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EFFECT OF ASSOCIATED FUNGI IN SESAME
SEEDS ON SEEDS GERMINABILITY

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Abstract :

Many pathogenic and nonpathogenic fungal species were isolated from month stored sesame seeds. The species Aspergillus niger repere- sends 83% of colonies obtained on medium . However these seeds with 168000 propaules /g seeds were planted on water Agar inside test tubes, steam sterilized soil and nonsterilized soil. Results of seed germination revealed a considerable variations between sterillized and nonsterilized seeds .Regarding the effect of cultural filterates of these species on seed germination, the germinability of sesame was significantly reduced (9-18%) Therefore data of this test indicated that this method can not be demonstrate the real effect of associated fungi on sesame seeds at all.

INTRODUCTION :

Seeds of sesame (Sesamum indicum L.) as other seed lots of field crops usually carry a certain level of fungal spores or any reproductive structures (1,2). The associated fungi on seeds might cause remarkable reduction in seed quality and quantity (3,4). Reduction in seed quality could be attributed to the deterioration phenomenon in stored seeds (5,6). Whereas, the lacking of seed quantity will be reflected in seed germination and survival numbers of a given rate of seeding. However many attempts were conducted to identify the fungi carried on the seeds of different crops (7,8,9). Most of these experiments studied the role of associated fungi in seed germination by soaking the seeds in cultural filterate of isolated fungi. In sallowere , a complete reduction in

seed germination was obtained when the seeds were soaked for 30hr in culture filtrate of mixed fungi (Aspergillus flavus, A niger, Penicillium expansum, Alternaria alternata, and Fusarium equiseti (7)). However, the reduction percentages (26.70 to 79.50) were varied depending on the fungal species and the soaking period. On wheat and barley seeds, A. alternata was mostly isolated (73-90%) on both seed lots while 20% of seed germination was reduced when the seeds soaked for 30 min

in spore suspension (8×10^5 spores/ml) and planted in sterilized soil (9).

Hence, because of lacking real information on the role of associated fungi on seed germination and survival of sesame we initiated this study.

MATERIALS AND METHODS :

Associated fungi and contamination level :

Randomized sampel (1g) of six months stored seeds of I 539 sesame cultivar (R.H. 4.52) was placed in flask with 100 ml of sterilized distilled water. After 30 min. of shaking the suspension, each growth plate was recieved 0.1 ml (10). The medium used for this test called S medium which contain Ca (No3) 2 lg, KNO3 0.25g 0.125 g, Mg So4. 7H2O 0.25 g, KH2pO4 0.25 g , Saccharose 5g , Malt Extract 1g, Citric Acid 0.025g, Malic Acid 0.025 g and Agar 25 g in 1000 ml of distilled water (11).

Three days later, numbers of fungal colonies were counted and the isolated fungi were mostly identified to the genera ranks.

Effect of contamination level on germinability and survivals :

Sampels from the above mentioned seeds were planted in water Agar (slants), sterilized and nonsterilized soil with six replicates. The same seeds were surface sterilized in 10% of bleach containing 5% of Sodium hypochlorite for 2 min . The seeds then were planted as perviously stated . All the 3 kg soil pots were irrigated prior to seeding to avoid spore leaching from nonsterilized seeds . The slants and the pots were maintained

at growth room with 29-30 C and 14 hr photoperiod . seed germination and survivals were measured after 5 and 30 days respectively .

Effect of cultural filterates of assoiated fungi on seed germination :

All isolated fungi were cultured individually on Czapeck's broth in small flasks incubated at 25 C. Two weeks later , cultural filterates of a given fungus was obtained . Surface sterilized seeds were soaked in each filterate for 15, 30, and min and placed on filter paper moistened with 10 ml of uninoculated broth medium and kept inside a petridish (12). Seed samples had been soaked for 15 min in culture filterate were placed on filter paper moistened with 10 ml of the same cultural filterate . Germination percentage was taken after 36 hr of incubation . The same procedure was demonstrated on wheat seeds using culture filterate of A. niger isolated from sesame . The soaking periods were 30, 60, 120 min. and the seeds were placed on filter paper moistened with cultural filterate. The uninoculated medium served as control in the whole test.

RESULTS AND DISCUSSION :

The associated finqi and contamination level :
Results of culturing water suspension of nonsterilized sesame seeds revealed the occurrence of 16.8×10^6 propaules /g seeds. However these propaules belonge to Aspergillus niger (82.89%) . Penicillium sp.(5.30%) , Alternaria alternata (4.70) , Alternaria sp. (2.80%), Fusarium equisti (1.73%) , Macrophomina phaseolina (0.96 %) Curvularia sp. (0.70%), Fusarium solani (0.42%) , Rhizopus sp. (0.20%) , phoma sp.(0.20%) and A. terrus (0.10%) . The high frequent accurrence of

A. niger in sesame seeds met with the data obtained on stored sesame because of its nature as a storage fungus (1). Meanwhile, The failure of isolating of high percentage of Macrophomina could be attributed to the disease free of seed sources (2).

Effect of contamination level on germinability and survivals :

The germinability of sesame seeds varied in this test depends on seeds and seeding media (Table 1). However the highest percent of germination (94.67) was obtained when sterilized seeds had been planted in steam sterilized soil. The emerged seedlings remained healthy for 30 days . In contrary to this results seeding sterilize seeds in nonsterilized soil caused considerable reduction in both germination and survivals (13.0%). This is due to the effect of soil infestation . Data of using nonsterilized seeds increased sharply the percent loss in germination 50.70 and survivals 20.22 because of the enhancement of contaminated fungi in sterilized soil . The high occurrence of A. niger (82.89%) on nonsterilized seeds might explain the heavy loss in seed germination . However the total loss in germination was reduced to 34.70 and 8.63% in seed germination and survivals respectively when nonsterilized seeds were planted in nonsterilized soil (Table 1). Thus the contamination level of sesame seeds (16.8×10 propaques/g seeds) reduced 34.70 of seed germination While this amount of propaques and during 30 days failed to damage more than 8.63% of emerged seedling. The low percentage of loss in survivals could be attributed to the nature of contaminated fungi found on seeds and to the competition phenominon (13,1).

Using the water Agar slants, the percent germination increased from 72.0 to 89.0 due to the surface sterilization of the seeds . A heavy loss (45.0%) was observed on the survivals of nonsterilized seeds. The fast growth and propagation of contaminated fungi inside a limited area (slant) induced blight on the stems of most seedlings. Moreover the heavy growth of these fungi might produce sufficient toxic compounds which enhanced stem maceration (4). However these biased conditions

Table 1: Germination and survival percentages of sesame seeds affected by seed contamination and soil infestation.

Treatments	Percent		Percent lost at	
	Germination ^a	Survivals ^b	Pre. em.	Post. em. ^c
	%	%	%	%
St. seeds in St. soil.	94.67	94.67	5.33	0.00
St. seeds in nonSt. soil.	86.67	75.33	13.33	13.08
St. seeds in water Agar (slant)	89.00	81.00	11.00	8.98
non St. seeds in St.soil	49.30	39.33	50.70	20.22
non St. seeds in non St. soil	65.30	56.67	34.70	8.63
non St. seeds in water Agar	72.00	27.00	28.00	45.00

a- The germinated seeds were counted at 5th and 2nd day for soil and slant tests respectively.

b- Number of survivals were counted 30 days after seeding.

c- Percent lost based on germinated seeds.

(Slant Method) will never meet the truth in sesame or any crop .

Effect of cultural filterates of associated fungi on seed germination :

The results indicated that soaking the seeds in cultural filterates had no effect on seed germination if the seeds were placed on blotter moistened with uninoculated broth or water. The germinability was highly reduced when the seeds placed on blotter moistened with cultural filterate even they were soaked for 15 min (Table 2). This reduction can only induce when any kind of seeds kept inside a saturated atmosphere with any cultural filterate . These results were confirmed on wheat seeds . The cultural filterate of A. niger had no effect on seed germination even they were soaked for 2 hr. while 40% reduction was observed when the seeds were soaked for 30 min and placed on blotter moistened with culture filterate. Similar results were obtained on saflower, cotton and soybean (7,8). Thus it could be concluded that using cultural filterates of isolated fungi to study the effect of these fungi on seed germination is not logical. The practical values of such result in the nature is negligible due to the unrelated conditions used . Therefore seeding in nonsterilized soil will demonstrate the real influence of contamination fungi on seed germination .

Table 2: The influence of cultural filterates of associated fungi on seed germination of sesame.

Fungal Species ¹	Seed Germination (%)			
	Soaking period (min)			
	15 blotter moisted with broth	30	60	15 bl. moistened with Cul.filt
<u>Aspergillus niger</u>	95.0 ²	94.0	96.0	19.0
<u>penicillium</u> sp.	96.0	96.0	93.0	18.0
<u>Alternaria alternata</u>	94.0	94.0	92.0	8.10
<u>Alternaria</u> sp.	98.0	95.0	92.0	9.00
<u>Fusarium equisti</u>	94.0	95.0	93.0	2.83
<u>Macrophomina phaseolina</u>	97.0	96.0	94.0	3.00
<u>Curvularia</u> sp.	94.0	94.0	94.0	8.51
<u>Fusarium solani</u>	96.0	95.0	95.0	9.18
<u>Rhizopus</u> sp.	98.0	93.0	97.0	4.00
<u>Aspergillus terrus</u>	96.0	94.0	95.0	20.30
<u>Phoma</u> sp.	97.0	96.0	93.0	14.20
Mix population	93.0	92.0	93.0	9.80

1- All fungal species were cultured on Czapeck's broth for three weeks.

2- The germination percentages were measured after 36 hr.

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