GC-MS Analysis of Anti-Candida and Antioxidant Activities of Hydroalcoholic Leaf Extract of Chaerophyllum macropodum

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Abstract

Background: Chaerophyllum is a genus from the Apiaceae family. Chaerophyllum macropodum as a wild species is endemic to Iran and Turkey. The leaves of this plant are used in the food industry, as well as medicine. Since resistance has increased in some Candida species, side effects of chemical drugs and the use of medicinal plants are very important.

Objectives: We reviewed the antioxidant and anti-Candida effects of hydroalcoholic leaf extracts of C. macropodum.

Methods: For the evaluation of the antioxidant potential of C. macropodum extracts, DPPH radical scavenging test, reducing power assay, and β-carotene bleaching test were performed. Moreover, the total free phenolic and flavonoid contents were measured. A GC-MS instrument was used for analyzing the extract components. In addition, hydroalcoholic extraction was performed by agar well-diffusion method against 40 Candida species isolated from patients.

Results: According to the DPPH test, a moderate antiradical activity was attributed to C. macropodum leaf extract; maximum inhibition (6.38) was reported at 1000 μg/mL. Based on the findings, the total phenolic and flavonoid contents were 57.43 ± 0.25 and 138 ± 19.80 (mg/g), respectively. The minimum inhibitory concentrations for C. albicans and C. glabrata were 300 and 400 μg/mL at 48 hours, respectively.

Conclusions: In this study, a moderate antioxidant activity was attributed to C. macropodum leaf extracts. In addition, the results confirmed that leaf extracts had inhibitory activity against bacteria and Candida species. Therefore, they may be applied as antioxidant, antibacterial, and antifungal agents in food protection.

Keywords: Chaerophyllum, Candida, Antioxidant Activity, Hydroalcoholic Extract

1. Background

Chaerophyllum genus, from the Apiaceae family, includes nearly 110 species in temperate and sub-temperate regions of Asia, Africa, and Europe. Chaerophyllum (chervil) is a native herb with weak stems and leaves, similar to parsley or parsley-like leaves. C. macropodum is known as "Gazarsare" in Mahdsihahr (Sangsar) and "Jafari Frangi Kohi" in Iran. Eight Chaerophyllum species have been found in Iran, including C. macropodum, which is a wild species endemic to Iran and Turkey. The leaves of this plant are used in the food industry, as well as medicine. Previous studies have confirmed the presence of phenolic acids and constituents with cytotoxic and antimicrobial activities in Chaerophyllum species (1-4).

Candida species, particularly Candida albicans, are common pathogens in patients with organ transplantation, AIDS, and neoplastic disease, immunocompromised patients, and users of immunosuppressive drugs and broad-spectrum antibiotics. Recently, the use of medicinal plants has been highlighted, as natural products with therapeutic properties are cost-effective, available, and beneficial. In addition, chemical drugs have more side effects. Treatment of some diseases using medicinal plants, especially herbs, is in its infancy. On the other hand, researchers try to detect the active constituents of extracts to treat different diseases.

2. Objectives

We aimed to examine the anti-Candida and antioxidant potential of hydroalcoholic leaf extracts of C. macropodum via GC analysis.