In Vitro Antifungal Activity of Clove Oil against Candida Albicans Isolated from Clinical Samples

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ABSTRACT

The main goal of this study was to investigate the antifungal activity of clove oil against candida albicans of vaginal candidiasis in females from Syria. An in vitro study was carried out using the following Candida albicans strains involved in vaginal candidiasis using the well diffusion (WD) testing. Candida albicans (ATCC 90028) and 15 strains were compiled from Aleppo University Hospital. These strains were collected from women having vaginal candidiasis. The antifungal activity of clove oil was determined in the form of inhibition zone using antifungal assay by agar WD testing. In all experiments, the obtained results indicated that clove oil has inhibitory effects on Candida albicans (ATCC 90028) and against 15 fungal strains. This study showed that clove oil was active against the tested Candida albicans strains. Clove oil was more effective against Candida albicans compared to the antifungal antibiotics nystatin, ketoconazole and itraconazol. Clove oil may have potential for use in the development of clinically useful antifungal preparations. Therefore, clove oil might be clinically effective in the natural prevention treatment of vaginal candidiasis.

KEYWORDS: Vaginal candidiasis; Candida albicans; Clove oil; Well-diffusion assay.

Introduction

Fungal infections have been increased in recent years due to a growing number of high-risk patients. (Pinto et al., 2008). Vaginal candidiasis is caused by the overgrowth of a fungal species Candida albicans in the vaginal flora (Sobel et al. 1998). The symptoms of vulvovaginal candidiasis include pruritus (itching), soreness, change in vaginal discharge, and dyspareunia (Sobel, 1997; Sobel, 2007), and can disrupt sexual and social functioning (Peyton et al. 2006). Vaginal candidiasis can be sexually transmitted or associated with sexual activity, but commonly occurs in women who are not sexually active. Risk factors associated with vaginal candidiasis include elevated estrogen, diabetes mellitus, use of antibiotics and immune suppression (Sobel, 2005).

In 20% of healthy asymptomatic women, Candida species can be found in the lower genital tract flora (Sobel, 2005). Vulvovaginal candidiasis is common in adults: 70-75% of women are affected by this infection at least once in their lives. Nearly 50% of adult women will experience a second case and 5-8% of women will report four or more episodes (Sobel, 2007). Unfortunately, few antifungals medicines are available for treating funginfections, not to mention that most of them have serious side effects (Wang et al., 2012).

Aromatic plants have been used in folk medicine as antimicrobial agents since ancient times (Cowan, 1999; Grayer and Harborne, 1994). The essential oils (EOs) from many plants are known to possess antibacterial and antifungal activity (Bakkali et al., 2008; Burt, 2004; Dorman and Deans, 2000). EOs have been empirically used as antimicrobial agents, but the spectrum of activity and mechanisms of action remain unknown for most of them. Although only limited consistent information exists about activity toward human fungal pathogens, some EOs have shown important antifungal activity against yeasts, dermatophyte fungi and Aspergillus strains, which could predict therapeutic benefits, mainly on diseases involving mucosa, the skin and the respiratory tract (Cavaleiro et al., 2006; Pina-Vaz et al., 2004; Pinto et al., 2006). They constitute, in this way, complementary or alternative therapeutic options that are increasing in popularity, yet they still have scant scientific credibility.

The clove oil has been described as having useful antiseptic, analgesic and anesthetic effects (Chaieb et al., 2007a) and is largely used in dental medicine. Previous studies have reported antifungal activity for clove oil against yeasts and filamentous fungi, such as several food-borne fungal species (Velluti et al., 2004; Lopez et al., 2005) and human pathogenic fungi (Gayoso et al., 2005; Chaieb et al., 2007b). Clove oil has also been tested as antifungal agents in animal models (Chami et al., 2004ab, Ahmad et al., 2005). Clove oil is reported to have strong antifungal activity against many fungal species.