

The cellular toxicity of *Panax ginseng* plant extract against certain pathogenic fungi and human lymphocytes

Abstract

This work focused on the mycological examination of clinical specimens and an anti-fungal and immunomodulatory role of *Panax Ginseng* alcoholic extract. Out of 110 samples, 67 tested positive for the fungus (61%) whereas 43 samples were negative for the fungus (39%). From among positive cases, 65.55% of the samples showed fungal growth while the remaining 34.45% of samples did not. Of all the species isolated 58.3% were *Candida* species, 25% *Aspergillus* and 12.5% *Trichophyton*. Adult females (55.6%) became infected more than adult male (44.4%) a large proportion of patient 30.6% had oral cavity as the most frequent site of infection. Highest infection rate was observed in 15–24 years and the lowest in individuals with >45 years of age. All isolated compounds exhibited a relatively potent antifungal activity against *Candida*, *Aspergillus*, *Trichophyton*, *Microsporum*, and *Penicillium* species and the pattern of the growth inhibition for *Panax Ginseng* extract was more pronounced at higher concentrations (140–200 mg/mL). The concentration required to inhibit the growth of the bacterial species was an 80–90 mg/mL range. It also produced immune responses by increasing the lymphocyte count by a positive dose dependent manner. *P. Ginseng* seems to prove its efficiency as an antifungal and immunomodulatory agent based on studies presented above. Additional investigations are still needed to establish its effectiveness in using this treatment in Mycosis.

Keywords: cytotoxic effects, *Panax ginseng*, pathogenic fungi, human lymphocytes

Introduction

The candidiasis is one of the greatest opportunistic diseases that may cause fungal infections and recurrences, as it contributes to both the use of antibiotics with a broad spectrum immunodeficiency virus class basis in the events and repeat injuries sick (1). *Candida albicans* is the most important opportunistic *Candida*, followed by the type *C. glabrata*, which is the type receiving 16 percent of bloodstream infections, type *C. famata*, *C. krusei*, *C. tropicalis*, and other other yeasts (2). Also found that most fungal infections by molds get sick and called the term "mycoses." " As the president of the causes of these injuries, some of the molds being sick have light boards blowing out, working on the events of pathogenicity (3). A fungus that causes it is *A. fumigatus*, *A. flavus*, *A. niger*. The fungus *A. fumigatus* trimmer is the most common occurrence of this injury for having the ability to invade the host tissue (4). Also, leather rot arranged important events in the pathogenesis of the enzymes secreted by the analyst class stratum, including the keratinase enzyme, which has the ability to solve the keratin content in the stratum corneum in mammals (5). Antibiotics used to treat such injuries include polyenes, which are an example. Because of the negative role played by antibiotics through the high toxicity that leaves them (6). It has been resorting to alternative solutions, including the use of medicinal plants as antifungals. As used, medicinal plants for therapeutic purposes are either extracted in whole or in part. (7) if it is a plant, confounded normal for many of the compounds that have an important role in the inhibition of microbiology growth, as some of them fight properties of microorganisms in general, such as oils Volatile oil and volatile alkaloids Alkaloids and tannins Tannendes and other (8), In light of the above study aimed to isolate and diagnose some yeasts and molds disease-causing systemic infections and skin, Prepare an alcoholic extract of ginseng root, *Panax ginseng*, and effective disclosure of the vehicles. Study its impact on the molds using the agar dilution method and using the yeast spread through the agar-well diffusion method, and study the effect of the extract on the side of the immune lymphocytes to humans outside vivo in the in vitro method using the MTT assay.

Materials & methods

Collection the Samples

Samples were collected, including swabs of patients with oral thrush and oral swabs of patients with respiratory and immune issues and vaginal swabs, in addition to all of the skin, hair, nail, and ear. When isolated, the samples were carried out by direct microscopic examination of the samples by using potassium hydroxide 10% and then examined under the microscope under power (10X) and power (40X) to ensure the presence of spores and hyphae fungal. then Exposure thereafter to methods of diagnosis for yeasts and molds, and yeasts were diagnosed microscopically by using the Vaitek device, whereas the molds were diagnosed microscopically and morphologically.

Collecting of plant samples

The root part of the plant *Panax ginseng* Were collected from the local market as the city of Arbil, and then taken to the laboratory, it was well cleaned and left to dry well. And then it was crushed by the mill laboratory to begin the process of extraction.

Preparation of alcoholic extract and sterilize it

Preparation of alcoholic extract (80% ethanol conc.) The procedure for which included adding powdered root part (50 gm) in 500 ml of alcoholic solution (conc. 80%) in a flask, then stored at 4°C for 24 hrs. After that, the solution was filtered by vacuum filtration, and the resulting supernatant was concentrated by hot plate drying at 60°C till the concentrated solution became thick and the final was in glass containers at 40°C to use (9-10). Then sanitize the alcoholic extract by melting (1) g of alcoholic extract of the plant *Panax ginseng* in 5 ml of DMSO (dimethyl sulfoxide) and sanitize this extract using Millipore filter paper (0.22) to prevent the passage of germs through it. This concentration was considered a source for the preparation of subsequent concentrations used in the study, as used unit concentrations (mg/ml) of (140, 160, 180, 200) (11).

• General Reagents for Detection of phytochemicals in *Panax ginseng* .

1- Alkaloids

Dragendroff reagent :Dissolve 60 mg $\text{Bi}(\text{NO}_3)_3 \cdot \text{H}_2\text{O}$ in 0.2ml HCl and 600 mg KI in 1 ml water .combine both solution and added the acidic solution for the plant extract. An orange brown solution will appear.

2- Flavonoids

Sulfuric acid test: flavones & flavonols dissolved in conc.sulfuric acid giving deep yellow solution. Chalcones give red color, flavanones give orange-red color.

3- Glycosides

Benedict's test :Treat the test solution with few drops of Benedict's reagent (alkaline solution containing cupric citrate complex) and upon boiling on water bath, reddish brown precipitate forms if reducing sugars are present

4- polyphenols

Ferric chloride(5%) in water or ethanol produces brown precipitate will appear in presence of polyphenols.

5- Steroids:

1 ml of the extract is dissolved in 10 ml of chloroform and equal volume of concentrated sulphuric acid was added by sides of the test tube. The upper layer turns red and sulphuric acid layer showed yellow with green fluorescence. This indicated the presence of steroids.

6- Terpenoids:

2 ml of extract was added to 2 ml of acetic anhydride and concentration of H₂SO₄ . Formation of blue, green rings indicate the presence of terpenoids.

7- Tannins:

Ferric chloride test: 1ml each of filtrate is diluted with distilled water and two drops of ferric chloride is added. A transient greenish to black color indicated the presence of Tannins.

8- Coumarins:

3 ml of 10% NaOH is added to 2 ml of aqueous extract , formation of yellow colour indicates the presence of coumarins.

9- Saponins

Because of their surface active properties, they may be recognized by shaking an aqueous solution of the sample will produce foam. 5 ml of extract was mixed with 20 ml of distilled water and then agitated in a graduated cylinder for 15 minutes. Formation of foam indicates the presence of saponins

Inhibitory test the effectiveness of plant extracts on the molds

The chosen fungal organisms were prepared to the test ,The ethanolic extract (Panax ginseng) were mixed with (PDA) at final concentration of (140, 160 , 180 & 200 mg/ml)then cultures with the The chosen fungal (two duplicate for each concentration) and finally incubated at 25°C for 7 days . The diameter of growth (width & long) measured from the 3rd day of incubation to the 7th day . After that the inhibition zone for each culture plate were taken by the following equation.

$$\text{Inhibition rate} = \frac{\text{Diameter of control} - \text{Diameter of sample}}{\text{Diameter of control}} \times 100$$

The effect of plant extracts in the growth of yeasts pathological

Followed the way The agar-well diffusion method for testing through vaccination center surface Zorai Sabouraud's Dextrose agar (SDA) mediated cotton sterile swab (Steril Swabs) of cultivated yeasts containing the (1.5X10⁸) cells/ml by comparing it with fixed solution turbidity and then left to dry dishes at room temperature, then worked, then drilled diameter (5 mm) in the middle-grown-mediated piercing Cork Cork Borer. Then added (0.1 ml) Add all the concentrations of the alcoholic extract of each hole-mediated absorbent minutes Micropipete and sequentially work the hole control of the addition of organic solvent DMSO (12) and incubate dishes at a temperature of 37 m for a period of 24 hours. Identified the effectiveness of each measure of the concentration of CAS Qatar inhibition in the Inhibition Zone area around each hole (12).

Determination of the minimum inhibitory concentration (MIC) of the alcoholic extract of ginseng Panax ginseng

Followed the method used by the (13) I attended as a series of progressive Altakavljev plant extracts using liquid center Sabouraud medium ranged values (80-85-90-95-100-105-110) mg/ml. Then vaccinated by pipeline (0.1) mL of farm yeast or mold age (24) hours on the container (1.5X10⁶) cells/ml and then incubated tubes degree (30 m) for two (48) hours. The results were compared with Alsattrin (1) and (2) to establish central Zirie impregnated fungal and central Zirie with vegetable extract only, respectively. Returned experiment in the case of non-appearance Ekorh in control (1) or when they appear in the control

(2). HDDT damper minimum concentration value (MIC) as the lowest concentration of the extract, which prevents Ekorh clear to the naked eye in the center Zorai Then transfer (0.1) ml of all tubes where Ekorh did not appear to dishes container at the center of the Sabouraud medium dishes for two (24) hours at a temperature of (37 m) and set the value of the (MIC) as the lowest concentration of the extract that reduces the number of colonies by 99.9% of the transplanted original.

Effects of Panax ginseng on human Lymphocytes

Collection of Blood

Peripheral venous blood was used in all experiments. The source of the blood was a healthy 26 year old male donor. Ten ml of blood was collected in 50 ml sterile tubes with anticoagulant heparin. This blood was used for the isolation of lymphocytes.

The isolation of lymphocytes

Ten ml of blood was added to a 50 ml sterile test tube that contains 500 µl of heparin as an anticoagulant (14). The blood was diluted by adding 10 ml of PBS solution. Carefully, 20 ml of diluted blood was added into a test tube containing 20 ml of ficoll separation fluid (Lymphoprep; specific gravity = 1.077 g/l). The test tubes were centrifuged at 400 xg for 30 minutes at 4 °C. After centrifugation, four distinct layers were obtained. The isolation of lymphocytes from normal human blood using density gradient centrifugation. The upper plasma layer was aspirated and discarded. The lymphocyte layer was carefully removed using a 3 ml sterile Pasteur pipette and transferred to a sterile test tube. These cells were washed by adding 2 ml RBC lysis buffer and centrifuged at 400 xg for 10 minutes at 4 °C to remove RBCs, if present, and other debris. After centrifugation, the pellet lymphocyte was washed by adding 1 ml RPMI-1640 and centrifuged at 400 xg for 10 minutes at 4 °C; the washing step was repeated three times. All supernatant was discarded. Finally, the isolated lymphocyte cells were collected again and suspended in RPMI-1640 medium supplemented with 10% fetal calf serum, containing 100 units/ml penicillin and 100 µg/ml streptomycin, then transferred into a microtiter plate and incubated for 24 hours at 37°C in a 5% CO₂ incubator.

Cultured Human Lymphocytes

The suspension of cultured human lymphocytes was adjusted to give a cell number of 1 x 10⁴ cells/ml.(100 µl) of the cell suspension were dispensed into each of the 96 wells of the microtiter plate to give a final cell count of 1000 cells/well. Then plates were incubated at 37°C in an incubator supplemented with a 5% CO₂ atmosphere for 24 hours. After incubation, 100 µl of each concentration (120, 140, 160, 180, 200 mg/ml) of the serial dilutions of both Panax ginseng extract standards were transferred to individual wells of the microtiter plate using a micropipette. Negative control (lymphocytes only without any treatment). Then lymphocytes are exposed to Panax ginseng extract for 24 hours. Triplicates of each concentration were used. After incubation, 50 µl of MTT dye (2 mg/ml) was added to each treatment (50 µl/well) and then incubated for a further 4 hours. The MTT-formazan crystals, which formed only by live cells, were dissolved with 100 µl DMSO added to all wells. Optical density of each well was measured by using ELISA reader at a transmitting wavelength 620 nm (15,16). The inhibitory rate was measured according to follows:

$$\text{cell viability} = \frac{\text{OD growth in the test}}{\text{OD growth in the control}} \times 100$$

- **Statistical analysis**

Analyzed the results of the experiment by the statistical program (SPSS) in accordance with the CRD system design random 2×4×7×4×2 to extract less moral difference between LSD transactions at the level of probability of 0.01.

• Results and discussion

The positive sample for fungal infection 72 samples were diagnosed by microscopic examination and laboratory implant, as a percentage (65.45%) of the total 110 samples, while the samples that did not give the growth of fungal infection were 38 samples, as a percentage (34.55%), as shown in Table (1). The negative results obtained by microscopic examination and laboratory implant may be caused by some of the injured resorting to the use of topical therapies randomly and without consulting a specialist doctor because of the inconvenience caused by the injury. This has led to affecting the vitality of fungi that cause injury and lack of growth after implantation (17). Through samples that give a positive growth show that the yeasts isolated proportion (58.3%) while the molds isolated proportion (41.7%) as in the table (2). This is in agreement with (18), where the results showed that the yeast comes first in order of disease isolates, which may be the reason due to this being a normal flora found in the body. The study showed that the incidence in females is higher than in males, where the percentage of females of the total examined positive samples was 55.6%, while the males were 44.4%. Was also in the table (3). While the largest number of positive samples was obtained from the oral cavity with a percentage (30.6%), sputum samples did not show any growth for each of the molds and yeasts. as in the table (4). And that the presence of these pathogens as normal flora in the oral cavity that quickly become a pathogen in the event of an immune deficiency. The oral injuries are reflected significantly in children and especially infants in the early stages of their lives as a result of acquiring these pathogens through their mothers by kissing and touching. Age group (16-25) are also more vulnerable to fungal infections, where the infection rate (33.3%) of the total examined positive samples. While there was a decrease of this percentage in the elderly significantly, as the percentage (8.3%) at the age group (<45) is in the table (5). This study was comparable with (19). That reason for the high rate of infection was due to the nature of the work, which occupied females, and this age group is more susceptible to injury and reinfection as a result of obtaining a higher sexual activity and pregnancy and lactation initial complications that occur during childbirth, which provides living situation opportunism to cause pathogenicity, and this is consistent with the results of (20).

Fungi isolated during the study

After the diagnosis for each of yeasts by vitek and molds via phenotypic and microscopic diagnosis , Candida yeast came as higher Rate, more than Aspergillus molds with percentage (58.3%), (25%) for Each , respectively, while each of the genus Trichophyton, Microsporum and Penicillium recorded percentage (12.5%) (2.8%) and (1.4%), respectively, as in the table (6). This is close to the results of Mahmoud Abdi (2006) in terms of increasing yeasts, including Candida more than Aspergillus molds and other molds. These results did not agree with (21), because he reported that the percentage of Aspergillus genus is the highest of yeasts in the occurrence and recurrence of injury.

Chemical detection of active compounds in aqueous and alcoholic extracts of Panax ginseng

The results of the detection of the active compounds in the alcoholic extract of the Panax ginseng plant, It's contain a number of compounds which: Alkaloids, Tannines, Saponines, Flavonoids, Glycosides, Phenoles, Steroids, Terpenoids, Comarins. As in the table (7) detection results in the current study agree with the results of (22)

Testing of the Inhibitory effectiveness of the alcoholic extract of the roots of ginseng plant on pathogenic molds.

Results of statistical analysis showed the presence of significant differences $p \geq 0.05$ between the concentrations that were used in affecting isolated pathological molds; alcoholic extract has shown to be highly effective in inhibiting the growth of molds. It was found that the extract gave the highest level of effect at the level of significant $p \geq 0.05$ on *M. audouinii* for the four concentrations that were used. When the concentration was 200 mg/ml, the rate of colony diameter was 16 mm with a percentage of 76.95%. The *T. mentagrophytes* has appeared less effective as compared with other species where the rate of the colony diameter was 21 mm when the concentration was (200) mg/ml and the rate of inhibition was (72.70%) as in table (8). These results are comparable with the results of (23) when he stressed the high effectiveness of Ginsenosides content of the alcoholic extract of ginseng on some pathological molds with doubling concentrations; the concentrations of this study are located within its range, and he has been used concentrations (15.5 - 31.0 - 62.0 - 125.0 - 250.0 - 500.0) (mg/mL). Then he found a clear impact on all of *Aspergillus* sp., *Trichophyton* sp., *Fusarium* sp., *Rhizopus* sp., and *Alternaria* sp. Where growth rate diameters appeared to approach the results of this study All of saponin and alkaloids perform an important role on the fungal cell membrane, where the mechanism of action of these compounds on fungal cells is through direct effect on the cell membrane, causing the loss of vital membranes and membrane proteins. Denaturation, then fungal cell growth was stopped. And phenol that is found in the composition of this plant plays an important role through its effect on the balance of the cellular content through damaging some proteins of the membrane cell. As well as the alkaloids, in addition to the same function done by saponins, they work by making a difference with the osmotic pressure of the fungal cell. And play an important role in the interference of the construction of cell proteins and adversely affect the process of building DNA. (24).

Inhibitory effectiveness testing of the alcoholic extract of the ginseng plant on pathogenic yeasts.

Results of statistical analysis showed significant differences between the concentrations used for affecting isolated pathological yeasts. Results showed that the species *C. albicans* was more sensitive to this extract, while species *C. krusei* was more resistant to this extract effect from affecting species under the effectiveness test. At the probability $P > 0.001$. While the remaining species under the effect of the extract came by medium diameters of inhibition, as in table (9). These results are compatible with the results (13) through ethanolic extract of the *Panax ginseng* plant effect on the yeast *Candida*, including *C. albicans*, and with double concentrations ranging between 15-500 mg/ml. Where it showed clear results when treated with these concentrations Where the inhibition effect was increased whenever concentration increased. As the results came close in terms of the inhibitory effect of the study (21). During the extraction of chitinase-like protein from Asian ginseng, which has an effective inhibitory effect against *Candida* yeasts and some pathological fungi. the reason for extract inhibition for pathological yeast is attributed to ginsenosides content that contains phenol, saponins, and alkaloids, which works directly on the structure of the fungal cell wall. The mechanism of action of these materials appears mostly on the fungal cell membrane, where it works to disable the membrane structure, causing leakage and the death of the membrane cells. Where all of the alkaloids, phenols, and saponins work essential roles in the cell membrane. Where saponins work primarily on ergosterol of the cell membrane, which works to destroy and the loss of vital membrane reasoned loss of vital fungal cell through the disabling of the dynamic membrane. Causing wide pores of the membrane and resulting in the deposition of the contents of the cell, leading to damage. On the other hand, ginsenosides work to analyze fat layers in the cell membrane and the dispersion of electrical power in the membrane, which causes the production of non-specific pores (13). As well as alkaloids, in addition to the same work of

the saponins, it works on differences with osmotic pressure of the fungal cell, and it plays an important role by interfering with the construction of cell proteins to negatively affect the process of DNA building (19).

Determine the minimum inhibitory concentrations of the alcoholic extract against pathological molds and yeasts.

Has been investigating the MIC values of alcoholic extract of the Ginseng Panax plant against pathogenic species by preparing a gradient dilution of the extract, and there appeared to be a disparity in the recorded values against fungal and yeast species that the MIC values of alcoholic extract against the species of pathological molds are (80-95) mg/ml, as in the table (10). These results were comparable with the results of (23) and (25) in terms of the recorded values of *C. albicans*, the cause of the high minimum inhibitory concentration in some species over others, which was confirmed by previous studies attributed to the high capacity of the fungal spores resistance against the extract. The reason for the decrease in these values was due to the efficiency of the extract for affecting these species.

The effect of the Panax ginseng plant extract on human lymphocytes

The statistical analysis results showed the treatment of lymphocytes with Panax ginseng plant extract appeared to show significant differences between used concentrations at probability $P > 0.05$. Where was the higher cell growth rate? At the concentration (200 mg/ml) was (0.674) with a value of viability of the cells (723.609), while the lower growth rate of these cells At the concentration (120 mg/ml) (371). As shown in the table (10) this study is compatible with many of the previous studies that appeared on the effect of ginseng extracts on lymphocytes in vivo and in vitro with different concentrations, where it agreed with the results of (26). While he observed a significant increase in defense cells, including NK cells, phagocytosis, and T cells, compared with control groups who did not undergo the test. It has been noticed that the effectiveness of T-cells, including T-helper and T-suppressor as well as killer cells (NK cells), was increased. This was confirmed by (27) through extract dosage for a number of volunteers and noted an increase in the number of lymphocytes and a decrease in the frequency of infections in the gastrointestinal tract and upper respiratory tract, significantly.

Table (1), the numbers and percentages of the laboratory and microscopic examinations of samples

NO	Direct microscopic examination			Laboratory examination		
	Indicator	The number of samples	percentage	Indicator	The number of samples	percentage
1	The positive sample	67	%60.90	The positive sample	72	%65.45
2	The negative sample	43	%39.10	The negative sample	38	%34.55
3	Total	110	100	Total	110	100

Table (2) Identification of pathogen

NO	The pathogen	The number of samples	Percentage
1	Yeasts	42	58.3
2	Molds	30	41.7
3	The total number of samples	72	100

Table (3) Distribution of pathological infections According to a source of bacterial isolates

No	The source	The total number	percentage	The positive sample	Percentage
1	The mouth	30	27.2	22	30.6
2	The skin	21	19.1	14	19.4
3	The external ear	15	13.7	9	12.5
4	The hair	14	12.7	10	13.8
5	The vagina	13	11.8	10	13.7
6	The nails	10	9.2	7	9.8
7	The respiratory tract	7	6.3	0	0
8	Total	110	100	72	100

Table (4) age groups of samples

No	age group	The total number	percentage	The positive sample	percentage
1	14-5	21	19.0	12	16.7
2	24-15	27	24.5	24	33.3
3	34-25	26	23.7	22	30.6
4	44-35	22	20	8	11.1
5	<45	14	12.8	6	8.3
6	Total	110	100	72	100

Table (5) Genera of isolated fungi

No	Fungal genus	Number of isolates	Percentage
1	<i>Candida</i>	42	58.3
2	<i>Aspergillus</i>	18	25
3	<i>Trichophyton</i>	9	12.5
4	<i>Microsporum</i>	2	2.8
5	<i>Penicillium</i>	1	1.4
6	Total	72	100

Table (6) detection of active ingredient in Ginseng *Panax ginseng*

No	Active compound	alcoholic	Aqueous
1	Alkaloids	++	+
2	Tannines	+	+
3	Saponines	+	+
4	Flavonoids	++	-
5	Glycosides	+	++
6	Phenoles	+	±
7	Steriods	+	+
8	Terpenoids	-	+
9	Comarins	+	+

(+) Indicates to positive detection (±)Indicats to a weak positive detection

(-) Indicates to a negative detection (++)Indicates to a strong positive

Table (7) the effect of alcoholic extract of ginseng *Panax ginseng* in the growth of some pathological molds

No	Fungus type	standard error \pm Diameter rate of the colony growth Concentration (mg / mL) the measuring unit (mm)				Con +	P <
		200	180	160	140		
1	<i>mentagrophyate</i>	21 \pm 2.26a	\pm 2.76 32b	0.919 \pm 35c	\pm 1.77 44d	78 \pm 0	0.001
2	<i>T.rubrum</i>	19 \pm 2.40a	1.20 \pm 22b	\pm 6.72 30c	\pm 2.33 41d	60 \pm 0	0.001
3	<i>M. audouinii</i>	\pm 1.344 16a	1.061 \pm 21b	3.11 \pm 33c	3.18 \pm 43d	68 \pm 0	0.0001
4	<i>A. fumigatus</i>	0.849 \pm 20a	1.77 \pm 28b	1.56 \pm 30b	0.849 \pm 35c	75 \pm 0	0.001
5	<i>A.niger</i>	1.061 \pm 18 a	1.061 \pm 22b	1.061 \pm 28c	4.17 \pm 40d	67 \pm 0	0.001
6	<i>A. flaves</i>	1.131 \pm 17a	1.131 \pm 21b	2.26 \pm 29c	\pm 3.39 44 d	62 \pm 0	0.0001
7	<i>P.rubrum</i>	1.84 \pm 18a	10.89 \pm 25b	1.131 \pm 28b	2.12 \pm 38c	65 \pm 0	0.026

Table (8) the effect of different concentrations of the alcoholic extract of ginseng root *Panax ginseng* in the growth of some yeasts isolated during the study

No	yeast type	standard error \pm Diameter rate of the inhibition				Con +	P <
		Concentration (mg / mL) the measuring unit (mm)					
		200	180	160	140		
1	<i>C.glabrata</i>	\pm 0.707 15.50a	\pm 0.707 11.50b	\pm 0.707 10.50b	\pm 0.707 6.50d	0	0.001
2	<i>C. norvegensis</i>	\pm 2.40 12.50 a	\pm 1.20 10.50b	\pm 6.72 7.50c	0.000 \pm 1.00 d	0	0.00004
3	<i>C. krusei</i>	0.707 \pm 10.50a	0.707 \pm 8.50b	0.707 \pm 6.50c	0.707 \pm 1.50d	0	0.001
4	<i>C. guilliermondii</i>	0.707 \pm 15.50a	0.00 \pm 11.00b	0.707 \pm 8.50c	0.000 \pm 8.00c	0	0.00001
5	<i>C. kefyri</i>	0.00 \pm 15.00a	0.707 \pm 13.50b	0.707 \pm 10.50 c	1.41 \pm 10.0c	0	0.012
6	<i>C.albicans</i>	0.707 \pm 16.50 a	1.41 \pm 13.00b	\pm 0.707 11.50 c	0.707 \pm 10.50 c	0	0.001
7	<i>C.famata</i>	0.707 \pm 15.50a	0.707 \pm 10.50b	0.707 \pm 9.50b	1.41 \pm 10.0b	0	0.009
8	<i>C.spherica</i>	0.707 \pm 15.50a	0.707 \pm 10.50b	0.707 \pm 7.50c	0.000 \pm 6.00d	0	0.0001
9	<i>C. parapsilosis</i>	0.707 \pm 15.50a	0.707 \pm 12.50b	0.00 \pm 12.00b	0.707 \pm 11.50 c	0	0.009

* Similar letters in per class means the absence of statistical differences between the averages according to level of significance.

* Con + represents control Meaning colonies diameters values without treatment with the extract

Table (9) values of (MIC) for alcoholic extract of Ginseng plant in the growth of fungi that studied with (mg / ml).

No	Types of molds	MIC values	Types of yeasts	MIC values
1	<i>T.mentagrophyate</i>	90	<i>C.glabrata</i>	90
2	<i>T.rubrum</i>	85	<i>C.norvegensis</i>	90
3	<i>M.audouinii</i>	80	<i>C.krusei</i>	95
4	<i>A.fumigatus</i>	80	<i>C.guilliermondii</i>	80
5	<i>A.niger</i>	85	<i>C.kefyr</i>	85
6	<i>A.flaves</i>	80	<i>C.albicans</i>	80
7	<i>P.rubrum</i>	85	<i>C.famata</i>	85
---	-----	-----	<i>C.spherica</i>	80
----	-----	-----	<i>C.parapsilosis</i>	80

Table (10) the effect of different concentrations of ginseng root extract on human lymphocytes using the Mtt assay

No	Concentrations (mg / mm)	Cell growth rate	The percentage of viability of cells
1	200	0.674 a	723.609
2	180	0.656 a	713.043
3	160	0.592 b	643.478
4	140	0.556 c	604.348
5	120	0.371 d	403.260
0.092	0.092	CON	6

P > 0.05 *

Conclusions

It was a positive relationship between the anymore the extract concentration increased its inhibitory effect. As related to the impact of plant extract Ginseng on lymphocytes, it showed the apparent influence in the increase in the number of lymphocytes increased significantly

compared with the totals for control, as observed increase in the number of lymphocytes whenever a relationship is a positive and clear focus has increased, which is reinforced by the increase in stimulus immune when the incidence of fungal or microbial.

Consent

As per international standards or university standards, patient(s) written consent has been collected and preserved by the author(s) and also collected parental written consent for minor patient.

Authors' contribution

The final manuscript draft was reviewed by all authors, who also gave their approval.

DISCLAIMER

NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of this manuscript.

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