

Short Communication

Invitro Antitrichomonas Activity of *Allium hirtifolium* (Persian Shallot) in Comparison with Metronidazole

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Abstract

Trichomonas vaginalis infection is a sexually transmitted infection causing vaginitis and acute inflammatory disease of the genital mucosa. Although Metronidazole resistance in *T. vaginalis* is well documented, The only drug approved for the treatment of trichomoniasis in some countries is metronidazole. Genus *Allium* plants including garlic; shallot and onion have had an important medicinal role for centuries. Some study have proven antibacterial, antifungal, antiviral, antiprotozoal and antihelminthic properties of genus *Allium* plants. at first PSHE and PSDE (persian shallot hydroalcoholic and dichlromethanic extract) was prepared in ethanol/water (50:50) and dichlromethane respectively at cool temperature (10°C). genus *Allium* plants extracts were shown to decrease the oxygen uptake, reduce the growth of the organism, inhibit the synthesis of lipids, proteins and nucleic acids and damage membranes. In this study the Minimal Inhibitory Concentrations (MICs) of PSHE, PSDE and metronidazole respectively were 10, 5 and 2µg/ml. Persian shallot inhibited growth of *T. vaginalis* at low concentrations and in short times, therefore this plant have some antitrichomonas components (including allicin, ajoene and other organosulfides) that antimicrobial properties of these was proven.

Keywords: *Metronidazole*, *Persian shallot*, *Allium hirtifolium*, *Trichomonas vaginalis*

Introduction

Trichomonas vaginalis is a primitive protozoan infecting of the urogenital tract of humans (1). Although there are some reports that trichomoniasis cases are declining in some developed areas (2-4), recent evidences suggest that sexually active inner-city and third world populations are experiencing a resurgence of the disease (5). An estimated 7.4 million new cases occur annually (6). It is the most common protozoan infection in Europe and North America (7).

The only drug approved for the treatment of trichomoniasis in some countries is metronidazole (8). Metronidazole resistance in *T.vaginalis* is well documented, and the principal mecha-

nisms have been defined (8). It has some side effects including metallic taste, nausea, transient neutropenia, an effect like that of disulfiram with alcohol, interaction with warfarin, and peripheral neuropathy(9).

Persian shallot (*Allium hirtifolium*) is a native plant in Iran. The use of genus *Allium plants* including shallot, garlic and onion as medicine and condiment predates written history (10, 11). More recently evidences of genus *Allium plants* antibacterial, antifungal, antiviral, antiprotozoal and antihelminthic properties were proven (10). These plants can treat diabetes, arthritis, colds and flu, stress, fever, coughs, headache, hemorrhoids, asthma, arteriosclerosis and cancer (12).

Materials and Methods

Preparation of PSHE and PSDE (persian shallot hydroalcoholic and dichloromethanic extract)

At first, Persian shallot corns collected from Khansar, Iran, was washed with tap water and cut into small slices. Then, the slices were macerated in ethanol/water (50:50) for one month at cool temperature (10 °C). After that, the extract was filtered through cotton cloth, completely air-dried at 10 °C and dry extract was collected. The dry extract was preserved at -2 °C and used later (13).

For preparation of PSDE, all above steps was done except instead of ethanol/water (50:50), dichloromethane was used.

Parasite culture For evaluating inhibitory effect of the extract, Iranian strain of *T. vaginalis* (prepared in the protozoology unit of the School of Public Health, Tehran University of Medical Sciences, Iran) was cultured in Diamond's culture medium supplemented with 500 IU/ml streptomycin at 37 °C.

Preparation of stock solutions Concentration of 0.1 g/ml of PSHE in distilled water was prepared as stock and sterilized through a 0.22 µm millipore filter. Concentration of 0.1 g/ml of PSDE in solution A (contained 10% MeOH, 0.2% Tween 80 and 5% ethylacetate in distilled water) was prepared as stock and sterilized through a 0.22 µm millipore filter.

Exposure and evaluation Stock solutions of extracts and metronidazole were diluted in sterile distilled water to produce twofold serial dilutions ranging from 1 to 256 µg/ml, and 1 ml portions of each concentration were added to test tubes. Portions of 1 ml of a culture medium suspension (1.0×10^3 trophozoites of *T.vaginalis*) were added to the tubes that contained culture medium and PSHE, PSDE, cavacrol, metronidazole or controls (DW, solution A, and ethanol 19%). These tubes were then incubated at 37 °C for 48 h. The lowest concentration of each test plant components that prevented visible growth was considered the MIC (14).

Statistical analysis Data were analyzed using

two-way analysis of variance (ANOVA).

Results

In this study, minimal inhibitory concentrations (MICs) of PSHE, PSDE and metronidazole were 10, 5 and 2 µg/ml, respectively. The controls had not any effects on growth of *T. vaginalis*.

Discussion

Pattern of parasite standard growth depends on primary number of active parasites, temperature and conditions of culture medium. With regard to similarity of environmental conditions in all experiments, the results are significantly different from control ($P < 0.01$). Persian shallot inhibits growth of *T. vaginalis* at low concentrations and in short times, therefore this plant has some antitrichomonas component(s).

Other species of genus *Allium plants* have antimicrobial agents including allicin, ajoene and other organosulfides. It has been suggested that microbial cells are more affected than human cells because they do not have intracellular thiol content adequate to counterbalance the thiol oxidation by allicin and allicin-derived products. Ajoene has been shown to inhibit phosphatidyl choline synthesis in some protozoan (10, 13).

Genus *Allium plants* extracts were shown to decrease the oxygen uptake, reduce the growth of the organism, inhibit the synthesis of lipids, proteins and nucleic acids and damage membranes (11).

Very little works have been done to study antitrichomonas properties of genus *Allium plants*, therefore more studies for recognizing antitrichomonas properties of these plants are necessary.

With regard to this and other studies, PSDE and PSHE may contain sulfide components including allicin, ajoene and other organosulfides; accordingly antitrichomonas properties of this extract could be related to these components, also previous studies have shown that these compo-

nents had inhibitory effect on *Entamoeba histolytica* and *Giardia lamblia* as well (10).

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