



## EFFECTIVENESS OF RED BETEL (PIPER CROCATUM) EXTRACT ON LEUCORRHEA IN WOMEN OF CHILDBEARING AGE

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### Abstract

**Introduction:** Reproductive health problems exist in Asia; 76% of women experience vaginal discharge. Vaginal discharge symptoms are also experienced by women of childbearing age (around 31.8%). Women of childbearing age are more at risk of fluor albus, which can be a trigger for reproductive organ infections. One of the treatments is to use betel leaves, which contain natural antiseptics and antibiotics.

**Objectives:** This study aimed to determine the effectiveness of red betel leaf extract (*Piper crocatum*) against leucorrhea in women of childbearing age. Method: This research method uses a quasi-experiment design with one pre-and post-test design technique group. The research was conducted at the Independent Midwife Practice in Bandung City. The population in the study were all women of childbearing age in Bandung City. The sample consisted of women of childbearing age, according to the inclusion criteria of 36 people. The data obtained were primary data from the measurement of vaginal pH with Neco test litmus paper. The data analysis used was the Wilcoxon test to test the difference in pH scores before and after the intervention.

**Result:** The results showed a significant difference in the use of 0.5% red betel leaf extract in women of childbearing age before and after the intervention.

**Conclusion:** Red betel leaf extract 0.5% is effective in reducing the incidence of leucorrhea. There is a decrease in vaginal pH before and after the use of red betel leaf extract 0.5% by 1.78 ( $p < 0.05$ ).

**Keywords:** Red betel extract, leucorrhea, women of childbearing age

## INTRODUCTION

Problematic female reproductive health accounts for 33% of the total burden of disease affecting women worldwide <sup>1</sup>. Leucorrhea is a symptom often experienced by most women related to reproductive health problems.

Leuchorea (leucorrhea, leukorrhea, or vaginal discharge) is the term for discharge from a woman's genitalia that is not blood. In physiological conditions, the discharge is mucus, or mucus that is clear, odorless, and slightly sticky. In pathological conditions, there are changes in genital fluids in quantity, consistency, color, and odor <sup>2</sup>. Epidemiologically, pathological Leuchorea can affect women ranging from a young age, healthy reproductive age, and old age and does not recognize educational, economic, and socio-cultural levels <sup>3</sup>. Under normal (physiological) conditions, the amount of vaginal fluid that comes out naturally from the body can function as a lubricant and defense for various infections. This condition is not disturbing; there is no blood, and it has a pH of 3.5–4.5 <sup>4</sup>. Abnormal (pathological) conditions are typically yellow, green, grayish, fishy, and foul-smelling, causing complaints such as itching and burning in intimate areas. Factors causing complaints in the vagina are mostly caused by vaginal infections caused by germs, fungi, viruses, parasites, and tumors <sup>5</sup>. Bacteria that live in the vagina or are classified as vaginal bacteria (BV) can cause vaginal discharge and odor; more than 50% of women with BV are asymptomatic. Reproductive health problems in Asia: 76% experience vaginal discharge <sup>6</sup>. About 90% of women in Indonesia have the potential to experience leucorrhea because Indonesia has a tropical climate, so fungi, viruses, and bacteria are easy to grow and develop, which results in many cases of leucorrhea in Indonesian women. Symptoms of leucorrhea are also experienced by unmarried women or women of childbearing age aged 15–24 years, which is around 31.8%. This shows that women of childbearing age are more at risk of leucorrhea, which can be a trigger for infection or leucorrhea pathology <sup>7</sup>. One study conducted by Susanti et al. showed that of 315 housewives who had symptoms of vaginal discharge studied, 5.7% were found to have candidiasis, 37.1% had bacterial vaginosis, 14.6% had trichomoniasis, 0.7% had gonorrhea, 5.6% had chlamydia, 0.3% had genital herpes, and 0.3% had acute condyloma <sup>8</sup>.

One indicator of reproductive health is an imbalance in pH and the number of normal vaginal flora. In balance, the vaginal ecosystem is dominated by *Lactobacillus* sp. bacteria that produce organic acids such as lactic acid, hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>), and bacteriocins. Lactic acid, such as organic acid lanilla produced by *Lactobacillus* sp., plays an important role in maintaining a fixed pH between 3.8 and 4.5, which is an unsuitable place for bacterial growth, especially for microorganisms that are pathogenic to the vagina. A pH value of more than 4.5 may indicate bacterial vaginosis or trichomoniasis <sup>9</sup>. One of the efforts to overcome vaginal discharge is the use of scientifically proven herbal medicines. Red betel (*Piper crocatum*) is a multifunctional plant that is silver-red and thrives in Indonesia. Red betel has an alkaloid content that functions as an antimicrobial and has antiseptic power. It also contains carvacrol, which is a disinfectant and anti-fungal, so it can be used as an antiseptic drug to maintain oral health, cure leucorrhea, and have a bad odor <sup>10</sup>.

The application of betel leaf extract to wash the vagina can reduce physiological vaginal discharge. Betel leaves contain essential oils consisting of betlephenol, chavicol, sesquiterpene, hydroxycavicol, cavibetol, estragol, eugenol, and carvacol. Some literature states that betel leaves also contain the enzyme diastase, sugar, and tannin. Usually, young betel leaves contain more diastase, sugar, and essential oil compared to old betel leaves. While the core tannin content is relatively the same, eugenol compounds in betel leaves are proven to kill the *Candida albicans* fungus that causes vaginal discharge, while tannin is an astringent that reduces fluid secretion in the vaginal canal <sup>11</sup>. Based on this, there are many benefits to the red betel leaf. For

that, we want to examine the effect of red betel leaf extract (*Piper crocatum*) on leucorrhea in women of childbearing age.

## METHOD:

This research method uses a Quasy Experiment design with a one-group pre- and post-test design technique. The research was conducted at the Independent Midwife Practice in Bandung City. The population in the study were all women of childbearing age in Bandung City. The sample was women of childbearing age by the inclusion criteria of 36 people and taken by the consecutive sampling method. The data obtained were primary data from the measurement of vaginal pH with Neco test litmus paper. This study begins with the process of making red betel leaf extract (*Piper crocatum*). The extract package given to respondents was used to wash twice a day, every morning and evening, for 7 days. The data analysis used was the Wilcoxon test used to test the difference in pH scores before and after the intervention.

## RESULTS AND DISCUSSION

### 1. Phytochemical Test Results

Phytochemicals are all types of nutrients and chemicals that come from plants. Phytochemical screening tests are carried out to determine the secondary metabolite compounds contained in the ethanol and ethyl acetate extracts of red betel leaves. The results of phytochemical screening in this study showed that 0.5% red betel extract contained alkaloids, flavonoids, steroids, terpenoids, saponins, and tannins. The results of this study are in line with Wardani's research (2017), screening ethanol extracts containing alkaloids, flavonoids, saponins, tannins, triterpenoids, and steroids.<sup>12</sup>

### 2. Characteristics of Research Subjects

This study involved 36 research respondents and was carried out from November to December 2021 at the Birthing Specialist Independent Practice using questionnaires, checklists, and direct examination of pre- and post-data by researchers assisted by students.

Table 1: Frequency Distribution of Respondent Characteristics

Karakteristik	Kelompok Penelitian (n=36)
<b>1. Usia (th)</b>	
20-30	18 (50%)
31-40	9 (25%)
41-49	9 (25%)
Mean	33
Std Deviasi	9,1
<b>2. Akseptor KB</b>	31 (86%)
Kalender	1
Kondom	2
Suntik 1 bulan	4
Suntik 3 bulan	11
Pil	3
Alar Kontrasepsi dalam Rahim (AKDR)	9
Implant	1
<b>Bukan Akseptor KB</b>	5 (14%)
Mean	4,69
Std Deviasi	1,98
<b>3. Lama Penggunaan Alat Kontrasepsi</b>	
Tidak KB	5 (14%)
1-5 tahun	25 (69%)
6-10 tahun	2 (6%)
Lebih dari 10 tahun	4 (11%)
Mean	4,5
Std Deviasi	3,97
	4,81
<b>4. Paritas</b>	
Primipara	16 (44%)
Multipara	20 (56%)

Table 1 shows that the average age of female respondents of childbearing age is 33 years, with a minimum age of 20 and a maximum age of 49 years. Vaginal discharge can be experienced by unmarried women or women of childbearing age aged 15–24 years, which is around 31.8%. This shows that women of childbearing age are more at risk of fluor albus, which can be a trigger for infection or leucorrhea pathology<sup>11</sup>. The number of primiparous parity was 16 respondents (44%) and multiparous 20 respondents (56%). The number of respondents who had given birth once (primipara) was 44%, and the rest had given birth more than once (multipara) by 56%. This situation shows that women of childbearing age who experience vaginal discharge do not differ much in terms of parity.

The number of respondents in this study was more than 31 (86%) who became family planning acceptors with an average use of contraceptives for 4.5 years. The most common type of contraceptive used by respondents was hormonal birth control (61%), consisting of 1-month injections, 3-month injections, pills, and implants. There were 9 AKDR acceptors (29%); the rest used simple methods (9.6%), namely calendar birth control and condoms. Hormonal contraceptives contain the hormones estrogen and progesterone, which will inhibit the maturation process of the egg, thicken the cervical mucus, and atrophy the endometrial wall to prevent fertilization and pregnancy. One of the side effects of excess progesterone and estrogen hormones due to contraception is vaginal discharge (BKKBN, 2011).

According to Baziad (2008), the use of hormonal contraceptives can cause an increase in the incidence of fluoride. There are several causes of physiological increases in the amount of vaginal fluid<sup>13</sup>. For example, an increase in the amount of hormones around the menstrual period or during pregnancy, sexual stimulation, stress or fatigue, and the use of drugs or contraceptives<sup>14</sup>. The most common complaint among IUD acceptors is vaginal discharge. Vaginal discharge that occurs in IUD acceptors can be caused by a reaction to a foreign object, thus triggering the growth of candida fungi, which were originally saprophytes, to become pathogenic, resulting in vaginal candidiasis with symptoms of excessive vaginal discharge. Tosun's research showed that the prevalence of bacterial vaginosis (BV) in IUD users was 9.3–37%<sup>14</sup>. Compared to other contraceptive methods, BV was also found to be higher among IUD users (37.0% vs. 19.3%;  $p = 0.03$ )<sup>15</sup>.

### 3. Vaginal pH and The Effect of Using Betel Leaf Extract on The Number of Bacteria

Table 2: Overview of vaginal pH before and after the use of 0.5% red betel leaf extract

Keterangan	pH	Nilai p*
<i>Pre</i>		
x (SD)	6,53 (1,08)	
Median	7	
Rentang	3-9	
<i>Post</i>		
x (SD)	4,75 (0,84)	
Median	5	
Rentang	3-7	
Pengaruh pre dan post		<0.001

Keterangan \* Uji wilcoxon

In the results of this study, researchers used the Wilcoxon test to compare vaginal pH before and after the use of 0.5% red betel leaf extract because the results of the normality test using Shapiro Wilk were 0.00 ( $p < 0.05$ ), so the data was not normal, whereas the data

requirements are normal if  $p > \alpha$  (0.05). Table 5.3 explains that the results of statistical tests with a p-value  $< 0.05$  are 0.00, meaning that at 5% alpha, there is a significant difference in the average pH of the vagina and the effect of using 0.5% red betel leaf extract on leucorrhea for women of childbearing age within 7 days. This study provides an intervention using red betel leaf decoction for 7 days, twice a day (morning and evening). Before and after the intervention, respondents took fluor albus specimens from the researcher to check the pH of the vagina using litmus paper (Neco pH test). During the intervention, respondents filled out a questionnaire to determine the condition of vaginal discharge, including amount, color, odor, and itching. In addition to using questionnaires, changes in vaginal discharge complaints were evaluated using observation sheets through interviews filled out by researchers on days 0 and 8. There was a decrease in the average vaginal pH before and after using 0.5% red betel leaf extract. Normal vaginal acidity (pH) for women of childbearing age ranges from 3.8 to 5.0, which is moderately acidic. The vagina has normal flora that supports the internal physical and chemical environment.

Normal vaginal flora are normal microorganisms that colonize the vagina. The most important and commonly encountered normal flora are groups of the genus *Lactobacillus*, such as *Lactobacillus crispatus*, which produce lactic acid and serve to protect against bacteria from pathogenic species<sup>16</sup>. These vaginal bacteria are the main source of lactic acid in the vagina. *Lactobacilli*, as the dominant microflora of a healthy human vagina, must maintain a pH of 4.5 in the vagina. This low pH reduces the risk of colonization by pathogens. This acidic condition provides a protective effect, creating a barrier that prevents the unfavorable microbiome from multiplying too quickly and causing infection. Imbalances in this ecosystem can lead to unusual vaginal pH and can be used to determine the presence of pathogenic bacteria<sup>17</sup>.

Several studies have shown that using betel leaves to wash the vagina can reduce physiological vaginal discharge. The results of the phytochemical analysis conducted at the Laboratory of the Medical Laboratory Technology Study Program of the Bandung Health Polytechnic showed that 0.5% red betel leaf extract contained alkaloids, flavonoids, steroids, terpenoids, saponins, and tannins (Table 5.1). These chemicals have benefits resembling antibiotics and antibacterials. This ability is due to the various substances contained therein. Betel leaf can be used as an antibacterial because it contains 4.2% essential oil, which consists mostly of betephenol, which is an isomer of eucalyptus allypyrocatechine, cineol methyl eugenol, caryophyllen (cisquiterpenes), kavikol, kavibekol, estragol, and terpinen.<sup>18</sup>

Red betel has an alkaloid content that green betel does not have as antimicrobial, and red betel leaves have antiseptic power twice as high as green betel leaves<sup>19</sup>. Not only does it have antimicrobial content and antiseptic power higher than green betel, but red betel boiled water also contains carvacrol, which is a disinfectant and antifungal, so that it can be used as an antiseptic drug to maintain oral health, cure whitish disease, and bad odor. (Fera, 2016) Karvacol is disinfectant and antifungal, so it can be used as an antiseptic, and eugenol and methyl-eugenol can be used as painkillers. Eugenol compounds in betel leaves are proven to kill the *Candida albicans* fungus that causes vaginal discharge, while tannin is an astringent that reduces fluid secretion in the vaginal canal<sup>20</sup>. (Wayan, 2014) In addition, there are flavonoids, saponins, and tannins in betel leaves. Saponins and tannins act as antiseptics. Flavonoids, besides functioning as bacteriostatic, are also anti-inflammatory<sup>21</sup>. The content of cavicol and cavibetol has five times the antibacterial power of ordinary phenols<sup>22</sup>.

Based on the theoretical information above, it can be proven that the use of red betel extract can reduce the incidence of vaginal discharge and the risk of vaginal infection due to the content of chemical compounds in the extract. These chemical compounds can be used as effective antiseptics and antimicrobials, so they can be used as an external medicine or antiseptic for women of childbearing age who experience vaginal discharge to prevent infection.

The use of betel leaf extract solution can be an alternative treatment for vaginal discharge in women of childbearing age. Midwives can educate women to wash using a red betel leaf solution and can also optimize the role of midwives in maintaining reproductive health in women of childbearing age.

## CONCLUSION

The results showed a significant difference in the use of 0.5% red betel leaf extract in women of childbearing age before and after the intervention. This 0.5% red betel leaf extract is effective in reducing the incidence of leucorrhea; this can be seen in the decrease in vaginal pH before and after the use of 0.5% red betel leaf extract by 1.78 ( $p < 0.05$ ).

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