

Antifungal effect of *Allium sativum* either individually or in combination with Fluconazole, Itraconazole and Ketoconazole against pathogenic yeasts

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Abstract

Background and Objective: The increase of nosocomial systematic fungal infections due to pathogenic yeast, led to researchers on finding novel antifungals with potent inhibitory activity toward a wide range of pathogenic fungi. In the present study, antifungal effect of aqueous garlic extract individually and in combination with Fluconazole, Itraconazole and Ketoconazole were studied against some pathogenic yeasts.

Materials and Methods: Broth microdilution method was used for evaluating antifungal activities of aqueous garlic extract with 0.03-256 µg/ml individually and in combination with Fluconazole, Itraconazole and Ketoconazole against *Candida albicans* PTCC5057, *Candida dubliniensis* CD36, *Cryptococcus neoformance* CNE1 and *Malassezia furfur* MF1, in vitro. The microdilution method was used for assessing antifungal susceptibility of above-mentioned compounds in two culture media sabouraud dextrose broth (for all fungi except *M.furfur*) and modified Dixon broth (for only *M.furfur*). The minimum inhibitory concentration (MIC) and minimum fungicidal concentration (MFC) of aqueous garlic extract and antifungal drugs tested were determined by on comparison of colony forming units (CFU) between test and control groups.

Results: Aqueous garlic extract inhibited the growth of all fungi tested in a dose-dependent manner, in a concentration comparable with azole drugs. The MIC ranges of aqueous garlic extract, *Candida albicans*, *Candida dubliniensis*, *Cryptococcus neoformances* and *Malassezia furfur* was determined to be 0.25-64 g/ml. The MIC ranges of aqueous garlic extract in combination with Fluconazole was determined 0.125-8, 0.25-16, 0.125-16 and 0.5-8 µg/ml, respectively. The MIC ranges of aqueous garlic extract in combination with Itraconazole was determined 0.25-8, 0.125-2, 0.125-16, 0.25-4 µg/ml, respectively. The MIC ranges of aqueous garlic extract in combination with Ketoconazole was determined 0.125-4, 0.125-1, 0.125-8 and 0.125-2 µg/ml, respectively. The results indicated that the antifungal activities of drugs were increased in combination with aqueous garlic extract (P<0.05).

Conclusion: This study showed that, the aqueous garlic extract increased the antifungal activity and decreased MIC of drugs in combination with them.

Keywords: Pathogenic yeasts, *Allium sativum*, Fluconazole, Itraconazole, Ketoconazole, Synergistic effects

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