International Journal of Allied Medical Sciences and Clinical Research (IJAMSCR)

ISSN:2347-6567

*IJAMSCR |Volume 10 | Issue 2 | Apr- Jun - 2022*
**www.ijamscr.com**

*Research article* *Medical research*

# The Effect of Tahongai Leaf Extract (Kleinhovia Hospita Linn) on the Growth of Candida Albicans In Female Mice Vaginal Candidiasis

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## ABSTRACT

### Background

Vaginal discharge is one of the problems that occur in women and about 80% occurs at the age of 15-45 years. This can trigger the development of fungi that cause vaginal discharge and the risk of vaginal candidiasis, namely candida albicans yeast infection. Tahongai leaf medicinal plants contain phenolic compounds (flavonoids, tannins, terpenoids, alkaloids) which show the ability to treat vaginal discharge caused by candida albicans by inhibiting ergosterol in cell membranes and affecting the function of enzymes so that they are antifungal.

### Purpose

Analyze the effect of Tahongai (Kleinhovia hospital linn) leaf extract at a dose of 500mg/kg BW and 750mg/kg BW for 14 days on the growth of candida albicans in female mice vaginal candidiasis.

### Method

True experimental study of female mice (Mus musculus) which consisted of 4 groups, namely the experimental group at a dose of 500mg/kg BW, the experimental group 750mg/kg BW, the positive control group (Ketoconazole) which was given 1 x 1 for 14 days, and the control negative group.

### Results

Tahongai leaf extract (Kleinhovia hospita linn) dose of 750mg/kgBB once daily for 14 days affected suppressing the growth of candida albicans in female mice vaginal candidiasis with a decrease in the average number of colonies of 31 cfu/ml with a p-value of 0.010 <0.05, while the Tahongai leaf extract dose of 500mg/kg BW showed a decrease in the number of colonies but not significant (p-value 0.430).

### Conclusion

Tahongai leaf extract (Kleinhovia hospita linn) at a dose of 750mg/kgBW for 14 days affected suppressing the growth of candida albicans in female mice vaginal candidiasis.

**Keywords:** Tahongai leaf extract, vaginal discharge, vaginal candidiasis

## INTRODUCTION

Vaginal discharge is one of the most common conditions experienced by women starting from adolescence, reproductive age to menopause. Physiological vaginal discharge by the reproductive cycle with clear discharge and does not cause complaints such as itching, burning, and smell. Pathological vaginal discharge is characterized by white, yellow to greenish discharge with complaints of itching, burning and a fishy smell. Discharge (flour albus) is often considered normal for some women, but this can be an indication of a disease, various reasons can cause vaginal discharge.[1,2]

According to the World Health Organization, there are reported 357 million cases of sexually transmitted diseases per year and more than 95% of women are not aware of the relationship between vaginal discharge and sexually transmitted diseases. The incidence of vaginal candidiasis alone worldwide is around 138 million women each year with the age group 25-34 years having the highest prevalence. [3–5]

In Indonesia, about 90% of women have the potential to experience vaginal discharge because Indonesia is an area with a tropical climate, so fungi can develop which results in cases of vaginal discharge. As many as 75% of women have experienced vaginal discharge at least once in their life, in adolescent girls aged 14-24 years the occurrence of vaginal discharge is around 31.8%.[6]At Dr. Kariadi Hospital Semarang in 2015 the most common cause of vaginal discharge was the fungus candida albicans as many as 43,33% on examination of the patient's vaginal discharge. The moist condition of a woman's vagina can trigger the development of fungi that cause vaginal discharge and risk of vulvovaginal candidiasis, about 85-95% of vaginal discharge is caused by the fungus candida albicans. [7-9]

Tahongai (Kleinhovia hospita linn) is one of the medicinal plants currently being widely used by people in East Kalimantan. The Tahongai plant (Kleinhovia hospital linn) belongs to the Malvaceae family, this plant has a different name in each area such as in Central Sulawesi it is called balaroa, South Sulawesi is called paliasa, and in Java itself, it is called katimaha. Tahongai has several pharmacological potentials, including anticancer, antidiabetic, antioxidant, and hepatoprotective. Choice of non-pharmacological drugs from Tahongai leaves (Kleinhovia hospital Linn), which contain active substances such as flavonoid compounds, alkaloids, and saponins that have potential as antifungal agents.[10–12]

## METHODS

This type of research is an in vivo experiment, namely an experiment on living female mice (Mus Musculus) by measuring the effect of the experiment on the dependent variable. The research design used was a pure experimental laboratory (true experiment) with a randomized pretest-posttest control group design. This research has received permission from the ethics commission from the Islamic University of Sultan Agung (Unissula) with the number: 130/IV/2021/Commission on Bioethics. The research subjects were mice. Female mice (Mus Musculus) were reared and adapted for 1 week, then induced by transvaginal candida albicans was given a dose of $10^2$ g candida albicans strain ATCC 10231. This study used 4 groups of female mice (Mus Musculus) consisting of 2 experimental groups. K1 and K2, namely female mice with the administration of Tahongai leaf extract (Kleinhovia Hospita L) with different doses, 1 positive control group, namely female mice with ketoconazole drug administration, and 1 negative control group without any administration. Administration of Tahongai (Kleinhovia Hospita L) leaf extract orally for 14 days with measurements on day 0 (pre-test) and day 15 (post-test). The analysis used paired sample t-test, anova and independent t-test.

## RESULTS

**Table 1: Effect of Tahongai leaf extract on the growth of candida albicans.**

| Time | Negative Control | Positive Control | Dose 1 | Dose 2 | *P value* |
|---|---|---|---|---|---|
| | *Mean* | *Mean* | *Mean* | *Mean* | |
| *Pre test* | 34,33 | 31,83 | 32,67 | 35,33 | 0,992[b] |
| *Post test* | 63,33 | 1,67 | 23,00 | 4,33 | 0,000[b] |
| *Δ CA* | 29,00 | -30,16 | -9,66 | -31,00 | 0,000[b] |
| *P Value* | 0,007[a] | 0,009[a] | 0,430[a] | 0,010[a] | |

*a: Paired T Test ; b: Anova*

In the table, a test is carried out to see the differences between each group before and after being given treatment by using the paired sample t-test parametric test. In the negative control group, a p-value of 0.007 was obtained, the positive control group had a p-value of 0.009, and in the 750mg Tahongai leaf extract group, a p-value of 0.010 <0.05 was obtained, which means that there was a significant difference between before and after the intervention, while in the leaf extract group,

Tahongai 500mg has a p-value of 0.430, which means that there is no significant difference before and after the intervention. So from these results, it can be interpreted that Tahongai leaf extract at a dose of 750mg/kg BW affects decreasing the growth of candida albicans in female mice vaginal candidiasis, while Tahongai leaf extract at a dose of 500mg/Kg BW has no significant difference before and after the intervention

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**Table 2: Comparison of Extract Doses 500mg and 750mg.**

| | **Extract 500mg Mean** | **Extract 750mg Mean** | ***p-value*** |
|---|---|---|---|
| *Pre test* | 32,67 | 35,33 | 0,831[b] |
| *Post test* | 23,00 | 4,33 | 0,006[b] |
| *Δcandida albicans* | -9,66 | -31,00 | 0,148[b] |
| *p-value* | 0,430[a] | 0,010[a] | |

*a: Paired T-test ; b: Independent T-test*

Based on the results of the Independent t-test statistical test in the 500mg extract group and the 750mg extract group, the p-value in the pre-test was 0.831, which means that there was no difference before the intervention was given to the two groups, while in the post-test, the p-value was 0.006, which means that there is a there was a significant difference in mean fungiload levels of candida albicans between the two groups.

## DISCUSSION

In the results of this study, it was found that the leaf extract of Tahongai (Kleinhovia hospita linn) at a dose of 750mg/kg BW could suppress the growth of candida albicans in female mice with vaginal candidiasis with a decrease in the number of colonies by a percentage of 87%, as well as in the positive control group by administering pharmacological drugs. ketoconazole which can suppress the growth of candida albicans fungus with a decrease of 94%. This study is in line with previous research conducted by Parwati which showed the potential of Tahongai leaves in inhibiting candida albicans with a concentration of 100% in vitro in laboratory studies with an inhibitory capacity of up to 15.33 mm, whereas in the use of fluconazole the inhibitory power was almost no different its 14.66mm for 24 hours. This can indicate that the higher the concentration, the greater the inhibitory ability of Tahongai leaves against candida albicans which is a fungal pathogen that causes reproductive disorders and discomfort in women. [12]

Administration of Tahongai (Kleinhovia hospita linn) leaf extract at a dose of 500 mg/kg BW once a day for 14 days had no significant effect on suppressing the growth of candida albicans fungus in female mice vaginal candidiasis with an average decrease in the number of colonies of 9.66 cfu/ml. While the leaf extract of Tahongai (Kleinhovia hospita linn) at a dose of 750mg/kg BW once a day for 14 days affected suppressing the growth of candida albicans in female mice vaginal candidiasis by decreasing the average number of colonies by 31 cfu/ml. This research can be continued in humans with a small number of groups and can also be developed on dependent variables such as other vaginal discharge-causing microorganisms. [10]

Tannin compounds as antifungal candida with a mechanism against the formation of biofilms thereby inhibiting morphogenesis into hyphae. Phenol group compounds can inhibit fungal activity by suppressing the formation of fungal cell walls or by lysing or breaking existing cell walls, alkaloids themselves have antifungal activity by suppressing proliferation in the formation of proteins in cells that result in the death of microorganisms by destroying shrinking peptidoglycan components. so that fungal cell walls cannot develop properly, it can cause damage to candida albicans fungal cells. The tannin compound works as an antifungal, damaging cell by shrinking the candida cell walls. This is also

influenced by the amount of dose given, the stronger the dose, the greater the effectiveness of the killing power on microorganisms because the high dose affects the amount of active ingredients contained in the extract. [13,14]

## CONCLUSION

Tahongai (Kleinhovia hospita linn) leaf extract at a dose of 500 mg/kg BW 1 time a day for 14 days had no significant effect in suppressing the growth of candida albicans in female vaginal candidiasis mice with an average decrease in the number of colonies of 9.66 cfu/ ml. Tahongai leaf extract (Kleinhovia hospita linn) at a dose of 750 mg/kg BW 1 time a day for 14 days affected suppressing the growth of candida albicans in female mice with vaginal candidiasis by decreasing the average number of colonies by 31 cfu/ml.

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**How to cite this article**: Nur Syahria, Suharyo Hadisaputro, Yuni Kusmiyati. The Effect of Tahongai Leaf Extract (Kleinhovia Hospita Linn) on the Growth of Candida Albicans In Female Mice Vaginal Candidiasis. Int J of Allied Med Sci and Clin Res 2022; 10(2): 148-151.

**Source of Support:** Nil. **Conflict of Interest:** None declared.