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Bitter Orange may be used to Treat Patients with Anti-Fungal Drug-Resistant Candida Infection.

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Abstract:

Background: Bitter orange (*Citrus aurantium*) extracts are used by tribal populations throughout the globe for treatment of wide spectrum of diseases but its efficacy as an anti-fungal agent particularly on non-albicans *Candida* spp. is largely unknown. At present the most prevalent species of candida in human infections in India is *Candida tropicalis* and infections caused by *Candida albicans* are on the wane. In most of the cases, this non-albicans *Candida* spp. are resistant not only to fluconazole, but are also resistant to amphotericin B to some extent. Thus, in this context, we were interested in studying anti-fungal activities of bitter orange extract against the multiple anti-fungal drug-resistant *Candida* spp. isolated from blood from patients suffering from candidaemia.

Methods: Alcoholic extracts of bitter orange leaves were prepared following standard pharmacological protocols and different aqueous concentrations of the extracts were prepared after evaporating the alcohol and they were challenged in lawn cultures of ten wild strains of *Candida albicans*, eighteen wild strains of *Candida tropicalis* and two wild strains of *Candida parapsilosis* by gel diffusion techniques. This was followed by study in broth cultures with bitter orange and fluconazole at different concentrations following standard protocols. **Results:** It was found that bitter orange could inhibit growth of all *Candida* spp. (100%) with a minimum anti-fungal concentration of 10 micrograms/mL. Most of the *Candida* spp. were resistant to fluconazole (60%). **Conclusion:** Bitter orange is a good anti-fungal agent effective on *Candida albicans* as well as other non-albicans *Candida* spp. It can also be used in infections with anti-fungal drug-resistant *Candida* spp. Bitter orange is widely consumed in large quantities against different diseases particularly in tribal populations thus it appears to be non-toxic and may be used easily.