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Composition and antifungal activity of *Zhumeria majdae* essential oil

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Background & Purpose: The essential oils from different plants are extensively used in the perfume, beverage and food industries and are reported to exhibit antimicrobial activities against a variety of fungi. *Zhumeria majdae* is a rare and endemic medicinal plant species grown wild in Iran. The leaves have been used for many years as a curative for stomach aches, as an antiseptic, carminative especially in infants and for treatment of painful menstruation. This plant belongs to the Lamiaceae family and has a strong and pleasant odor.

Materials & Methods: Gas chromatography/mass spectrometry (GC/MS) analysis was performed to determine the main constituents of aerial part of *Z. majdae* essential oil. Also the minimum inhibitory concentration (MIC) was determined using serial dilution method.

Results: Based on GC/MS analysis, 31 compounds representing 95.36% of the aerial part oil, respectively were identified; of which linalool (63.40%) and camphor (27.48%) were the major compounds. Total phenolic content was 42.74 mg GAE/g dw. The hydro distilled essential aerial part oil display potential of antifungal activity against the tested 7 phytopathogenic fungus (*Candida albicans*, *Trichophyton mentagrophytes*, *Aspergillus flavus*, *Trichophyton rubrum*, *Microsporum canis*, *Microsporum gypseum* and *Epidermophyton floccosum*). The inhibition zones and MIC values for all test strains, which were sensitive to the essential oil of *Z. majdae* were in the range of 29 mm and 0.015 µl ml⁻¹, respectively.

Conclusion: The results support the traditional usage and also possible use of *Z. majdae* essential oil in the food, pharmaceutical and cosmetic industries.

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Prophylactic effects of *Bifidobacterium bifidum* (strains of human origin), probiotic feeding on *Escherichia coli* O157:H7 infection in rats (*in vivo* antagonism)

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The *B. bifidum* strain (Bf1) was isolated on MRS medium contained 0.5 g/L of cysteine hydrochloride, 2 mg/L of nalidixic acid and 0.1 mg of mupirocin. This strain was isolated from (breastfed infant feces). The effectiveness of *Bifidobacterium bifidum* Bf1 as a probiotic against enterohemorrhagic *Escherichia coli* O157:H7 infection was studied using the rats model, were fed the probiotic for 7 days before or after single challenge with *E. coli* O157:H7. Fecal *B. bifidum* Bf1 and *E. coli* O157:H7 counts obtained by selective culturing methods were assessed for 1 week before and after infection while feed intake, body weight and composition were monitored during 1 week after infection. Histology of gut tissue (intestine) was analyzed until 1 and 2 weeks post infection, respectively. The pathogenicity of *E. coli* O157:H7, marked by body weight loss and intestinal histopathological changes in the infected group was significantly reduced in the *B. bifidum* treated group. Feeding *B. bifidum* Bf1 for 7 days before infection resulted in greater post challenge feed intake and weight gain and lower fecal levels of *E. coli* O157:H7. A lesser degree of protection against *E. coli* O157:H7 infection was observed when bifidobacteria were given during the 7 days after *E. coli* O157:H7 infection. These results demonstrate that feeding the probiotic *B. bifidum* Bf1 to rat can reduce the severity of *E. coli* O157:H7 infection and suggest that this strain represents a good candidate for the prevention of enteric infections in human.

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