



## RESEARCH ARTICLE

### A REVIEW: TO STUDY ABOUT THE EFFECT OF PANCHAVALKAL ON THE ANAEROBES CAUSING VAGINITIS\*

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#### ABSTRACT

Panchavalkal is a combination of five astringent plants, these are Vata, Peepal, Udumbara, Parisha, Plaksha. Panchavalkala, a herbal preparation in Ayurveda, shows promise in managing a potential treating vaginitis caused by anaerobic bacteria. Studies suggest its antimicrobial properties, particularly against organisms commonly found in vaginitis, and its ability to reduce symptoms like itching and discharge. Further research, including clinical trials, is needed to confirm its efficacy and optimal usage for vaginitis treatment. The herbal constituents possess tannin, flavonoid, and phenolic compounds, which contribute to their astringent, antibacterial, and anti-inflammatory effects. These properties help in reducing infection, inflammation, and restoring normal vaginal flora. Hence, Panchavalkal may serve as a safe, effective, and natural alternative to conventional antimicrobial agents in managing vaginitis, especially in recurrent or drug-resistant cases. However, further clinical trials and in vivo studies are needed to confirm its efficacy and safety profile. A study on the effect of Panchavalkal on anaerobes causing vaginitis would investigate the antimicrobial properties of this Ayurvedic formulation against the anaerobic bacteria responsible for conditions like bacterial vaginosis (BV). The research would build upon existing studies that have already demonstrated Panchavalkal's general antimicrobial effects and clinical efficacy in treating vaginal infections.

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## INTRODUCTION

Panchavalkal literally means "5 barks", i.e. pancha = 5, and valkal = barks, in Sanskrit, and in several regional languages. PVK is prepared from the barks of 5 specified medicinal plants from the ficus family and is extensively used for the treatment of women's diseases, specially leucorrhoea, uterine diseases and cervical erosions, and also for wounds and ulcers in other parts of the body. The combination of the barks of 5 medicinal plants . Vata (Ficus bengalensis Linn) , Dumber (Ficus racemosa Linn), Peepal (Ficus religiosa Linn) , Plaksha (Ficus infectoria/ Ficus lacor ), and Parisha (Thespiapopulnea) in equal proportions is known as the Classical Panchavalkal and is described in the treatment of women's diseases, wounds and ulcers. All five herbs are astringent (cause contraction in soft Tissue) in nature. It's is they are found is the Researchers in recent and past Evaluated anthelmintic, antimicrobial, Diabetic wound Healing etc. Activities of these plants in combination And individual too . Microorganisms are developing and is Resistance against many antibiotics due to the Unsystematic use of antimicrobial drugs. Furthermore, Antibiotics are sometimes associated with side effects .Panchavalkal is one of the choice of the drug As a Broad-spectrum antibiotic, and have wound healing Properties.

#### Classification of modified panchavalkal:

There are banyan trees, udumbara, horse, ashvattha, pārīṣa, plakṣa and trees. The trees are pavvete milk forests and their skin is green bark. Bha. P.O. Milk tree : Nima vana vaginal ulcer pa Anaerobic bacteria are part of the normal flora of human skin and is the a mucosal membranes. The site of anaerobic infection is commonly the site of normal colonization. The spectrum of infections ranges from local abscesses to life-threatening infections. Anaerobics bacteria differ from aerobic bacteria in their oxygen requirement. Oxygen is toxic to anaerobes is which can be explained by the absence of enzymes in the anaerobes of catalase, super dismutase, and peroxidase enzymes. Anaerobes are fastidious organisms and are difficult to grow if proper collection and culture methods are not used. The diagnosis requires clinical suspicion and proper microbiological identification. Anaerobic bacteria are rare agents of urinary tract infections (UTIs). Since these microorganisms are known commensals/colonizers of the genitourinary tract, they could easily contaminate a midstream urine specimen or cause infection. Anaerobic bacteria can produce enzymes and toxins that can destroy tissues and lead to the death of organs. The most abundant infections which are mainly developed by anaerobic bacteria are gangrene and tetanus. However, some antibiotics with anaerobic coverage can be used for the treatments.<sup>[2]</sup>

vaginitis is the most common gynecological disease with 21% of the cases being caused by *Candida albicans*, bacterial vaginosis, and *Trichomonas vaginalis*. The risk factors for Chronic *albicans* infection are pregnancy, diabetes, immunosuppressive agents, and antibiotics. Studies have shown that taking birth control pills, having a history of sexually-transmitted diseases, pregnancy, childbirth, stress, and some diseases play role in the occurrence of fungal diseases. Different species of *Candida* are among invasive infections and their resistance to antifungal medications is constantly increasing. The healthy vaginal microflora has been described as being constituted mainly by Grampositive bacilli of the genus *Lactobacillus*, being *L. crispatus*, *L. iners*, *L. gasseri*, and *L. jensenii* the most common species. Microbiologically, this condition is characterized by a dramatic shift of vaginal microflora which involves the loss of beneficial bacteria (lactobacilli) and a simultaneous proliferation of anaerobic bacteria including *G. vaginalis*, *Alopiobiumvaginae*, *Mobiluncus* spp., *Bacteroides* spp., and *Prevotellasp*.<sup>[3]</sup>

## PANCHAVALKAL

Table. 1. (List of plants for pharmacognosy and bark collection)

### Panchavalkal Five Ficus plants

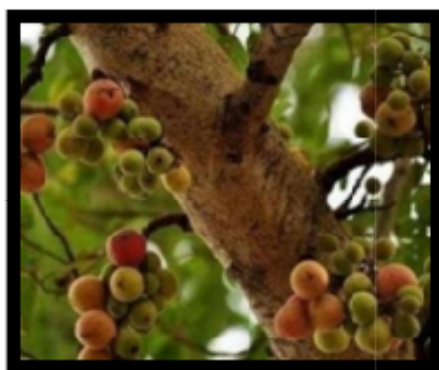


Fig.1. Vata plant<sup>[5]</sup>

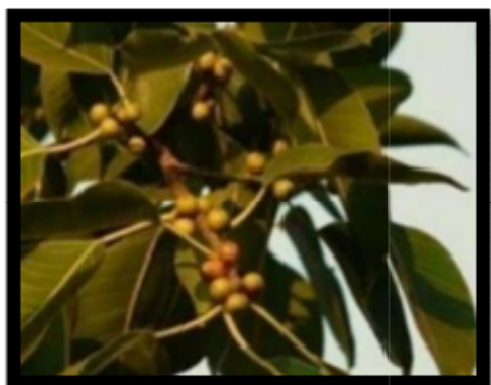


Fig.2 Peepal plant<sup>[6]</sup>



Fig.3 Udumberplant<sup>[7]</sup>



Fig. 4. Parishapant<sup>[8]</sup>

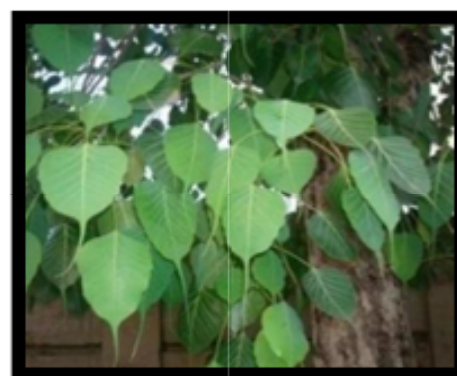


Fig. 5 Plaksha plant<sup>[9]</sup>

**TRADITIONAL USE OF PANCHAVALKAL:** Panchavalkal is a combination of five astringent plants, these are Vata, Peepal, Udumbara, Parisha, Plaksha. Individual and combinations of drugs have Kashaya rasa (astringent) Dominant and useful in the Management of Vrana (Wounds) as well as Shotha (Inflammations). Panchvalakal is used in different forms, For instance, Kwath, ointment, And powder. Its formulation can prepare in oil for future prospective to add More Medicinal value and improve its shelf life without any chemical preservative. The purpose Of this Study was to demonstrate the scientific proof of old literature and further evaluate The wound healing Property of water extract of Panchvavkal and blend with Amaltas (Cassia fistula) and Neem (Azadirachta Indica). Disc diffusion was adopted to assess Antimicrobial activity against the range of standard Antimicrobial agents. The results were Promising that *E.coli*, *S.aureus*, *P.aeruginosa* are sensitive to Panchvavkal Kwath. This Herbal medicine is able to prevent vaginitis and also cure it without any side Effects.

**PHARMACOLOGICAL ACTION OF PANCHAVALKAL:** Pharmacological action of Panchavalkal proves that all the five Drugs of Panchavalkal are found to have anti-inflammatory, Analgesic, antimicrobial, and wound healing properties. The pharmacodynamic properties of Panchavalkal are stated in Chemical constituents of the trial drug-Panchavalkal cream are Explained. Tannins are known antioxidants and blood Purifiers with anti-inflammatory actions. As the oxidation process hampers the wound healing, Antioxidants protect the tissue from the oxidative damage. The flavonoids rich fraction of the bark of Pareesha, Vata, Ashwatha and Plaksha has proven to possess good in vitro Antioxidant property. Tannins, phytosterols and flavonoids are Anti-inflammatory; hence they prevent the prolongation of the Initial phase. They also reduce the pain, tenderness, redness, Swelling like features and thus help to control the infection. Tannins and phytosterols promote the healing process by wound Contraction with increased capillary formation. Tannins have been reported to possess ability to increase the collagen content, Which is one of the factors for promotion of wound healing. Vitamin A and K are essential for epithelialization promoting The healing. The statistical data as stated above has revealed highly

Significant results in reducing the slough, swelling, redness, Pain, discharge, tenderness, and malodour. Moreover, the tissue Biopsy taken for the estimation of the microbial load supported The clinical study showing highly significant results for reduction Of the load prior to and after treatment.<sup>[10]</sup>

**MODE OF ACTION PANCHAVALKAL:** The panchavalkalkwath used for yonidhawana has antiseptic, Antibacterial as well as pain relieving action. It prevents the growth of Bacteria organism and helps in restoring Ph of vagina. Drugs used for Yonidhavanabsorb through mucosa and blood circulation and also Have beneficial effect on uterus. All the dravyas in kwath are Kashaya Rasatmak so having properties like stambhan, grahi guna helps in Reducing vaginal discharge and also contains kandughan and Krimighan action.<sup>[11]</sup>

## MATERIALS AND METHODS

**Collection of Plant Material:** Stem bark of selected plants viz., Panchavalkal is the formulation with barks of five trees viz. Vata(Ficus bengalensis Linn), Udumbara (Ficus glomerata Roxb.), Peepal (Ficus religiosa Linn.), Parish (Thespesia populenea Soland ex corea.) and Plaksha (Ficus lacer Buch-Ham.) free from disease were collected from Gadhinglaj, Maharashtra. The plants parts were dried in sunlight till it became moister free for 7 days.

**Preparation of Panchavalkal Powder:** Panchavalkal powder was prepared by adopting classical method of choornakalpana. Small pieces of Panchavalkal were dried completely and grinding of enough size (sieve number 10). The prepared PanchavalkalaChoorna was kept in air tight container for antimicrobial activity.

### Preparation of Panchavalkal ointment

- The ointment was prepared by following there stages:
- Preparation of Panchavalkalakwatha
- Preparation of Panchavalkalataila
- Preparation of Panchavalkalaointment<sup>[12]</sup>

## ANAEROBIC BACTERIA

**ANTIMICROBIAL ACTIVITY:** Micro organisms are broadly classified as bacteria, fungi, viruses, actinomytes, etc. These are causative factors in the manifestation of various infectious diseases. Detailed study of these factors, the ways in which they produce diseases in human body and information regarding diagnosis and treatment is essential. In-vitro tests are used as screening procedure for new agents and for testing the susceptibility of individual isolates from infections to determine which of the available drug might useful therapeutically. In general any compound or drugs that inhibit the growth or cause the death of micro organisms are known as antimicrobial agents. Any drug that inhibits the growth of bacteria or fungi is said to possess bacteriostatic and fungistatic activity respectively. In the current study it is planned to check comparative antimicrobial activity of the Panchavalkal in powder and ointment form.<sup>[13]</sup>

**ETIOLOGY OF ANAEROBIC BACTERIA:** Common sites of anaerobic infections include oral, abdominal, and pelvic cavities; however, anaerobes can Cause infections of other regions such as the head, neck, and skin. Clinically significant anaerobes associated With human infections.

### Gram-Positive

**Gram-Positive, Spore-forming Bacilli:** Clostridium: These are spore-forming anaerobes responsible for some of the more serious human infections. They account for close to 10% of all anaerobic infections. Significant members of this family are Clostridium difficile, which causes C. difficile infection. Clostridium perfringens, which causes gas gangrene or soft tissue infections. Clostridium septicum also causes gas gangrene.

### Gram-positive, Non-spore-forming Bacilli

- **Actinomyces:** These colonize the human gastrointestinal (GI) tract, and infections result from a break in the mucocutaneous barrier.
- **Propionibacterium:** This species is part of the normal flora of skin and mucosa. The most significant Member of this family is Propionibacterium acne which plays a role in the pathogenesis of acne Vulgaris.
- **Bifidobacterium:** This is normal flora of intestinal tracts. It is usually non-pathogenic; however, Pediatric infections have been documented in the form of chronic otitis media, abdominal abscesses, And peritonitis.
- **Lactobacillus:** These organisms are also normally found in the GI tract and can be recovered from Numerous food products. They have low pathogenic potential; and bacteraemia, particularly in Neonates, have been described.
- **Peptococcus and Peptostreptococcus:** These anaerobes are part of the mouth, GI tract, upper Respiratory tract, and urogenital tract, as well as the skin. They can be pathogenic and cause numerous Infections such as chronic otitis media, chronic sinusitis, aspiration pneumonia, pelvic inflammatory Disease, including tube-ovarian abscesses.

### Gram-negative

**Bactericides:** These are the most frequently recovered anaerobic pathogens from clinical specimens. They Are part of human colonic and normal female genital flora. These organisms are most commonly the cause of intra-abdominal infections, particularly abscesses. There are majority of these abscesses are mixed Infections. They can also cause extra-abdominal of the infections such as aspiration pneumonia, brain Abscesses, among others.

- **Fusobacterium:** One of the species from this group of anaerobes, Fusobacterium necrophorum, is a common cause of peritonsillar abscesses associated with a complication of internal jugular vein thrombosis, known as Lemierre syndrome.
- **Campylobacter:** This is one of the most common causes of acute bacterial.<sup>[14]</sup>

## VAGINITIS

**HEALTHY VAGINAL MICROBIOME:** The vaginal microbiome is an intricate and dynamic Micro ecosystem that constantly undergoes fluctuations during The female menstrual cycle and the woman's entire life. The Vaginal mucosa is made up of a stratified squamous Nonkeratinized epithelium covered by cervicovaginal secretion. The vaginal mucosa acquires oxygen, Glucose, and other nutrients from underlying submucosal tissues Through diffusion due to the limited blood supply. This establishes a relatively anaerobic habitat condition. The vagina houses a complex microbial community that subsists In a symbiotic relationship with the host. Marked differences have been Reported between nonpregnant and pregnant womten in terms of the vaginal microbiome. Moreover, the Predominance of Lactobacillus spp., Actinomycetales, Clostridiales, and Bacteroidales is observed in pregnant women.<sup>[15]</sup>

### PATHOPHYSIOGY OF BACTERIAL VAGINITIS

Bacterial vaginosis is caused by an imbalance of the naturally occurring vaginal flora, characterized by both a change in the most common type of bacteria present as well as an increase in the total number of bacteria present. TheBacterial it is thought that most bacterial vaginosis infections start with Gardnerella vaginosis, which creates a biofilm that subsequently provides a conducive environment for the proliferation of otheropportunistic bacteria. vaginalis also produces vaginolysin, a pore-forming toxin affecting human cells. Vaginolysin is a cholesterol-dependent that initiates complex signaling cascades that trigger target cell lysis and enhance Gardnerella virulence. Gardnerella has the necessary virulence factors

that facilitate its adherence to host epithelial cells, enabling it to compete with *Lactobacillus* for dominance within the vaginal environment effectively.<sup>[16]</sup>



Fig.6. Vaginitis<sup>[17]</sup>

#### Types of vaginitis

- Bacterial vaginosis.
- Yeast infections.
- Trichomoniasis.
- Non-infectious vaginitis.
- Genitourinary syndrome of menopause (atrophic vaginitis).

#### Symptoms of Vaginitis

- Changes in the color, texture or smell of your vaginal discharge.
- Vaginal itching, burning or irritation. Your vulva may even appear or feel swollen.
- Pain when you pee (dysuria).
- Pain during sex or when inserting tampons.
- Light bleeding or spotting when you're not on your period.

#### Risk factors for vaginitis

- Recent treatment with antibiotics or prolonged corticosteroids.
- Hormonal changes.
- Having unprotected sex with multiple partners.
- Having an STI.
- Wearing damp, sweaty and tight-fitting clothing.
- Douching.
- Use of scented vaginal sprays or spermicides.
- Unmanaged diabetes or health conditions and medications that weaken your immune system.<sup>[18]</sup>

#### ANAEROBES CAUSE IN VAGINITIS

In reproductive-aged women, bacterial vaginosis is the most common cause of vaginitis. This condition is caused by a shift in normal vaginal flora, with lactobacilli being replaced by anaerobic bacteria. Because bacterial vaginosis is not an inflammatory condition, erythema, fissuring, and bleeding may not be present on physical examination. Bacterial overgrowth of *G. vaginalis*, *Mycoplasma hominis*, *Mobiluncus* spp., *Bacteroides* spp., *Prevotella* spp., *Peptostreptococcus* spp., *Fusobacterium* spp., and *Proteobacteria* spp. may be present. Symptoms include foul-smelling discharge, irritation around and outside the vaginal introitus, and, sometimes, burning with urination. Alternatively, a gram stain of the vaginal fluid can be done to examine the predominant strain of bacteria. This technique is referred to as the Nugent process. The Nugent scoring system employs a microscopic examination and gram-stain technique to evaluate the presence of vaginal bacteria, assigning a numerical score ranging from 0 to 10. A higher score indicates a more significant presence of bacteria associated with bacterial vaginosis. Nugent score is primarily utilized within the realm of research. Data have shown that this technique has a sensitivity and specificity of 89% and 83%, respectively, but it rarely is used in clinical practice.

#### COMPLICATION OF BACTERIAL VAGINITIS

Bacterial vaginosis can lead to various complications, underscoring the importance of timely diagnosis and management. The complications associated with bacterial vaginosis include the following:

- Increased risk of endometritis and salpingitis
- Increased risk of acquiring STIs
- Elevated risk of postsurgical infections
- Adverse pregnancy outcomes include premature labor, premature rupture of membranes, and postpartum endometritis
- Development of pelvic inflammatory disease
- Increased risk of neonatal meningitis.<sup>[20]</sup>

**Panchavalkal (Modified) Vaginal Formulation development:** The vaginal douche used and described in Chapter 3 had to be prepared fresh every day and was a tedious as well as time consuming process for the health assistant who prepared it everyday, and also for the physician who administered it every day. Additionally it was also time consuming, uncomfortable and costly for the patient consumer who was required to visit the hospital daily for 14 days. Hence there was a great need to develop a vaginal formulation which could be self administered at home by the patient. Vaginal formulations, eg vaginal creams or pessaries are available as user friendly local applications for other drugs like miconazole, clotrimazole, clindamycin, and mycostatin as also lactate gel preparations. Most of them are available as OTC (Over The Counter) medicines. However only one Ayurvedic marketed formulation is available as vaginal Cream and that is Vgel which is widely used by Ayurvedic physicians for the treatment of leucorrhoea.<sup>[21]</sup>



Fig. 6 PanchavalkalChurna<sup>[22]</sup>



Fig.7. PanchavalkalCapsule<sup>[23]</sup>





Fig.8 PanchavalkalLepam/ Ointment <sup>[24]</sup>

## PANCHAVALKAL FORMULATION

### Which formulation product are rapidly action shows on vaginitis

Panchavalkal ointment are the rapidly absorb in virginity and rapidly action shows vaginitis as compared to Panchavalkalachurna or Panchavalkala capsule. Panchavalkala ointment – cream, derived from a traditional Ayurvedic formulation, is primarily used for wound healing and infection control. It known for its Antimicrobial, anti-inflammatory, and wound-cleansing properties, making it effective in managing infected Wounds, including chronic non-healing wounds.

### How Panchavalkal helps with vaginitis

- **Antimicrobial Action:** Panchavalkala exhibits antibacterial and antifungal activity, which helps Combat the microorganisms responsible for causing vaginitis. Studies have shown its effectiveness Against bacteria like *E. coli* and *S. aureus*, which are common culprits in vaginitis.
- **Anti-inflammatory Properties:** Panchavalkala reduces inflammation in the vaginal tissues, which can Help relief, and irritation.
- **Wound Healing:** It promotes the healing of any wounds or ulcers that may be present in the vaginal Area due to the infection or inflammation.
- **Restores Vaginal pH:** Panchavalkala helps in restoring the natural acidic pH of the vagina, which is Crucial for maintaining a healthy vaginal environment and preventing infections.
- **Reduces Symptoms:** It can help reduce common symptoms of vaginitis, such as abnormal vaginal Discharge (leucorrhea), itching, and pain <sup>[25]</sup>

## DISCUSSION

A study on the effect of Panchavalkal on anaerobes causing vaginitis would investigate the are antimicrobial properties of this Ayurvedic formulation against the anaerobic bacteria responsible for conditions like bacterial vaginosis (BV). The research would build upon existing studies that have already demonstrated Panchavalkal's general antimicrobial effects and clinical efficacy in treating vaginal infections.

## CONCLUSION

Panchavalkala, a herbal preparation in Ayurveda, shows promise in managing a potential treating vaginitis Caused by anaerobic bacteria. Studies suggest its antimicrobial properties, particularly against organisms Commonly found in vaginitis, and its ability to reduce symptoms like itching and discharge. Further research, Including clinical trials, is needed to confirm its efficacy and optimal usage for vaginitis treatment. The herbal constituents possess tannin, flavonoid, and phenolic compounds, which contribute to their Astringent, antibacterial, and anti-inflammatory effects. These properties help in reducing infection, Inflammation, and restoring normal vaginal flora. Hence, Panchavalkal may serve as a safe, effective, and natural alternative to conventional antimicrobial agents In managing vaginitis, especially in recurrent or drug-resistant cases. However, further clinical trials and in Vivo studies are needed to confirm its efficacy and safety profile.

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