:

R_f = Distance travelled by solute (in cm) / Distance travelled by solvent front (in cm)

RESULTS

Percentage yield

The yield of the petroleum ether, benzene, chloroform, ethyl alcohol and water extract for , leaf buds of *Ficus bengalensis* L., roots of *Asparagus racemosus* and fruits of *Anethum sowa,* was found out to be 2.19%, 0.54%, 0.23%, 9.32%, 0.63%, 0.16%, 0.42%, 0.37%, 13.03%, 10.44%, 1.84%, 1.26%, 3.36%, 7.46,% and 3.50% respectively. Table 1 presents the percentage yield of different extracts.

Table 1: Percentage yield of *F. bengalensis, A. racemosus* and *A. sowa* using different solvent system

S. No.	Drug	% yield of extract				
		Petroleum ether	Benzene	Chloroform	Ethyl alcohol	Water
1	*F. bengalensis*	2.19	0.54	0.23	9.32	0.63
2	*A. racemosus*	0.16	0.42	0.37	13.03	10.44
3	*A. sowa*	1.84	1.26	3.36	7.46	3.50

Preliminary phytochemical screening

Table 2a, 2b and 2c depicts the reports of phytochemical analysis results

Table 2(a): Preliminary phytochemical screening of *Ficus bengalensis, Anethum sowa* various extracts

Preliminary phytochemical screening	*Ficus bengalensis*				
	Petroleum Ether extract	Benzene extract	$CHCl_3$ extract	Ethyl Alcohol extract	Aqueous extract
Sterols/ Triterpenoids	-	-	+	-	-
Saponins	-	-	-	+	+
Alkaloids	-	-	-	-	-
Tannins	-	-	-	+	-
Carbohydrates	-	-	-	+	+
Flavonoids	+	-	-	-	-
Lactones	+	-	+	-	-
Amino acid/ Protein	-	-	-	-	-
Resins	+	+	+	-	+
Starch	-	-	-	-	-

Table 2(b): Preliminary phytochemical screening of *Asparagus racemosus* various extracts

Preliminary phytochemical screening	*Asparagus racemosus*				
	Petroleum Ether extract	Benzene extract	$CHCl_3$ extract	Ethyl Alcohol extract	Aqueous extract
Sterols/ Triterpenoids	+	+	+	+	-
Saponins	-	-	-	+	+
Alkaloids	-	-	+	-	-
Tannins	-	-	-	-	-
Carbohydrates	-	-	-	+	+
Flavonoids	-	-	-	-	-
Lactones	+	-	+	+	-
Amino acid/ Protein	-	-	-	-	-
Resins	-	-	-	-	-
Starch	-	-	-	-	-

Table 2(c): Preliminary phytochemical screening of *Anethum sowa* various extracts

Preliminary phytochemical screening	*Asparagus racemosus*				
	Petroleum Ether extract	Benzene extract	$CHCl_3$ extract	Ethyl Alcohol extract	Aqueous extract
Sterols/ Triterpenoids	+	+	+	+	-
Saponins	-	-	-	-	-
Alkaloids	-	-	-	-	-
Tannins	-	-	-	+	+
Carbohydrates	-	-	-	+	+
Flavonoids	-	-	-	+	-
Lactones	+	-	+	+	+
Amino acid/ Protein	-	-	-	-	-
Resins	+	+	+	+	-
Starch	-	-	-	-	-

Petroleum ether and benzene extract

All the drugs indicate the presence of steroids and/or triterpenoids. Among the three *Ficus* presents maximum yield in petroleum ether extract compared to *Anethum* which showed 1.84% and *Asparagus* the lowest 0.16%. *Anethum* presents maximum in benzene extracts 1.26% compared to other two, *Ficus* 0.54% and *Asparagus* the least 0.42%.

Chloroform extract

Ficus and *Anethum* indicate the presence of flavonoids. *Asparagus* indicates the presence of alkaloids and all the three respond for terpenes. *Anethum* presents maximum of 3.36 compared to other two which was 0.37 for *Asparagus* and 0.23 for *Ficus*. This is probably due to presence of volatile oil content in *Anethum*. Chloroform extract provides information about flavonoids, terpenes and alkaloids.

Alcohol extract

Asparagus has maximum alkaloids, carbohydrates, saponins compared to the other two with the value of 13.03. The ethanolic extract of *Ficus* reports the presence of tannins, carbohydrates, saponins, flavonoids with yield of 9.32. *Anethum* the least with presence of carbohydrates,

tannins, flavonoids with 7.42%. Alcoholic extract indicates the presence of organic constituents like alkaloids, glycosides, tannins, carbohydrates, flavonoids, saponins etc.

Aqueous extract

Maximum yield of *Asparagus* 10.44% indicates the presence of saponins and carbohydrates, while the other two, *Anethum* 3.50 shows the presence of tannins and carbohydrates and *Ficus* the least of 0.63% of all showed the presence of tannins, saponins and carbohydrates.
Aqueous extract indicates the presence of inorganic and partially organic constituents like tannins, sugar, carbohydrates, saponins, inorganic salts etc.

TLC studies

Ficus bengalensis different extracts were developed using the mobile phase of toluene, ethyl acetate and formic acid iin the ration of 10:6.2:0.1. The plates were developed by ferric chloride. The petroleum ether, benzene and chloroform extract showed four, five and four spots respectively.

Following were the observations of TLC pattern:

- There is only one nearly common spot in all three extract PE-0.618, Bz-0.636 and $CHCl_3$-0.636.
- In Bz and $CHCl_3$ extract there are two common R_f values were found to be 0.090 and 0.090.

The chloroform and benzene extracts of *F. bengalensis* were eluted with chloroform and methanol (9:1) and developed with vanillin sulfuric acid reagent. There were two nearly common spots in the two extract with corresponding values of 0.446 and 0.480 for chloroform and benzene extract. And, 0.625 and 0.653 for chloroform and benzene extract.
Petroleum ether, benzene and chloroform extract of *A. racemosus* was eluted with chloroform and methanol (9:1) and developed with vanillin sulfuric acid reagent. The TLC pattern showed three common spots in all three extract i.e 0.277, 0.259 and 0.240 for petroleum ether, benzene and chloroform extract respectively.

Alcohol, benzene and chloroform extract of *Anethum sowa* was spotted and eluted with chloroform and methanol (9:1) and developed with vanillin sulphuric acid reagent. Following were the observations:

- There was one common spot in all three exatrcts i.e of R_f value of 0.210.
- There were two spots of nearly common R_f value in all three extracts, alcoholic at 0.403, benzene at 0.438, chloroform at 0.456 and alcoholic at 0.964, benzene at 0.929 and chloroform at 0.947.

DISCUSSION

Preliminary phytochemical screening

The chemical analysis shows the presence of alkaloids, terpenoids, flavonoids, steroids, tannins, saponins, proteins, resins.

Alkaloids: As, petroleum ether and chloroform extract of *Asparagus* have significant amount of alkaloids and those are responsible for most varied type of pharmacological actions and have the effect on central nervous system probably may help in relieving the causes of infertility and maintenance of pregnancy with overall influence on the body and foetus.

Triterpenoids: All three drugs taken for the trail have triterpenoids constituents in them suggesting their action of anabolism, weight promotion, rectification of *agni*, soothing, finally diuretic. All these therapeutic activities are essential for achieving a non complicated pregnancy. The lipid content in these drugs may also help in rectifying disturbances responsible for infertility.

Flavonoids: *Anethum* and *Ficus* significantly showed the presence of flavonoids which are protective in action. These are considered as naturally dietary biologic response modifiers, disease preventing and health promoting may be effective in the management of infertility and pregnancy.

Steroids: All the three drugs elute the steroidal presence which indicates that these drugs may have influence on endocrine system. As these are precursors for synthesizing sex hormones especially progesterone and estrogen which are basic factors for infertility. These are also anabolic agents. Hence, maintain the functioning of *agni* in both conditions of infertility as well as pregnancy.

Tannins: Tannins were positive in *Ficus* and *Anethum* but not present in *Asparagus*. In *Anethum* they are contributory to overcome the possible haemorrhagic or other discharges of yoni and helps conception. During pregnancy *Ficus* helps to maintain the pregnancy and overcome the *garbha srava* and *patha* by stypic astringent action. The tannin content has the capacity to combine with the tissue protein may assist *sthirikarana* of the conceited matter. Though Shathapushpa has revealed the presence of tannins, it does not have astringent taste- *kashata rasa* thus it may help for a better absorption because of its *katu rasa* and *ushna virya*. On the other hand Vata is said to possess *kahaya rasa*- astringent taste and sheetha virya which may be responsible for its sthambhana and sthirikarane action on the foetus which in turn prevents abortions.

Saponins: *Ficus* and *Asparagus* are positive denoting they have role in rectifying the abnormalities responsible for infertility and maintaining a normal pregnancy. Saponins are glycosides which may be either steroidal or terpenoid type. As discussed earlier this component of the drug also may have similar or synergistic influence as steroids.

Proteins: They were absent in the test for all three drugs. So they may be present in minute quantities not amenable for test. Though *Asparagus* has no protein it is considered as weight promoting drug, may be because of starch and carbohydrate content.

Carbohydrate and starch: As all three drugs, indicate the absence of starch. They are not polysaccharides. However, carbohydrates were positive in all the three drugs. They are nutritive, help for conception and maintain pregnancy and promote normal delivery. *Asparagus* and vata act as catalyst also for health promotion. *Anethum* acts as digestive and absorptive. In the clinical

practice, the duration of administration of vata is minimal while shatavari is the drug of choice, which is administered throughout the pregnancy from its *brimhana*, and *rasayana* action that may be attributed to the presence of carbohydrates and steroids.

Resin: *Ficus* and *Anethum* are responding to resins, *Anethum* is a very commonly used drug in basthi because of its antibacterial and anti-fungal and protective properties. There are conditions in infertility which are due in inflammatory lesions which may be overcome by Shathapushpa. *Ficus* is generally administered through nasal route which may be easily absorbed through the receptors. This may favour the pharmacological activity as a catalyst.

Lactones: It was present in all three drugs taken for study. Similar to terpenes lactones also exhibit the therapeutic action.

Comparative findings of R_f value of the TLC [15]
Vata and shathapushpa-petroleum ether extract 0.827-0.854.
Shatavati and shathapushpa-petroleum ether extract 0.235-0.236.
Vata and shatavari-petroleum ether extract 0.258-0.235
Provides information about steroidal constituent.
Vata and shatavari–benzene extract 0.480-0.481
Shatavari and shatapushpa-benzene extract-0.925-0.929.
Vata and shatapushpa-chloroform extract- 0.446-0.456.
Signifies information about the presence of terpenoids.

Individual drugs
Vata- $CHCl_3$-0.625 and Benzene-0.653.
Shatavari-Benzene-0.407 and $CHCl_3$-0.407.
Shathapushpa-Benzene-0.210, $CHCl_3$-0.210 and Alcoholic-0.210.
Signifies the information about the presence of terpenoids.

Comparative therapeutic activity
Vata: *Pumsavana karma* is aimed at opting the sex of the child to be born and also stabilizing the foetus. As the time of drug administration is spsecified during *rithu kala*. This may enhance the process of ovulation (*unudhbhutha arhava pravrithi*). The route of administration is often trans nasal. Nasal passage has the baro-receptors though the medicament is instantly absorbed into the system. Further, it is said that the nasal passage is the entrance for *shiras* which is the seed for the brain which governs the functioning of the body. Thus, the medicine administered trans-nasally may influence the brain and master gland pituitary and finally resulting in proper ovulation, maintenance of pregnancy. Vata is also known for its *sthambhaka* action, which may be due to *kashaya rasa*, *sheetha virya*, and *kapha pitta shamaka* actions.

Shatavari: It is protective, nutritive, nervine stimulants and helps to strengthen both the mother and the foetus. Its and anti-oxytocic property is responsible for stabilizing the foetus and preventing the abortion. This is because of its *rasayana, vathpithahara property, madhura thiktha, rasa sheetha virya* and *guru snigdha sheetha guna*. Shatavari improves *rasa dhathu* which is the source *dhathu* for *arthava. Arthava pravritti* is considered as the index of reproductive system and deviation from normalcy is one of the common causes of infertility.

Shathapushpa: It corrects abnormalities related with infertility because of its *deepana pachana, rajorodha hara, garbhashaya uttejaka, yoni shodhna* and *raktha sodhna* activities. It also helps in rectifying the *rasadhathu*, which is the source *dhathu* for *arthava*, by influencing the *agni*. Shathapushpa has *Katu thiktharasa, ushna veerya* and *kapha vatha shamaka* action.

To conclude prajasthapana activity is contributed to:
1.*Garbhashaya dhardyakara*-Shathapushpa, Shatavari
2.*Garbhadharaka*- Shathapushpa, Shatavari
3.*Garbhopa ghathakara bhavan hanthi*- Vata, Shatavari
4.*Garabha samaye garbhadharini bhavanthi*- Vata, Shatavari
5.*Garbha srava and garbha patha*- Vata, Shatavari
6.*Supraja janayanthi*- Vata, Shatavari.

Structure activity relationship
By modifying chemical structures and functional groups attached that drug molecular weight changes its pharmacodynamic properties like onset of action, intensity or duration of action. Lipoidal drugs cross the blood brain barrier better. Thus, vata administered with milk (lipid + water), shatavari, shathapushpa with ghee will have better action and better acceptance.

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