



Effect of water extracts of some plants on growth of some skin fungi

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Abstract This paper aims to study the inhibitory activity of clove extracts, pomegranate peels, chamomile, pepper and bitter melon by digging on a number of dermatophytes including Trichophyton, Microsporium spp, Mucor, Aspergillus Niger, the results showed that the most isolated strains of skin fungi were Microsporium (53.84%), followed by Trichophyton (30.76%). Aspergillus Niger and Mucor were isolated from toes infected with fungus, a non-cutaneous opportunistic fungus. Most aquatic extracts of the studied plants showed high inhibition efficiency on isolated fungi and increased inhibition with increasing concentration of treated plant extract. The water extract of clove inhibited the growth of all tested fungi, which affected the treated fungi (75%), compared with the water extract of bitter melon and chamomile (50%) and water extract of pomegranate and pepper (25%). The results revealed that water extracts of chamomile, pepper and pomegranate husks stimulated the growth of Trichophyton spp mushrooms and intensely. While the fungus Mucor spp showed its high resistance (100%) against all extracts treated even with increasing concentrations used. The highest inhibition rate was inhibited Microsporium (50.044 mm) at concentration (0.58ppm) with chamomile water extract. While the results of statistical analysis showed that there were significant differences between the extracts of the studied plants in their effect on fungi, especially the fungus Microsporium and Trichophyton water extract of cloves were not significant in other.

Keywords: skin fungus, water extract, clove and pepper, chamomile, inhibition.

تأثير المستخلصات المائية لبعض النباتات على نمو بعض الفطريات الجلدية

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المخلص تهدف هذه الورقة إلى دراسة الفعالية التثبيطية لمستخلصات نبات القرنفل وقشور الرمان والبابونج والفلفل والحنظل بطريقة الانتشار بالحفر على عدد من الفطريات الجلدية والتي شملت فطر Trichophyton ، Microsporium spp ، Mucor ، Aspergillus Niger ، أظهرت النتائج أن أكثر السلالات الفطريات المعزولة من الجلد كان فطر Microsporium (53.84%)، يليه فطر Trichophyton (30.76%). كما عزل فطر Aspergillus Niger و Mucor من أصابع قدم مصابة بالفطريات وهي من الفطريات الانتهازية غير الجلدية. وأظهرت أغلب المستخلصات المائية للنباتات المدروسة كفاءة تثبيط عالية على الفطريات المعزولة وازدادت نسبة تثبيط مع زيادة تركيز المستخلص النباتي المعامل به. وثبط المستخلص المائي للقرنفل نمو جميع الفطريات المختبرة، حيث أثر في الفطريات المعامل بها وبنسبة (75%)، مقارنة مع المستخلص المائي لكل من الحنظل والبابونج وبنسبة (50%) والمستخلص المائي لكل من قشور الرمان والفلفل وبنسبة (25%). النتائج كشفت أن المستخلصات المائية للبابونج والفلفل وقشور الرمان حفزت لنمو فطر Trichophyton spp وبكثافة. بينما أظهر الفطر Mucor spp عن مقاومته العالية وبنسبة (100%) ضد جميع المستخلصات المعامل بها حتى مع زيادة التراكيز المستخدمة . وإن أعلى معدل هالة تثبيط كانت لفطر Microsporium المثبط (50.044 مم) عند التركيز (0.58ppm) مع المستخلص المائي للبابونج. في حين أظهرت نتائج التحليل الأحصائي وجود فروق معنوية بين مستخلصات النباتات المدروسة في تأثيرها تجاه الفطريات وخاصة فطر Microsporium والمستخلص المائي للقرنفل وكانت غير معنوية في غير ذلك.

الكلمات المفتاحية: الفطريات الجلدية، المستخلص المائي، القرنفل والفلفل، البابونج، تثبيط.

1. Introduction

The fungi widely spread on the surface and in different environments, including beneficial and harmful, and the second type is responsible for the harmful effects on humans, plants and animals. The fungal fungi live on the human, where the injury of the skin, especially the scalp, hair and feet, causing some skin diseases such as the disease of the arctic and sports foot disease, especially if it has adequate conditions of life from heat and moisture sufficient. Some fungi have the ability to produce fungal toxins such as

aflatoxinate, one of the most dangerous food contaminants because of its carcinogenic effects and the ability to break down various tissues, [1]. Skin infections are common in humans for a long time, with 10-50% of the world's population being infected. The fungal fungi are a group of skin fungi that cause skin-specific lesions under the associated layer that may attack live cells and cause septic ulcers [2] in hair follicles, beard area, face, trunk and extremities (including hand and foot), thigh, and nail. [3]. In recent years, many studies have shown the side effects of chemical

compounds found in some therapeutic drugs (human or animal). Which have a devastating effect on some vital organs in the body such as liver, kidneys and some cells such as pancreas and spleen cells [4,5,6,7]. So recent trends were to use medicinal plants (Leaf, seed, fruit and bark). Because of their important role in the treatment of some infectious diseases in humans and animals because of their containment of highly effective substances on the treatment Bacteria, fungi and parasites. Many of them have been used as alternatives to chemical compounds because they have the same effect on the pests and have little side effect on the environment and its components as a result of their rapid degradation due to their high sensitivity to light, heat and humidity and their transformation into non-toxic or polluting materials as much as possible. [8]. The results of several researchers confirmed that the effect of plant extracts on some plants is no less than the effect some medicines towards some fungi. The effect is due to some compounds such as turpensides, phenols, resins and glycosides and their high toxicity against fungi. The effectiveness of plant extracts varies depending on the solvent used in the extraction or the used plant fraction and also on the different age range of the plant used. [9. 10] Mechanisms affecting plant compounds also vary in microorganisms, [11]. The water extracts of plant leaves *Euphorbia peplus*, *Glycyrrhiza glabra*, garlic, cactus leaf juice and onion oil inhibited the growth of 15 fungi, [12,13]. The cruciferous family plants of stems, leaves and roots of green or soil have a toxic effect on the soil of pathogenic soil, including *R.solani*, after mixing with soil. They are useful in resistance to a wide range of pathogenic soil and chemical substitutes for containing the chemical *Glucosinolate* and high concentrations. In addition, the inhibitory effect of *Microsporum gypseum*, *Scopulariopsis brevicaulis*, *Trichophyton mentagrophytes* and *Microsporum canis* was observed with increased concentration of water extracts of chamomile plants and melanin plant compared with the inhibition of water extracts of *Myrtus communis* and *Zizyphus spina-christi*. [14]. The concentration of 3% of the leaves of the leaves showed a high inhibitory effect of growth of colony diameter of *pythium aphanidermatium* [15]. The water extract was shown to exhibit high inhibition of *Aspergillus niger* (89.79%) and *Penicillium spp* (31.65%) compared with *Saccharomices cerevisiae yeast* and *alhicanc yeast* [16]. The effect of the extract of clove oil and the concentration of 20 g/l on the growth of *Rhizoctonia solani* significantly compared with the water extracts of the seeds of *pond* and *garlic*, where the rate of inhibition was 100%, 85.69% and 81.66% of the extracts, respectively. [17]. The effect of the water extract for pomegranate and leaf leaves on the growth rates of the *alternaria alternata* was isolated from the fruits of apples. There was a significant increase in growth inhibitory, with a maximum concentration of 4% with a concentration of 75% and 39% respectively [18]. The water extracts of the garlic stalks at a concentration of 100 mg/cm³ showed high

inhibitory growth of *Rhizopus stonlinfer*, *Aspergillus candidus*, *Aochraceus*, *A. niger*, *A. fumigatus*, *A.flavus*, *Trichclodium opacm* isolated from wheat seeds. [19]. The inhibitory effect of cold water extract on the growth of *Trichophyton mentagrophytes* was significantly higher than that of green tea extracts after 5 and 7 days of incubation and concentrations of 55 and 75 mg/ml [20]. The water extract of the *Punica granatum* and 7.5% showed the highest inhibitory rate of 100% on the growth of the skin fungus *mentagrophytes*, *T.verrucosum*, *T. tonsurans* and *T. rubrum* due to ringworm disease compared to the results of the papaya seed extract where the highest percentage was 7.5% [21]. The aim of the research is to test the possibility of preparing a natural extract plant – which is environment friendly that is resistant to pathogenic fungi and infect various parts of the human body (scalp, back skin, arm, between the toes). In addition to comparing the efficiency of plant extracts considered in this study in the treatment of isolated skin fungi.

2. Materials and methods:

2.1. Materials used

Used Plants: Five plant samples were collected from the beginning of September 2018 from different regions This includes some farms and aromatic shops and the local market for the sale of vegetables in the city of Brak, namely *citrulluscolocyn*, *Camomile*, *Syzygium aromaticum*, *Capsicum Punica granatum*

Used Media: The media of the potato agar and dextrose (PDA) prepared according to instructions from the manufacturer Oxoid, UK.

Fungus: Fungi were isolated from various parts of patients with fungal infections including back skin, arm, hair follicles and thumb toes, including *Trichophyton*, *Microsporum spp*, *Mucor*, *Aspergillus Niger*.

2.2. Method:

Plant samples extracting and processing:

Plant extracts were prepared and incubated in dark bottles at room temperature for 24 hours with continuous stirring, as reported in [22].

Isolation, diagnosis and definition of fungi :

The fungus have been planted on pre-prepared dishes in a way that is drawn on Petri dishes by the PDA nutrition medium and incubated at 25° C/7 days for detection, [23]. The fungi were then isolated on dishes and identified according to

[23, 24].

Test the sensitivity of fungal isolates towards plant extracts:

The effectiveness of plant extracts was determined using the diffusion method in the boreholes by measuring the diameter of the inhibition zone, as reported by [25. 26.27].

Statistical analysis:

The results obtained from the experiment were entered and statistically analyzed using Statgraphic plus 5 and ANOVA statistical tests were performed at a significant level of 0.05.

3. Results and discussion:

The results showed that the considered plants provide varied abilities in inhibiting the isolated fungi. More specifically, *Trichophyton spp* was inhibited by 40.00% after being treated with the water extract of the carnivorous carnation plants. *Microsporum spp* was affected by the water extracts of cloves, paprika and pomegranate seeds with an inhibitory rate of 60.00%. The extracts of cloves, chamomile and chamomile seed affected the growth of the *Aspergillus Niger* mushroom by 80.00%. The results also revealed that the water extracts of chamomile, peppers and pomegranate seeds were favorable for the growth of *Trichophyton spp* and that they were encouraging the growth of other microbes besides the primary fungi. Some of the water extracts did not affect the fungus under study even with the increased concentrations used, especially with *Mucor spp*, which was not affected by all the used extracts and concentrations.

Table (1): Efficiency of water extracts of plants under study on isolated fungi

isolated fungi				plant extracts
Asp <i>Niger</i>	Mucor	Mico. <i>spp</i>	Tri. <i>spp</i>	
✓	-	✓	✓	Carnation
✓	-	-	✓	Bitter melon
✓	-	✓	+	Chamomile
-	-	✓	+	Pomegranate peels
✓	-	-	+	Pepper
✓ / Affected		- / Unaffected		+ / encouraging
for growth				

Effect of plant extracts on isolated fungal strains:

After the treatment of fungi isolated with plant extracts, it was found that the inhibitory rate of some studied plant extracts on isolated fungi increased with increasing concentration of plant extract and the type of the extracted plant. There are also some fungi that showed resistance to active substances, and inhibitory in the water extract of some plant extracts under consideration, while others were encouraging for growth after treatment with plant extracts .

Effect of water extract of cloves on treated fungi (75%) except for *Mucor spp*, which revealed high resistance and (100%) against treated water extract of cloves where it was not affected even with increasing concentrations used, this may be due to inefficiency Polar compounds present in plant extracts in inhibition of treated mushrooms. The largest inhibiting aura was (26.21 mm) for *Microsporum spp* compared to the lowest inhibiting aura (2.35 mm) for *Aspergillus Niger*. (Figure 2).

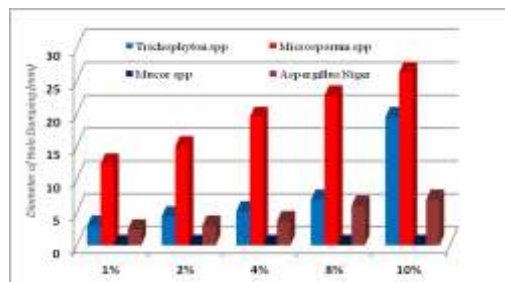


Figure (1): Growth area of isolated fungi colony after treatment with water extract of clove plant

The studied fungi were not affected by the low concentrations of water bitter melon extract. *Trichophyton spp* and *Aspergillus Niger* were affected by water extract of bitter melon (50%) compared to *Mucor spp* and *Microsporum spp* which showed high resistance against the extract. The largest inhibition was (8.88 cm) when treated with the highest concentration of extracts and the lowest inhibition was (5.11 cm) at the average concentration of extracts. (Figure 2).

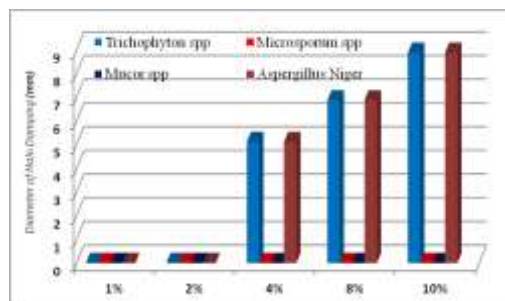


Figure (2): Growth area of isolated fungal colony after treatment with bitter melon water extract

The results indicated that although the highest inhibition rate of *Microsporum* inhibitor (50.044 mm) at concentration (0.58ppm) with water extract of chamomile plant, *Aspergillus Niger* was more affected by chamomile water extract during the study period compared to other fungi. The results also showed that *Mucor spp* was 100% resistant to chamomile water extract, while the same extract stimulated the growth of *Trichophyton spp* fungus (Fig. 3).

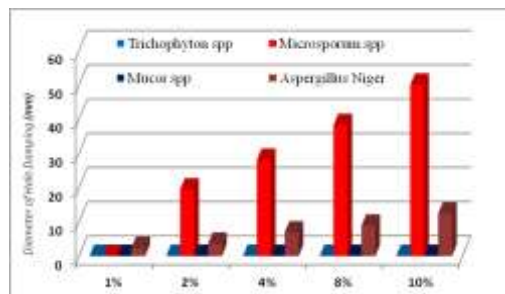


Figure (3): Growth area of isolated fungi colony after treatment with water extract of chamomile plant

The water extract of pomegranate peels inhibited the fungi by (25%), the highest inhibition of *Microsporum spp* inhibitor (28.06 mm) and the lowest inhibition of the same fungus (2.94 mm).

Significantly, the same extract showed no activity against *Mucor spp* and *Aspergillus Niger* during the experiment (Fig. 4).

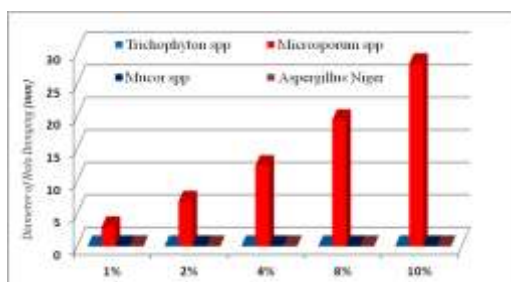


Figure (4): Growth area of isolated fungi colony after treatment with pomegranate husk water extract

The chemical compounds found in the water extract of pepper had no inhibitory effect on most of the treated fungi, especially with *Microsporum spp* and *Mucor spp*. (100%), the highest inhibition of *Aspergillus Niger* (6.87 mm) and the lowest inhibition of the same fungus (2.34 mm), (Fig. 5).

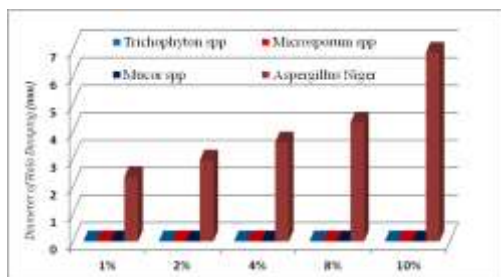


Figure (5): Growth area of isolated fungi colony after treatment with pepper water extract

While the results of statistical analysis P-Value showed that, there were significant differences between the effects of the extracts of the studied plants in their effect against the tested fungi. Especially the fungus *Microsporum* (Figure 6) and water extract of cloves (Figure 7), and the effect increased with increasing concentration of plant extract (Figure 8), and was not significant in other than that.

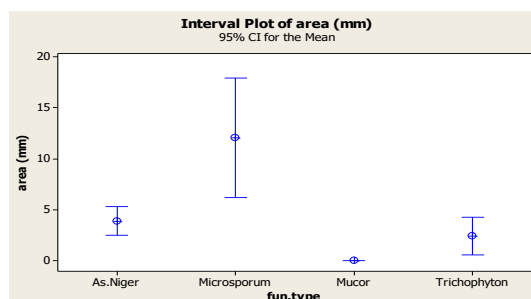


Figure (6): Rates of inhibition of fungi isolated from the skin

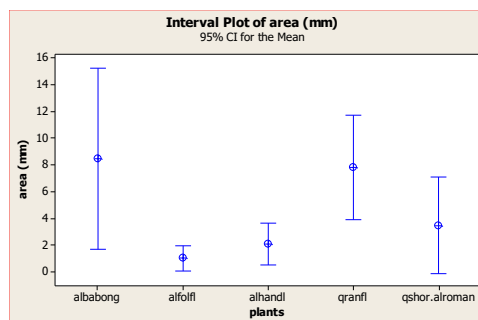


Figure (7): Effectiveness of aqueous extracts under study

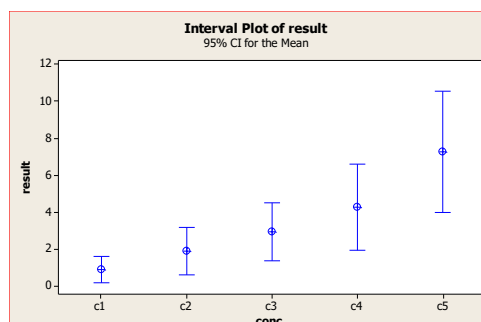


Figure (8): Effect of concentration of aquatic extracts under study on growth of isolated fung

From the results obtained can explain the efficiency of water extract of clove plant inhibition of the largest number of fungi, may be due to the high content of phenolic compounds with the ability to interact with cell membrane proteins. Which causes a change in the permeability of the membrane and thus an imbalance in the respiratory activity within the fungal thread. Which leads Cloves have high inhibitory activity against fungi because of the presence of Eugenol, which has antioxidant activity in addition to containing Flavonoids, Resins and Alkaloids [28]. Bitter melon contains active substances turbinos, flavonoids, alkaloids, glycosides and soaps, but they have only affected two fungi and this may be due to the lack of polarity of the existing compounds. Punica granatum contains four types of alkaloids, Punicine, Isopelletierine, Ethyl pelletierine, and Pseudo pelletierine [8], but they were only effective in preventing the growth of *Microsporum spp*. In addition, the active substance insulin found in chamomile [29] may have been the basis in preventing the growth and inhibition of the fungus *Microsporum spp* and *Aspergillus Niger*, and stimulate the growth of *Trichophyton spp*. Although pepper contains alkaloids, especially the active substance Piperine [13, 30], its water extract had only a inhibitory effect on one fungus, probably because the active substance is not persistent in water or non-polar, and the active inhibitory compounds of *Aspergillus Niger* Probably due to the compounds of Flavonoids, Resins or Alkaloids. [13, 28]. The results of the present study are consistent with a study [21, 31, 32] in isolating the same pathogenic fungi from different parts of the human body. The results of the present study were consistent with the results [14] in the

presence of inhibitory effect of bitter melon aquatic extracts against the growth of fungi *Microsporium*, *Trichophyton*, *Microsporium canis*. With the study [18] on the inhibitory action of the water extract of pomegranate plant with different fungus *Alternaria alternata* and the results [21] on the fungus *Trichophyton*. The results of the present study are consistent with a study [14] on the inhibitory effect of water extract of chamomile plant on the growth of fungi *Scopulariopsis brevicaulis* and its indication to increase the inhibitory effect of fungi with increasing concentrations of extracts compared with the leaves and sider and in varying proportions. It also agreed with the results [17] on the inhibitory effect of cloves against fungus growth compared to other plants such as exponents, garlic and pond. With the study [20] and that the fungus *Trichophyton* affected by different plant extracts with different concentrations. The present results were lower than the results obtained [33] in inhibition of *Fusarium* and *Trichoderma* with different plant extract type. The results of the study were not consistent with the results [16], In the presence of the inhibitory activity of chamomile extract against *Mucor* fungus, where the water extract of this extract failed to show any inhibition of this fungus in the present study. The present results were consistent with a study [34, 35], in the ability of water extract of bitter melon in inhibiting the growth of *A.niger* and *Trichophyton spp*.

In the light of the results of this study, we recommend the possibility of using clove extract in the inhibition of all studied fungi, and the use of wormwood extract and chamomile as natural anti-fungal skin materials with less efficiency than cloves. It is also possible to use bitter melon extract as a plant fungicide for its inhibition of fungus. Conduct a subsequent study to detect the active chemicals found in plants to identify the type of active compound that affects each fungus.

5. References:

- [1]- Mohammedi, Zohra. and Atik, Fawzia.(2013). Fungitoxic effects of natural extract on mycelial growth , spore germination and Aflatoxin B1 production of *Aspergillus flavus*. Australian Journal of Science(AJSC).7(3):293-298.
- [2]- Alexopoulos, C. J.; Mims, C. W. and Blackwell, M. (1996) :” Introductory Mycology. 4th ed. John Wily and Sons”. Toronto. 869 p.
- [3]- Dismukes, W. E.; Pappas, P. G.; SOBEL, J. D. (2003):” Clinical Mycology Oxford University.
- [4]- Chensheng L.U , Kenneth M. Warchol , Richard A. Callahan (2008): “In situ replication of honey bee colony collapse disorder”. Bulletin of Insectology 65 (1): 99-106, 2012 ISSN 1721-8861
- [5]- Choi A, Cordier S, Weihe P, Grandjean P. (2008): “Negative confounding in the evaluation of toxicity: The case of methylmercury in fish and seafood”. Crit Rev Toxicol 2008; 38: 877-93.
- [6]- Rajeh, Murtaza Saeed. (2017), "Effect of some antibiotics on the growth of some opportunistic fungi isolated from the skin at Afak General Hospital, College of Science, Iraq, unpublished letter.
- [7]- Erik Maloschik, András Ernst, Gyöngyvér Hegedűs, Béla Darvas, András Székács (2007): “Monitoring water-polluting pesticides in Hungary “.Microchemical Journal 85 (2007) 88–97.
- [8]- Watt, J.M. and Breyer- Brandwijk, M. G.; (1962) :” The medicinal and poisons plants of southern and eastern Africa E. and S”. Livingston Ltd. Edinburgh and London ; pp875-876
- [9]- Aba Alkhal,A.(2005):”Antifungal activity of some extract against some plant pathogenic fungi”. Pakistan Journal of Biological Sciences .8: 413 -417.
- [10]- Abbas, Hawazen Abdullah, Jawad, Aseel Tariq, Saleh, Hind Walid, Freih, Siham, Khalaf, Mohammed Zidan, Salman, Adnan Hafez, Hoss, Bassem Hassoun and Musleh Omar Abdul Razzaq (2013): "Synthesis of plant extracts to control sucking insects Insightful (environmentally friendly). "Journal of the University of Nahrain 16 (3), 5: 1.
- [11]- Comber, Sinan Abdul Latif Mohammed (2011): "Effect of plant extracts on microorganisms". College of Science for Girls. (Part of an unpublished Master Thesis 12-7-2011, 9:25:46 AM)
- [12]- Blok,W.J., J.G. Lamers , S.K. Termorshuizen and J.B. Gerrit (2000) :” Control of soil borne plant pathogens by incorporating fresh organic amendments followed by Tarping. Phytopathology”. 90.:235-259.
- [13]- Karim, Tarek Abdel-Sada (2010): "Evaluation of the Effectiveness of Five Essential Oils in Inhibiting the Growth of Four Pathogenic Fungi". Diyala Journal of Agricultural Sciences 2 (2): 220- 288.
- [14]- Bandar, Khalil Ibrahim (2009): "Effect of Some Plant Extracts on Growth of Cutaneous Fungi Isolated from Patients". Tikrit Journal of Pure Sciences, 14 (3): 160--169.
- [15]- Mohamed, Maher Naeem (2009) "Effect of water extract of Nerium oleander leaves on the fungus that caused the death of *Pythium aphanidermatium* seedling in vitro". Of pathogenic fungi. Diyala Journal of Agricultural Sciences. 2 (2): 220--228.
- [16]- Saleh, Nidal Mohammed, Yassin, Ali Amin (2010): "The role of extraction solvent in the inhibitory activity of wormwood plants against fungi." Diyala Journal for Humanitarian Research, Issue 42/2010, pp. 363-374.
- [17]- Khammas, Nihad Aziz (2011): "Effect of some plant oils and extracts on the growth of *Rhizoctonia solani Kuhn* fungi causing root rot disease." Diyala Journal of Agricultural Sciences, 3 (2): 805--811, 2011
- [18]- Obeid, Zeina Hadi, Mahmoud, Noor and Mezher, Amir (2013): "Effect of water extract of pomegranate and peppermint on the effectiveness and growth of fungus *Alternaria Alternata*." Journal of Babylon University of Exchange and Applied Sciences, 3 (21): 2013.

- [19]- Ghejeri, Hadeel Ali, Al-Jawhari, Ihsan Flaih and Saidi, Sabah Nahi (2014): "Efficiency of water and alcoholic extract of *garlic bulbs* in controlling the growth of some fungi associated with wheat seeds." Journal of Thi-Qar University, 9 (2): 2014.
- [20]- Al-Janabi, Jawad Kadhim and Kamal, Sabreen Abdul-Amir (2014): "Evaluation of the Efficacy of Green Tea Extracts and Students in Mushroom Growth (*Trichophyton mentagrophytes*). Journal of Babylon University / Pure and Applied Sciences: 2014, 22 (2).
- [21]- Ojja, Hamzieh Ali, Abdullah, Abdul Khaliq Sobhat, Abdul Wahab, Haifa Saadoun (2017): "Study of the effect of some antifungal and plant extracts on the growth of some fungi causing roundworm diseases." College of Basic Education, Mustansiriya University of Science. 21 (90): 2015.
- [22]- Afifi, Fathi Abdel Aziz (2002): "Accurate analysis of residues of toxins and environmental pollutants in ecosystem components". Dar Al-Fagr for Publishing and Distribution, Cairo, Egypt (2002).
- [23]- Campbell K Colin., Johnson M Elizabeth., and Warnock W. David.(2013): "Identification of Pathogenic Fungi, Second Edition." Health Protection Agency. Published 2013 by Blackwell Publishing Ltd. Appendix 2 further reading
- [24]- Samson RA, Hoekstra ES, Frisvad JC, Filtenborg O.(2002) :” Introduction to food- and Airborne Fungi”, 6th edn. Utrecht: Centraalbureau voor Schimmelcultures (2002).
- [25]- McGinnis, M. R.,(1980) :” Laboratory hand book of medical Mycology”. Academic press. New Yorck.
- [26]- Danqunlin, (1992): “Biological control of streptomyces scabies and of other plant pathogens”. Thesis Doctor of phylosophy Minnesota University.
- [27]- Habib, Raja Ali, Al-Saadi, Ali Hamoud Al-Saadi, Jasim, Niran Obaid (2015): "Isolation and Diagnosis of Some *Candida Spp* Yeasts and their Sensitivity to Some Fungi". Babylon Magazine, Pure and Applied Sciences, 3 (23): 2015.
- [28]- Jafeer ,Khulood Abed-Majeed Mohammed and Kheirallah, EnassAbbass (2014): “ Effect of Piper Nigrum fruit and *Syzygium aromaticum* roses extract on the some of Bacterial and fungal isolate growth” . Al Qadisiyah Exchange Magazine. 21(2):2016.
- [29]- Carmen V. Sciortino, Jr. (2017) :” Atlas of Clinically Important Fungi. Division of Infectious Diseases. University of Louisville School of Medicine, and Robley Rex Veterans Healthcare Medical Center Louisville”, kentucky, USA.
- [30]- Sartoratto,A;Machado,A,L.M;Delarmelina,C;Figueira,G.M;Durate,M.C.T.andRehder.V.L.G.(2004): “ Composition and antimicrobial activity of essential oils from aromatic plants used in Brazil” .J.Microbial .35(4), soa Paulo oct.dec.
- [31]- Yeasmin , F. ; Ashrafuzaman , M. and Hossain , I. (2012). Effects of Garlic Extract,Allamanda leaf Extrect and provax. 2200n seed borne fungi of Rice . The Agriculturists . 10(1). Pp : 46-50.
- [32]- Almola, Lecturer Zakaria Sami (2010):”The inhibitory effect of *henna Lawsonia inermis* leaves on”. Journal of Basic Education Research . 10(4).501-510.
- [33]- Bianchi, A. A. Zambonelli and F. Bellesia (1997) :” Ultrastructural studies on the effects of *Allium sativum* on phytopathogenic fungi in vitro”. Plant Dis. 81(11):1241-1246
- [34]- Hadizadehl , peiva .; Stegan, B. and Kolahim , M. (2009). Antifungal activity of *Citrullus colocynthis L.* , (*Neriumoleander L.* and *Zizyphus spinachriti L.* extracts on plants pathologenic fungi. Journal of biological science. 12(1).Pp: 58-63.
- [35]- Mohammed, L. Al-kamel. (2005). Antimicrobial activity of equeous extract of *Citrullus colocynthis L.*fruit .Tikrit journal of pharma centical sciences ,1(2):9-15.