

**Review Article**

# Effects of Herbal Plants on Candidiasis Vulvovaginalis Therapy

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**Abstract:** Candida vulvovaginitis (CVV) is an infection of the vagina or vulva by genus *Candida* with a variety of clinical manifestations that can occur acutely, chronically or episodically. An estimated 75 percent of women will have at least one episode of vulvovaginal candidiasis and 40 to 50 percent will have two or more, accompanied by vulvar symptoms such as itching, burning, irritation, odor and vaginal discharge. Fluconazole is diverse effective topical azole agents accessible in a variety of formulations for cvv treatment, because they are notably safe and well tolerated. Not many people know the effect of fungi protective in herbal medicinal plants in the treatment of CVV. Cumulative evidence suggests that ayurveda and some Chinese herbal medicines have a beneficial role in slowing the progression of CCV. On the other hand, some Chinese herbal medicines may be hazardous to patients with systemic disease. In this review, we discuss recent advances in the research of some plants herbs for natural pharmacological intervention of progressive CVV diseases.

**Keywords:** Candida Vulvovaginitis(CVV), Plants Herbal, Fungiprotective Effects

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## 1. Introduction

Vaginitis is a common place medical problem in women [1]. Vaginitis is the most prevalent gynecological problem for which woman seeks for treatment and is annually responsible for 10 million physician visits. Bacterial vaginitis and Candidiasis vulvovagialis (CVV) are the most prevalent causes of marked vaginitis, due to the high recurrence of vaginitis, many women quit antimicrobial treatments and use complementary treatment by medicinal plants [2]. CVV is a one of the gynecological problems in women and common fungal infection in adult women in reproductive age [3]. Around the world women with any races and at any ages would infected to Vulvovaginal candidiasis and this disease is

one of the most repeated diseases [4]. CVV is an acute inflammatory disease and a frequent reason for gynaecological consultation as it can affect up to 75% of women of child-bearing age [5]. Recent epidemiological investigations have suggested that the prevalence of RCVV may be higher than previously estimated and can be as high as 7–8% of women who experience a first episode [6].

*Candida* species belongs to the normal microbiota of an individual's mucosal oral cavity, gastrointestinal tract and vagina [7], and are responsible for various clinical manifestations from mucocutaneous overgrowth to bloodstream infections [8]. CVV is caused by the overgrowth of *Candida* species, most commonly *Candida albicans*, in the vagina and is characterized by curd-like vaginal discharge,

itching and erythema [9, 10]. CVV frequency is the last decade are increasing the use of antibiotics that are broad enough. The use of broad spectrum antibiotics is one of the predisposing factors that influence the occurrence of candida infections [11], such as use butoconazole, clotrimazole, miconazole, econazole, fenticonazole, sertaconazole, ticonazole, terconazole are diverse effective topical azole agents accessible in a variety of formulations for cvv treatment, because they are notably safe and well tolerated, but oral azoles can cause systemic toxicity dramatically with ketoconazole [5]. Therefore, the biologically active components of herbal plants improve human health through the herbal derived medicine as an alternative source.

Plants have been used for medicinal purposes long before recorded history. Ancient Chinese and Egyptian papyrus writing describe medicinal uses for plants as early as 3,000 BC. Indigenous cultures (such as African and Native American) used herbs in their healing ritual, while others developed traditional medical systems (such as Ayurveda and Tradicional Chinese Medicine) in which herbal therapies were used. Researchers found that people in different parts of the world tended to use the same or similar plants for the same purposes. The use of herbal supplements has increased dramatically over the past 30 years. Herbal supplements are classified as dietary supplements by the U.S Dietary Supplement Health and Education Act (DSHEA) of 1994. Little is known about the fungiprotective effects of Chinese herbal medicine. In fact, Chinese herbal medicines have a long history of use in the treatment of various CVV diseases. To date, a substantial body of evidence suggests that some Chinese herbs possess a range of important pharmacological properties in retarding progressive CVV. Plants have been a key source for the discovery of new drugs and higher plants may provide a potential antifungal lead against the resistance strains of *C. albicans* [12]. In this review, we discuss recent advances in the research on some of these Chinese herbs for pharmacological intervention in progressive CVV diseases as well as the potential from other Chinese herbal medicines.

## 2. Discussion

In the present paper, we studied the plants having effects on vaginitis. Hence, there is an essential need to find new agents having more efficacy and safety rather than current ones. To use natural remedies dates back thousands of years, it also calculated that there are 250,000-500,000 species of plants on Earth [13] that it can be a great hope to discover new pharmacological agents with more efficiency and less or no undesirable side effect.

### *Syngonanthus nitens* (Bong):

The genus *Syngonanthus*, a member of *Eriocaulaceae*, includes about 200 species found in Africa and America, with *Syngonanthus nitens* (*S. nitens*) exclusively found in South America [14]. The scape from *S. nitens* are used in the manufacture of ornamental products [14, 15]. Chemical studies have shown the presence of important flavones, predominantly luteolin *o*-and *C*-glucosides and apigenino-

glucosides [15]. There was identified 17 compounds among flavones and xanthenes, including six new molecules in *S. nitens* extracts [16]. Investigated the antifungal, cytotoxic and hemolytic properties of methanolic extracts of scape from *S. nitens* and the antifungal activity of a vaginal cream in an immunosuppressed rat model of CVV, that is *S. nitens* extracts could be considered as an effective non-toxic natural antifungal agent in the treatment of CVV [17].

### *Euphorbia hirta* L:

Longer exposure to the extract inhibits the total growth of *C. albicans*, seed extract of *E. hirta* L, possesses anticandidal activity against *C. albicans* strain in the electron microscopy observations. The *E. hirta* L has never been evaluated for anti-Candida activity before, it is the first time to study anti candida activity [18]. A Transmission Electron Microscopy (TEM) study of the diversity of *C. albicans* cells induced by *E. hirta* L leaf extracts in vitro was studied to determine the major changes in the microstructure of *C. albicans* after treatment with *E. hirta* L leaf extract. It was found that the main abnormalities were the alteration in morphology, lysis and complete collapse of the yeast cells after 36 h of exposure to the extract. Whereas the control (untreated) cultures showed a typical morphology of candida with a uniform central density, typically, structured nucleus, and a cytoplasm with several elements of endomembrane system and enveloped by a regular, intact cell wall. The significant antifungal activity shown by this methanol extract of *E. hirta* L suggest its potential against infections caused by *C. albicans* [18]

### *Centella asiatica* (CA):

CA (linn) belongs to the family of the umbelliferae (apiaceae) in specific to the hydrocotyle subfamily [19]. The plant is indigenous to South-East Asia, Srilanka, China, The western South Sea Islands, Madagascar, South Africa, South East United States, Mexico, Venezuela, Columbia and Eastern South America [20]. CA gained its popularity by its medicinal properties [21]. The experiment is scrutinized in targeting, the particular therapeutically active compound Asiatic acid from CA against *C. albicans* was resistant at lower concentration against asiatic acid and at highest concentration the zone of inhibition with 6 mm at 100 µg/well. In the view of versatile medicinal properties, the Asiatic acid derived from CA show activity against fungal strain. Consequently, the Asiatic acid can be taken for the further antifungal activity with the broad spectrum to develop as a drug, as the alternative treatment for fungal infections with less adverse effect.

### *Cymbopogon citratus* (DC) Stapf (*Gramineae*)

*Cymbopogon citratus* (DC) Stapf (*Gramineae*) is an herb worldwide known as lemongrass [22]. Lemongrass oil is characterized for monoterpenes compounds, and citral is the major component, present at levels of, approximately, 65-85%. Citral (3,7-dimethyl-2,6-octadienal) is the name given to a natural mixture of two isomeric acyclic monoterpene aldehydes: geranial (*trans*-citral, citral A) and neral (*cis*-citral, citral B). In addition to citral, the lemongrass oil consists of small quantities of geraniol, geranylacetate and monoterpene olefins, such as myrcene [23]. The antifungal activity of the lemongrass oil and citral against yeasts was determined using

the disk diffusion method [24]. Their mechanism of action appears to be predominantly on the fungal cell membrane, disrupting its structure causing leakage and cell death; blocking the membrane synthesis; inhibition of the spore germination, fungal proliferation and cellular respiration [25]. Because of high volatility and lipophilicity of the essential oils, they are readily attached to penetrate into the cell membrane to exert their biological effect [26]. Onawunmi (1989) reported that the MIC value obtained for citral against *C. albicans* was 0.05% (v/v), and this value was similar to those obtained in studies with lemongrass oil [27]. In addition, the lemongrass oil (100 µg/mL) and citral (25-200 µg/mL) inhibited the mycelial growth of *C. albicans*, suggesting the potential value of lemongrass oil for the treatment of cutaneous candidiasis [28]. The antifungal activity presented by lemongrass oil and citral were similar, and corroborates with literature, which indicated a significant association between the effect and the presence of citral in lemongrass oil [27, 29]. The Literature points that citral acts as a fungicidal agent because it is able to form a charge transfer complex with an electron donor of fungal cells, resulting in fungal death [30].

#### *Areca Catechu, L. Piper Betle L.*

Vulvovaginal candidiasis is a fungal infection caused by various types of *Candida*, especially of the type of *Candida albicans*. These infections often attack women with clinical features include the presence of hyperemia at the vaginal introitus and vaginal wall, the labia minora swell advanced stage, presence of watery vaginal discharge and become thick, yellow vaginal discharge to green, the main complaints of itching at night. Plant seeds areca (*Areca catechu* L.) and red betel leaf (*Piper betle* L. var. *rubrum*) containing Ævonid, alkaloids, such as arecoline, arekolidine, arekain, guvakolin, guvasine and isoguvanine, condensed tannins. Alternative in the treatment of vulvovaginal candida fungus can use traditional medicine easier and cheaper encountered. This study uses an experimental laboratory with diffusion and dilution methods. The synergistic effects of anti fungal extract of betel nut (*Areca catechu*, L.) and red betel leaf (*Piper betle* L.) can be used for the prevention of vulvovaginal candidiasis at the lowest concentration of  $7.6 \times 10^{-8}$  in the ratio of red betel and areca nuts 1: 2. This is the same effectiveness with betel nut with a concentration of 100%. Conclusion the absence of a synergistic effect of anti fungal extracts of red betel and areca nuts against candida vulvovaginal [31]

#### *Terminaliacatappa*

The Tropical almond leaf is one natural ingredient that has anti-fungal activity because of its saponin content. This study aimed to compare the effectiveness of in vitro tropical almond (*Terminalia catappa*) leaves extract and ketoconazole 2% against the growth of *Candida albicans* in vulvovaginal candidiasis. *C. albicans* colonies were grown only in one over 30 media with TCE. The conditions of chi-square test were not met, thus Fisher's exact test was used and the result was  $p=1,00$  (not significant). The effectiveness of TCE is similar to 2% ketoconazole in inhibiting the growth of in vitro *Candida albicans* from vulvovaginal candidiasis patients. This study still needs further research (in vivo). [32]

### 3. Conclusions

Candidiasis vulvovaginalis (CVV), the second most common reason of vaginitis, is recognized in up to 40% of women with vaginal complaints in the primary care setting [33]. About 70% of women underwent the infection caused by *Candida spp*, at least once through their lives. Moreover 40-50% of women will experience a reappearance [34]. Summary, cumulative evidence suggests that some Chinese herbal medicines, including *Syngonanthus nitens*, *Euphorbia hirta* L., *Centella asiatica*, *Cymbopogon citratus* (DC) Stapf (*Gramineae*), *Areca Catechu*, *L. Piper Betle* L., *Terminaliacatappa* have a beneficial role in slowing the progressive CVV disease. Such studies are nevertheless required to confirm the positive effects of these herbs. The frequency of herb-related nephrotoxicity could be markedly reduced if the herbs are prescribed strictly according to the recommendation of the pharmacopoeia with attention to its origin, dose, way of preparation, and duration of intake. Plants have been a key source for the discovery of new drugs and higher plants may provide a potential antifungal lead against the resistance strains of *Candida albicans*.

### Conflicts of Interest

The authors declare no conflict of interest

### References

- [1] Nyirjesy, P., C. Peyton, M. V. Weitz, L. Mathew and J. F. Culhane. Causes of chronic vaginitis: Analysis of a prospective database of affected women. *Obstet. Gynecol.*, 108: 1185-1191, 2006.
- [2] Imhof M, Lipovac M, Kurz C, Barta J, Verhoeven HC, Huber JC. Propolis solution for the treatment of chronic vaginitis. *Int J Gynaecol Obstet.*; 89 (2): 127-32, 2005.
- [3] Abdelmonem, A. M., Rasheed, S. M., & Mohamed, A. Bee-honey and yogurt: a novel mixture for treating patients with vulvovaginal candidiasis during pregnancy. *Arch Gynecol Obstet*, 286 (1), 109-114, 2012. doi: 10.1007/s00404-012-2242-5.
- [4] Babic, M., & Hukic, M. *Candida albicans* and non-*albicans* species as etiological agent of vaginitis in pregnant and non-pregnant women. *Bosnian journal of basic medical sciences/Udruzenje basicnih medicinskih znanosti = Association of Basic Medical Sciences*, 10 (1), 89-97, 2010.
- [5] Sobel, J. D. Vulvovaginal candidosis. *Lancet*, 369: 1961-1971, 2007.
- [6] Foxman B, Muraglia R, Dietz JP, Sobel JD, Wagner J. Prevalence of recurrent vulvovaginal candidiasis in 5 European countries and the United States: results from an internet panel survey. *J Low Genit Tract Dis*; 17: 340-5, 2013.
- [7] Shao L. C., Sheng C. Q., Zhang W. N. [Recent advances in the study of antifungal lead compounds with new chemical scaffolds]. *Yao Xue Xue Bao* 42, 1129-1136, 2007.

- [8] Eggimann P., Garbino J., Pittet D. Epidemiology of *Candida* species infections in critically ill non-immunosuppressed patients. *Lancet Infect Dis* 3, 685–702, 2003.
- [9] Rathod SD, Klausner JD, Krupp K, Reingold AL, Madhivanan P. Epidemiologic Features of Vulvovaginal Candidiasis among Reproductive-Age Women in India. Hindawi Publishing Corporation, *Infect Dis Obstet Gynecol*; 8, 2012.
- [10] Nviriesy P. Vulvovaginal Candidiasis and bacterial vaginosis infections. *North Am J Clin Diseases*; 22:637-652, 2008.
- [11] Janik MP, and Heffernan MP. Yeast infection: *Candida* and *Tinea* (Pitryasis) versicolor. In: Wolf K, Goldsmith LA, Katz SI, Gilehrest BA, Paller AS, Leffel DJ. Editors. *Fitzpatrick's dermatology in general medicine*. 8<sup>th</sup>. ed. New York: Mc-Graw-Hill; p 2300-1. 2012.
- [12] Rekha, S, Vidyasagar GM. Anti-candida activity of medicinal plants a review. *International journal of pharmacy and pharmaceutical sciences (IJPPS)*, 5 (4): 9-16. 2013.
- [13] Borris, R. P. Natural products research: Perspectives from a major pharmaceutical company. *J. Ethnopharmacol.*, 51: 29-38, 1996.
- [14] Giulietti A. M., Scatena V. L., Sano P. T, et al. Multidisciplinary studied on neotropical Eriocaulaceae. In: Wilson K. L, Morrison D. A (eds *Monocots: Systematics and evolution*. Melbourne: CSIRO Publishing: 580-589, 2000.
- [15] Ricci C. V, Patricio M. B. C, Salatino M. L. F, et al. Flavonoids of *Syngonanthus* Ruhl. (Eriocaulaceae): Taxonomic implications. *Biocher Syst Ecol*: 24; 577-583, 1996.
- [16] Pacifico M, Napolitano A, Masullo M, et al. Metabolite fingerprint c “capim dourado” (*Syngonanthus nitens*), a basis of Brazilian handicrafts. *Ind Crops Prod*; 33: 488-496, 2011.
- [17] Marcelo GDF, Mariana P, Wagner V, Lourdes CDS, Paula AI, et al. Evaluation of *Syngonanthus nitens* (Bong) Ruhl. Extract as antifungal and in treatment of vulvovaginal candidiasis. In *Medical mycology: official publication of the International Society for Human and Animal Mycology* 51 (7). June 2013.
- [18] Abu Arra Basma, Zakaria Zuraini, Sreenivasan Sasidharan. A Transmission electronmicroscopy study of the diversity of *Candida albicans* cells induced by *Euphorbia hirta* L leaf extract in vitro. *Asian Pacific Journal of Tropical Biomedicine*. p 20-22. 2011
- [19] Jiang SU. *Dictionary of Chinese materia medica*. Shanghai Scientific and Technical Publishing House. 1874. 1977.
- [20] Helmi Yousef Alfarra, Mohammad Nur Omar. *Centella asiatica* from folk remedy to the medicinal biotechnology- a state revision. *International Journal of Biosciences*, 3 (6): p 49-67. 2013.
- [21] Kashmira J. Gohil, Jagrutti A. Patel, Anuradha K. Gajjar. Pharmacological review on *Centella asiatica*: A potential herbal cure. *All Indian J Pharm Sci*, 72 (5): p 546-556. 2010.
- [22] Carlini E. A., Contar J. D. P., Silva-Filho A. R., et al. Pharmacology of lemongrass (*Cymbopogon citratus* Stapf). I. Effects of teas prepared from the leaves on laboratory animals. *J Ethnopharmacol*; 17: 37-64. 1986.
- [23] Ferreira M. S. C., Fonteles M. C. Aspectos etnobotânicos e farmacológicos do *Cymbopogon citratus* Stapf (capim limão). *Revista Brasileira de Farmácia*; 70: 94-7. 1989.
- [24] Schuck V. J. A., Fratini M., Rauber C. S., et al. Avaliação da atividade antimicrobiana de *Cymbopogon citratus*. *Revista Brasileira de Ciências Farmacêuticas*; 37: 45-9. 2001.
- [25] Harris R. Progress with superficial mycoses using essential oils. *International Journal of Aromatherapy*; 12: 83-91. 2002.
- [26] Inouye S. Laboratory evaluation of gaseous essential oils (part 1). *International Journal of Aromatherapy*; 13: 95-107. 2003.
- [27] Onawunmi G. O. Evaluation of the antimicrobial activity of citral. *Lett Appl Microbiol*; 9: 105-8. 1989.
- [28] Abe S., Sato Y., Inouye S., et al. Anti-*Candida albicans* activity of essential oils including lemongrass (*Cymbopogon citratus*) oil and its component, citral. *Jpn J Med Mycol*; 44: 285-91. 2003.
- [29] Wannissorn B., Jarikasem S., Soontornantasart T. Antifungal activity of lemon grass and lemon grass oil cream. *Phytotherapy Res*; 10: 551-4. 1996.
- [30] Kurita N, Miyaji M., Kurane R., Takahara Y. Antifungal activity of components of essential oils. *Agric Biol Chem*; 45: 945-52. 1981.
- [31] Rahajeng Putriningrum, Annisaul Khoiriya, The synergistic effects of anti fungal extract of betel nut (*Areca catechu*, L.) and red betel leaf (*Piper betle* L.) can be used for the prevention of vulvovaginal candidiasis *Jurnal KESMADASKA* Vol. 5 No. 1 Januari 2014. <http://jurnal.stikeskusumahusada.ac.id/index.php/JK/article/view/50/53>.
- [32] Gracia Rutyana Harianto, 2010. Pengaruh Pemberian Ekstrak Daun Ketapang (*Terminalia catappa*) Dan Ketokonazol 2% Terhadap Pertumbuhan *Candida albicans* Secara *In Vitro* Pada Kandidiasis Vulvovaginalis. <http://eprints.undip.ac.id/23378/1/Gracia.pdf>.
- [33] Ilkit, M and A. B. Guzel, The epidemiology, pathogenesis and diagnosis of vulvovaginal candidosis: A mycological perspective. *Crit. Rev. Microbiol.*, 37: 250-261, 2011.
- [34] Corsello, S., A. Spinillo, G. Osnengo, C. Penna and S. Guaschino et al. An epidemiological survey of vulvovaginal candidiasis in Italy. *Eur. J. Obstet. Gynecol. Reprod. Biol.*, 110: 66-72, 2003.