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WHEAT GRAINS INFECTION AND CONTROL MEANS WITH PLANT EXTRACTS

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ABSTRACT

Wheat (*Triticum aestivum*) is being attacked by several fungal pathogens, many of them are seed-borne, infesting wheat seeds (grains) are detected by methods as recommended by the ISTA, 1966. Fungi such as *Altenaria alternate*, *Aspergillus flavus, Aspergillus niger, Chaetomium* spp*, Cladosporium* spp*, Epicoccum* spp*, Fusarium* spp*, Fusarium oxysporum, Fusarium solani, Nigrospora oryzae, Penicillium* spp*, Rhizoctonia solani, Stemphyllium* spp. and *Trichoderma* spp. were isolated from the wheat cultivars i,e Gemmiza 7, Gemmiza 10, Sids 1, Sids 12, Sakha 93, Sakha 94 and Bani sweif 1. Extracts of pomegranate, Neem and Garlic were screened for the potential antimicrobial activity through cup-plate method against three fungi (*F. oxysporum, R. solani* and *A. alternata*. All extracts showed inhibitory activites. *F. oxysporum, R. solani* and *A. alternata* were the greater portions of the isolated fungi. *In vitro* studies, seed treatment with 10, 20 and 30 % of concentration of plant extracts for 24 hours showed a complete germination and all seed testing. *In vitro* studies using cup-plate method were exercised to examine the antifungal activity of three plant extracts i.e., Neem, Pomegranate and Garlic against such fungi associated with wheat seed. *F. oxysporum*, *R. solani* and *A. alternata* were the greater portion of the isolated fungi. However, they were regarded of our main concern in order that they were known of their serious pathogens. Neem leaf extract showed good activity followed by pomegranate peel and garlic leaf extracts. *In vivo* trials, results of the efficacy of plant extracts against the seed-borne pathogens were just about those cropped up *in vitro* practises.

Effect of fungicides (Rizolex T 50 %) and three plant extracts on the incidence of seed-borne fungi and their effect on seed germination were evaluated. The seed treatment by the fungicides showed that (Rizolex T 50 %) increased the germination percentage and reduced seed mycoflora. Fungal properties of plant products were tested. Efficacy of biocontrol agent against (*F. oxysporum, R. solani* and *A. alternata*) was found good in controlling the seed-borne fungi and pomegranate was proved to be good inhibitor of fungi associated with wheat seeds. Thus, the seeds should be treated invariably by less phytotoxic fungicides like Rizolex T 50% and biocontrol agent like Pomegranate to eliminate the seed-borne mycoflora of wheat. The main aim of present study is to ascertain the fungal species and their effect on wheat grains germination.

Keywords: *Triticum aestivum*, seed-borne fungi, pomegranate, Neem, Garlic, *F. oxysporum*, *R. solani, A. alternata*, aquous extracts. seed testing.

INTRODUCTION

Wheat is the most important cereal being the chief source of stable food for about one third of the global population.

Seed are regarded as highly effective means for transferring plant pathogens over the years. Seed-borne diseases have been found to affect the growth and productivity of crop plants. Some of the fungi infect the seed and cause discolouration of the seed (Christensen and Stakman 1934 and

Bhowmik, 1969). Several seed-borne pathogens are known to be associated with wheat seed which are responsible for deterioration of seed quality during storage (Pathak and Zaidi 2013). Seed are treated with chemicals to prevent their decay after planting by controlling pathogens carried on them, present inside the seed or existing in the soil where they will be planted (Pathak and Zaidi 2013). The most common biologically based control measures include use of resistance plant varieties, use of pathogen free seeds or propagation stocks and use of eco-friendly products to control the pathogen. *Fusarium, Rhizoctonia* and *A. alternata*, species were the most common fungi associated with seeds causing pre and post- infections and may lead to considerable quality losses *viz* seed abortion, seed rot, seed necrosis, reduction or elimination of germination capacity, seedling damage and nutritive value have been reported (Miller, 1995; Kavitha *et al*., 2005). Seeds are treated by various methods. Biological method need preference since plant metabolites and plant based pesticides appear to be one of the better alternatives as they are known to have minimal environmental impact and danger to consumers in contrast to synthetic pesticides. Antifungal activity of the leaves has been mentioned by Abdel Aziz *et al*., 1994-1996 and Mohamed *et al.,* 1996. Plant metabolites and plant based pesticides appear to be one of the better alternatives as they are known to have minimal environmental impact and danger to consumers in contrast to synthetic pesticides (Varma and Dubey, 1999). Extracts of many higher plants have been reported to exhibit antifungal properties under laboratory trails (Parekh *et al* ., 2006 and Mohana *et al*., 2008).

Several seed-borne pathogens are known to be associated with wheat seed which are responsible for deterioration of seed quality during storage. Seed-borne fungi can be controlled only through the treatment of seeds. Seeds are usually treated with chemicals to disinfect seeds from those associated pathogens and/or those seed internal infection ones. The aim of this study is to evaluate *in vitro* some plant extracts i.e., Neem, Pomegranate and Garlic against seed-borne pathogenic fungi of wheat, in order to manage and safe seed storage. In view of these the present investigation was undertaken to screen some plant part extracts against seed borne pathogenic fungi and the data has been presented in this paper.

MATERIALS AND METHODS

Isolation, purification ad identification of seed associated fungi:

Grains from seven wheat cultivars were collected from Cental administration for seed production (CASP) during 2013-2014 and were carried to Seed Pathol. Res. Dept. (SPRD), Plant Pathol. Res. Instit.(PPRI), Agricultural Research Center, Giza, Egypt for further investigations. Seeds were thereupon placed in blotter method and incubated at 22 ± 2 ºC (ISTA, 1966) for associated fungi detection. After 7 days of planting the seeds, the growth of seed-borne fungi shown on seeds were then recorded. Those growing fungi were then transferred to PDA medium. After 5 days of inoculation, the individual fungi were detected by Stereo microscope with the specific characters of mycelia and conidia. Lastly, the individual inoculum was

moved to PDA medium as a pure culture. Those cultures were then purified and kept for further experimental use. The identifications were confirmed using the descriptions of (Booth and Waterson 1964) and (Barnett and Hunter 1972).

Seed testing on the seven cultivars:

Seven seeds cultivars Gemmiza 7, Gemmiza 10, Sids 1, Sids 12, Sakha 9, Sakha 94 and Baniswaif, were examined for germination, weight of 100 seed (kernels), percentage of healthy seeds and infected. Embero count was also tested (ISTA, 1966). Laboratory seed testing aimed to provide accurate and reproducible guidance, viability, germination and vigour measure. Both a germination test and a hundred seed rate test allow calculation of sowing rates.

Seed germination tests

Seed germination tests measure the number of healthy well-developed seedling under laboratory conditions, not just whether a root has emerged from the seed. germination test takes at least 7 days for cereals.

Preparation of Aqueous extracts of the selected antifungal plants

Hundred gm of fresh leaves of neem (*Azadirachta indica* L.), 100 gm of dried powder of pomegranate peel (*Punica granatum* L.) and 100 gm of crushed bulbs of garlic (*Allium sativum* L.) (Table 1), were prepared. The pomegranate peels and the fresh leaves of neem and garlic were washed with tap water. They were then after rinsed in sterile distilled water, crushed in blender and pestle with 100 ml sterile distilled water. The macerate was first filtered through double layers muslin cloth and then centrifuged at 4000 rpm for 30 min. The supernatant was filtered through Whatman No.1 filter paper and sterilized at 121˚C for 20 min.

Table 1: Selected plants to be tested for their antifungal activities

Common name	Scientific name	Family name	Plant parts used
Neem	*A. indica*	Meliaceae	Leaf
Pomegranate	*P. granatum*	Lythraceae	Peel
Garlic	*A. sativium*	Amaryllidaceae	Bulbs

a) Antifungal activity assay:-

Concentration of all plant aqueous extracts were prepared. About 15 ml. of medium were poured into each Petri dish and allowed to solidify. Five mm disc of 7 days old culture of the tested fungi were placed at the center of the Petri dish and incubated at 25±2˚C for seven days. After incubation, the colony diameter was measured. For each treatment, four replicates were maintained. PDA without any aqueous extract served as check control. The fungal toxicity of the extracts in terms of percentage inhibition of mycelia growth was calculated by using the formula of (Singh and Tripathi, 1999).

$$\text{Inhibition (\%)} = [(R-r)/R \times 100]$$

Where R expresses the average increase in mycelia growth in control
r= Average increase in mycelia growth in treatment

Effect of seed treatment with plant extracts and fungicide on germination *In vitro*

Seeds of five cultivars, Gemmiza 7, Gemmiza 10, Sids 1, Sakha 93 and Sakha 94 were soaked for 24 h in three different extracts (Pomegranate, Neem and Garlic). Soaked seeds were plated in Blotter Petri-dish and incubated for 7 days at 22˚C ±2. Seeds soaked in sterile distilled water for 24 hrs served as control. Fresh and dry weights were measured to determine the efficiency of using plant extracts on plant growth.

Treated seed with plant extracts and synthetic fungicide as Rizolex was also tested at its recommended dosage (2gm1/100 gm seed). Twenty five of treated seeds with Rizolex T were plated in each Blotter Petri dish. Untreated seeds were also plated as control.

Effect of seed treatment with plant extracts or fungicide *In vivo*

Five treated seeds with plant extracts or fungicide from each cultivars (Gemmiza7, Gemmiza 10, Sids 12, Sakha 93 and Sakha 94) were sown in pots of 30 cm in diam. Pots were contained infested soil with inoculums of *F. oxysporum, R. solai* and *A. altenata*, and grown for ten days at Seed Pathology Greenhouse, PPRI, ARC. On the eleventh day, seedling emergence, shoot and root lengths and fresh and dry weight were recorded. Seeds soaked in sterile distilled water for 24 hrs served as control. Three replicates from each treatment were considered (Bagga and Sharma, 2006).

Statistical Analysis

Obtained data were statistically analyzed using the completely randomized design in factorial arrangement method according to (Gomez and Gomez, 1984).

RESULTS

Isolation, purification ad identification of the associated fungi:

Data in Table (2) indicate that 14 fungal isolates representing 11 species were isolated from seven wheat cultivars (Gemmiza 7, Gemmiza 10, Sids 1, Sids 12, Sakha 93, Sakha 94 and Bani sweif 1). According to their morphological features, the isolated fungi were identified as *A. alternate*, *A. flavus, A. niger, C.* spp.*, Cladosporium* spp*, Epicoccum* spp*, Fusarium* spp*, F. oxysporum, F. solani, Nigrospora oryzae, Penicillium* spp*, Rhizoctonia solani, Stemphyllium* spp. and *Trichoderma* spp. *Alternaria alternate* and *Penicillium* spp showed the highest number of isolates and mean of frequency (24.1 % and 16.6 %), followed by *Cladosporium* spp. being 8.2 % in the average. *Fusarium* spp. ranked third. Fungi belonging to the other genera were isolated with low frequency (Table ٢). However the occurrence and frequency of each isolated fungus varied from one cultivar to another (Table ٢). Pathogenic fungi (*F. oxysporum*, *R. solani* and *A. alternata*) gave 12.8, 7.69 and 33.7 respectively.

2-

Seed testing on seven wheat cultivars

Data presented in table (3) showed the quality and viability of the seven seeds cultivars from dry inspection of (Gemmiza 7, Gemmiza 10, Sids 1, Sids 12, Sakha 93, Sakha 94 and Baniswaif 1). Germination test was made on 200 seeds. All tested seeds recorded maximum germination. Weight of 100 seeds ranged from (4.19-5.44 g) in Gemmiza 10 and Baniswaif respectively.

Table (3): Incidence of normal and abnormal wheat seeds from dry inspection of seeds.

Test / Cultivars	Germination (%)	Weight of 100 seed (g)	Healthy Seeds (%)	Infected Seeds (%)	Embryo Count Test
Gemmiza 7	100.0	5.06	4.95	0.11	-
Gemmiza 10	100.0	4.19	3.79	0.40	-
Seds 1	100.0	4.53	4.5	0.03	-
Seds 12	100.0	4.84	4.70	0.14	-
Sakha 93	100.0	4.97	4.17	0.80	-
Sakha 94	100.0	4.51	4.15	0.26	-
Bani sweif 1	100.0	5.44	5.13	0.31	-

(-) Non-infested seeds

In the present investigation, the antifungal effect of Pomegranate, Neem and Garlic extracts (Table 1) was studied on three fungi and the following results were obtained: For aqueous extracts in the pathogenic fungi cultures showed some variations. High antifungal effect was recorded on 20 and 30% pomegranate extract concentration against *Fusarium oxysporum* Fig (1) followed by 10% Neem.

Fig (1): Inhibition of *F. oxysporum* on pomegranate peel extract at 30% concentration

Data presented in Table (3) and fig. (1) explained that the least activity was recorded on garlic extracts in spite of its antimicrobial components. The Diameter Inhibition Zone (DIZ) values ranged between 7.5 and 9 cm. A high inhibitory effect was recorded by pomegranate extract 20 % and 30 %. Among all the fungi tested, a slight effect was observed on *A.*

alternata. The significant antifungal effect was shown by only two extracts of pomegranate and neem.

Effect of pomegranate, neem and garlic extracts against seed-borne pathogenic fungi at different concentrations (10, 20 and 30%)

Pomegranate extract showed decrease in inhibition zone as (3.3) at concentration of 20% against *F. oxysporum*. *R. solani* recording (5.9) with 10% neem extract compared with pomegranate extract which recorded (8.2). No difference was observed between all concentrations with all extracts with all extracts and all concentrations.

Table 4: Effect of three extracts against seed-borne pathogenic fungi at different concentrations

Fungi / Source of Extract	Zone of Inhibition (mm)											
	F. oxysporum				*R. solani*				*A. alternata*			
	Control	10%	20%	30%	Control	10%	20%	30%	Control	10%	20%	30%
Neem	9.0	7.5	7.5	6.5	9.0	5.9	7.9	8.0	9.0	7.7	8.0	8.0
Pomegranate	9.0	7.8	3.3	4.8	9.0	8.2	8.0	7.7	9.0	8.0	7.9	7.7
Garlic	9.0	7.5	8.3	7.8	9.0	7.8	7.6	7.7	9.0	8.0	8.0	8.0

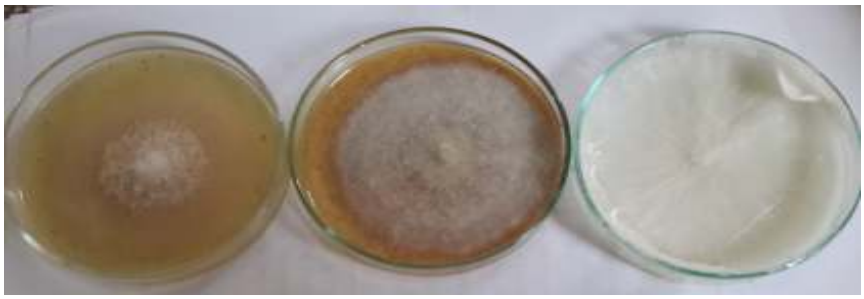
LSD 5% Con **0.28**
Con*F R S **0.49**
Extracts *Con* F R S **0.85**

Data presented in Table (◦) showed the reduction in mycelial growth at a formation concentration of the three plant extracts on diameter of inhibition zones (DIZ). Data presented in Table (◦) showed that the value of maximum reduction was occurred at the concentration 20 % in pomegranate extract (63.3 %) followed by 30 % concentration against *F. oxysporum* (48.7%), while *R. solani* revealed 34.3% with neem extract. Application of pomegranate peel extract significantly decreased the inhibition zone and recorded the highest reduction.

Table 5 : Reduction of mycelial growth at different concentration 10, 20 and 30%.

Concentration	10%			20%			30%		
Plant extract / Pathogen	Neem	Pomegranate	Garlic	Neem	Pomegranatee	Garlic	Neem	Pomegranatee	Garlic
F. oxysporum	16.7	13.3	16.7	16.7	63.3	7.8	27.8	46.7	13.3
R. solani	34.3	8.9	13.3	12.2	11.1	15.6	11.1	14.4	14.4
A. alternata	14.4	11.1	11.1	11.1	16.7	11.1	14.4	14.4	11.1

The efficacy of seed treatment with pomegranate, neem and garlic extracts and fungicides was observed in this investigation. Sakha 93 recorded complete germination after soaking for 24 hours at the three extracts and Rizolex T 50% and when applied with all the five cultivars. Also, Sakha 94 recorded the same results but low germination with fungicide treatment (88%). Gemmiza 10 cv. recorded 100% germination with fungicide treatment. Treatment with garlic extract increased the germination in most cultivars (Table 5).



Neem Pomegranate Garlic

Fig (2): Effect of Neem, Pomegranate and Garlic extracts on mycelial growth of *F. oxysporum* at 30 % concentration.

Table (5): Efficacy seeds treatment with pomegranate, neem and garlic extracts comparing with fungicide on wheat grains germination.

Treatment / Cultivars	Control	Pomegranate Extract	Neem extract	Garlic extract	Fungicide (Rizolex T)
Gemmiza 7	84	88	84	92	80
Gemmiza 10	80	84	80	88	100
Seds 12	96	96	96	96	96
Sakha 93	100	100	100	100	100
Sakha 94	100	100	100	100	88

The percentages of seed germination at five wheat cultivars (Gemmiza, Gemmiza10, Seds 12, Sakha 93 and Sakha 94) were presented in table (6). Sakha 93 and Sakha 94 recording complete germination (100%) compared with control. Treatment with the fungicide (Rizolex T 50%) showed reducing in germination efficacy (82 %).

Table (6) Effect of seed treatment with three extracts and fungicide on growth of five wheat cultivars *In vitro.*

Treatment / Cultivars	Control		Pomegranate extract		Neem extract		Garlic Extract		Fungicide (Rizolex T)	
	Fresh Weight (g)	Dry Weight (g)	Fresh Weight (g)	Dry Weight (g)	Fresh Weight (g)	Dry Weight (g)	Fresh Weight (g)	Dry Weight (g)	Fresh Weight (g)	Dry Weight (g)
Gemmiza 7	1.44	0.50	1.02	0.62	0.94	0.22	1.05	0.23	1.10	0.43
Gemmiza10	1.48	0.56	1.40	0.66	1.41	0.41	2.59	0.37	1.42	0.38
Seds 12	1.31	0.41	1.26	0.43	1.45	0.44	2.69	0.44	2.51	0.42
Sakha 93	2.33	0.39	2.09	0.65	1.22	0.50	1.40	0.50	1.98	0.39
Sakha 94	1.61	0.63	1.51	0.81	0.48	0.42	0.27	0.21	3.01	0.44

Table (6) presents the effect of seed treatment with three extracts (Pomegranate, Neem and Garlic) on growth of five cultivars. Sakha 93

recorded (2.09 g) in fresh weight followed by Sids 12 was (2.69) while seed treatment with Rizolex T 20 % revealed (3.01 g).

The germination quality of over-yeared seed of any species is likely to have deterioration, especially if storage conditions were not ideal. For over-yeared seed germination should always be re-checked that prior to use.

DISCUSSION

Seeds provide natural substrate for the growth of associated fungi, they get associated with seed externally on the seed surface, seed coat and internally with the endosperm, cotyledons, plumule ,radical, embryo (Sangvikar and Wadje, 2012). A special feature of higher angiospermic plants is their capacity to synthesize aromatic substances, most of which are phenols or their derivatives. These substances serve as plant defense mechanisms against microorganisms, insects and herbivores.

Many higher plants produce economically important organic compounds, pharmaceuticals and pesticides. Hamburger and Hostettmann (1991) reported that the total number of plant chemicals may exceed 400.00 and out of it. Exploitation of naturally available chemicals from plants, which retards the reproduction of undesirable microorganisms, would be a more realistic and ecologically sound method for plant protection and will have a prominent role in the development of future commercial pesticides for crop protection strategies with special reference to the management of plant diseases (Varma and Dubey, 1999; Gottieb *et al*., 2002).

Natural products play an important role in management and it has the ability to excreted compounds have the potentiality to prevent lot of phytopathogenic fungi. The antimicrobial effects of pomegranate were previously studied. Indeed, it is reported that the bark, leaves flowers and fruits of pomegranate are widely used as phytotherapeutic agents. Regarding fungi the inhibitory effect of *P. granatum* against mycelial fungi was reported by (Shuhua *et al*., 2010).

In this investigation three plants were screened *in vitro* for antifungal activity against important seed-borne phytopathogenic fungi. The screening revealed that plant extracts were effective in inhibiting the mycelial growth of tested fungi at 10, 20 and 30 % concentrations. The finding of this study is an important step towards crop production strategies for antifungal activity against seed-borne species, *F. oxysporum, R. solani* and *S. rolfsii.* Among the plants *P. granatum* would probably be an important candidate plant for preventage of biodeterioration of seeds during storage. Those results were agreed with Satish *et al*., (2007).

Garlic contains amino acids, vitamins and trace minerals, flavonoids, enzymes, alliin, and enzymes, B vitamins, proteins, minerals, saponins, flavonoids, a phytoalexin (allixin) was found, a non-sulfuric compound with a γ-pyrone skeleton structure with antioxidant effects, antimicrobial effects, The composition of the bulbs is approximately 84.09% water, 13.38% organic

matter, and 1.53% inorganic matter,. Allicin is the major biologically active component of garlic. First reported by Cavallito and Bailey 1944), allicin is the key ingredient responsible for the broad-spectrum of anti-bacterial activity in garlic.

The activity of neem extract by the presence of active ingredients like triterpenes or limonoids such as meliantriol, azadirachtin, desactylimbin, quercetin, sitosterol, nimbin, nimbidin, nimbinin, nimbosterol and margisine to the different bitter substances such as alkaloids, phenols, resins, glycosides, terpenes and gums Joshi *et al*., (1992).

The result was an agreement with the findings of Reddy and Elanchezhian, (2008), they reported that the plant extracts completely inhibited *A. flavus* as also reported by Somai and Belewa (2011), who stated that botanical extracts of some higher plants can inhibit the growth of *A. flavus* and *A. parasiticus.* Antifungal effect of leaf extract of some medicinal plants against *F. oxysporum* causing disease of *S. melogena L.* Some seed-borne pathogen like *F. oxysporum, A. niger, Penicillium* spp*. P. vexans, A. flavus* are managed by some botanical plant extracts (Singh *et al.,* 2001 and Mohana *et al*., 2011). Exploitation of naturally available chemicals from plant protection would be a prominent role in development of future commercial pesticides for crop protection strategies, with special reference to manage plant diseases (Varma and Dubey, 1999; Gottileb, *et al*., 2002).

Neem products from *Azadirachta indica* have been successfully used for pest control in agriculture since long, the registered neem products for control of pathogens or disease vectors affecting human, still need to be explored. In line with the above findings it is suggested that the further researches on neem should be directed towards identification and quantification of active principles responsible for reducting the diseases incidence Pandey *et al*., (2014) .

No correlation between the three extracts was found, on the other hand, the reaction of three plants species belonging to different families to the two tested isolates of *F. oxysporum* and *R. solani* revealed that there is a great specialization in this respect. In addition, these plants are reported to have excellent antibacterial, antifungal, antioxidant and antitumor properties (Dahham *et al*., 2010).

The efficacy of fungicide (Rizolex T50 %) has been used as 3 gm per Kg seeds gave the best result and significantly increased the seedling emergence and reduced the mycoflora as compared to untreated seeds (Control). On the basis of the results obtained of fungicide there were significantly against these fungi. As the effects of chemical fungicides are well known, efficacy of plant (Pathak *et al.,* 2013) Latex was tested against the seed fungi. The experiments were carried out to study the efficacy of fungicide and plant extracts (Pomegranate, Neem and Garlic) against seed-borne pathogens of wheat, that was in agreement with Sitara and Akhter (2007). Pomegranate extract has been found quite effective in controlling the seed-borne mycoflora of wheat.

Latex from plants has been found to contain chemicals like, fatty acids, resins, oil, acids, salt, sugar etc. (Chopra *et al.,* 1980). Results are in

conformity with (Zaidi, 1983) who had controlled a number of fungi with the application of *Calotropis* latex in case of cowpea. Plants have potent components of phytomedicine. Plant based natural constituents can be derived from any part of the plant like bark, leaves, fruits, flowers, roots, seeds etc., The therapeutic use of medicinal plant is becoming popular because of its inability to cause side effects and combat antibiotic resistant microorganisms (Siddiqui and Zaman 2004). In recent years more attention has been given to non-chemical substances for seed treatment to protect them against seed-borne pathogens. Many important pesticides has been banned by World Health Organization (WHO) due to their wide range of toxicity against non target organisms including humans, which are known to cause pollution problems (Barnard *et al* 1997). Chemical fungicides can control the plant disease, but they produce bad effects on human health, plants and animals and also harmful to the environment. On the other hand, several higher plant products and their constituents have shown success in plant disease control and are proved to be harmless and non-phytotoxic like chemical fungicides. The effect of aqueous leaf extracts of 8 allelopathic free species viz. *Acacia nilotica, Alstonia scholaris, Azadirachta indica, Eucaylptuscit riodora, Ficus bengalensi*s, *mangifera indica, Meliaaz edarach* and *Syzygium cuminion* germination and seed borne mycoflora of wheat (Sukirtha and Growther 2012). From these finding, it is concluded that the seed health testing is a primary need to avoid crop failure and it is desirable that seeds of crop plants should invariably be tested for seed health before planting so as to check the introduction of pathogens in new areas and be treated with fungicides to attain maximum yield of crops. Since these pesticides are likely to be hazardous, Latex of plant parts could be employed as encouraging results have been obtained (Pathak and Zaidi, 2013).

It is therefore necessary to search for control measures that are cheap, ecologically sound and environmentally safe to eliminate or reduce the incidence of those seed-borne pathogens and for the improvement of seed quality and emergence of plants, so as to obtain healthy and vigorous plant as well as better yield of important crops like wheat.

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الأمراض الفطرية المصاحبة لحبوب القمح ومقاومتها بإستخدام المستخلصات النباتية

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يعتبر القمح من اهم محاصيل الغذاء الاقتصادية وخاصة فى مصر. يصاب بالعديد من الامراض التى تقلل من الانتاجية السنوية (أردب / فدان). فى هذة الدراسة تم تجميع ٧ أصناف قمح محلية (جميزة ٧ ,جميزة ٩ ,سدس ١ , سدس ١٢, سخا ٩٣, سخا ٩٤ , بنى سويف ١) فى موسم ٢٠١٤. اختبرت هذة الاصناف من حيث الشكل الظاهرى و نسبة الاصابة المرضية ووزن ١٠٠ حبة وتقدير نسبة الحبوب السليمة والضامرة ونسبة الانبات . اظهرت النتائج وجود ١٥ مسبب مرضى فطرى تتبع ١٢ نوع الترتاريا الترناتا و اسبرجلس فلافس و اسبرجلس نيجر و كيتوميم و كلادوسبوريوم وايبيكوكم وفيوزاريوم وفيوزاريوم اوكسسبوريم و فيوزاريوم سولانى و نيجروسبورا اوريزى وبنيسيليوم وريزوكتونيا سولانى وسيتمفيليم بتاتيكولا و تريكودرما و تريكوسيسم. تم معاملة بعض الفطريات المنقولة بالبذرة مثل فيوزاريوم اوكسسبورم وريزوكتونيا سولانى بمستخلصات مائية لنبات الرمان و النيم و الثوم بثلاث تركيزات مختلفة (١٠و٢٠ و٣٠%) والمعروفة بكفاءتها وقدرتها على انتاج مضادات فطرية. تنافست الثلاث مستخلصات نباتية كمصادر طبيعيه للحد من الاصابة و انتشار كل من الفطرين. حيث سجل مستخلص قشر الرمان انخفاض فى نسبة الاصابة عند دراسة التأثير المثبط مع فطر فيوزاريوم اكسسبوريوم بنسبة (٦٣.٣٣ %) وذلك عند استخدام مستخلص بتركيز ٢٠% يليه نفس الفطر عند تركيز ٣٠%.

أيضا لوحظ عند عد الاسكروليشيات الناتجة من الفطر *Sclerotium rolfsii* بعد المعاملة بالثلاث تركيزات زيادة كبيرة فى تركيز٣٠% لمستخلص قشر الرمان و الثوم (١٩٨ و ١٣٢) على التوالى بينما فى النيم على تركيز٢٠% (٨٩).

أختبرت ٥ اصناف من حيث قدرتهم على الانبات بعد المعاملة بالنقع فى ٥مل من كل مستخلص (قشر الرمان و النيم و الثوم) لمدة ٢٤ ساعة للحبوب مع المقارنة بالمبيد الفطرى (ريزولكس). أظهرت المعاملة أرتفاع نسبة الانبات مقارنة بمعاملتى الكنترول والمبيد الفطرى.

مما سبق يتضح ان استخدام المستخلصات النباتية مثل قشر الرمان و النيم و االثوم بتركيرات مختلفة كان لها اثر ملموس فى مقاومة بعض الامراض الفطرية المحمولة و المنقولة على حبوب بعض اصناف القمح وزيادة نسبة الانبات.

Table 2: Frequency of seed-borne fungi associated with wheat seeds cultivars in Blotter method.

Cultivars / Isolated Fungi	Efficiency (%)														
	Gemmiza7*	%	Gemmiza10	%	Sids1	%	Sids12	%	Sakha 93	%	Sakha 94	%	Bani swaif	%	Mean
A. alternata	4.0	18.3	8.0	18.8	9.0	23.3	2.0	9.2	15.3	45.8	3.5	19.9	8.5	33.7	24.1
A. flavus	0.0	0.0	1.0	2.3	2.0	5.2	1.5	7.1	0.0	0.0	0.5	2.8	1.5	5.9	3.3
A. niger	0.0	0.0	1.5	3.5	3.0	7.8	0.5	2.4	1.0	2.9	1.0	5.7	1.5	5.9	4.0
Chaetomium spp	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	2.0	0.3
Cladosporium spp	2.5	11.5	0.0	0.0	4.5	11.7	1.5	7.1	9.0	26.9	0.0	0.0	0.0	0.0	8.2
Epicoccum spp	0.0	0.0	0.0	0.0	1.0	2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3
Fusarium spp	1.5	6.9	2.5	5.9	2.0	5.2	2.0	9.5	1.5	4.5	2.5	14.2	2.0	7.9	7.7
F. oxysporum	3.0	13.8	18.1	19.1	5.0	3.8	3.0	14.2	2.0	6.0	5.1	28.9	1.0	4.0	12.8
F. solani	0.0	0.0	0.0	0.0	0.5	1.3	0.5	2.4	0.0	0.0	0.0	0.0	1.5	6.0	1.4
N. oryzae	0.0	0.0	1.5	3.5	3.5	9.1	0.0	0.0	0.7	2.1	0.0	0.0	2.0	7.9	3.2
P. spp	6.0	27.5	13.5	31.8	3.5	9.1	6.5	30.8	0.7	2.1	1.3	7.4	2.0	7.9	16.6
R. solani	2.1	9.6	2.9	6.8	2.5	6.5	2.6	12.3	1.2	6.3	1.5	8.5	1.5	5.9	7.9
S. bataticola	2.7	12.4	2.0	4.7	0.0	0.0	0.0	0.0	0.0	0.0	1.3	7.4	0.5	2.0	3.8
Trichoderma spp.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	5.9	0.8
Total count of fungal isolates	21.8	-	42.5	-	38.5	-	21.1	-	33.4	-	17.6	-	25.2	-	-