RESULTS

RESULTS

Survey of Wheat Grains Mycoflora :

Fungi isolated from the grains of different cultivars are presented in **Table (2) :**

Many fungi were isolated from grains of different wheat cultivars. These fungi were purified and identified as shown in **Table(2).**

Data in **Table (2)** show that three isolates of *Aspergillus flavus*, one isolate of *A niger*, 4 isolates of *Penicillium caryophilhum*, one isolate of *P. funiculosum*, 3 isolates of *Alternaria alternata*, 3 isolates of *Stemphyllium verractosum*, 2 isolates of *Fusarium solani*, one isolate of *Nigrospora sphaerica*, *Cladosporium herbarum*, *Chaetomium sp.* and *Rhizopus nigricans* were isolated from wheat grains.

Table (2) : Survey of some local wheat grains mycoflora.

Cultivars	Isolated fungi
Sakha 69	*Aspergillus flavus I* *Alternaria alternata I* *Penicillium caryophillum I* *Stemphyllium verractosum I* *Rhizopus nigricans*
Sakha 61	*Penicillium caryophillum II, Cladosporium herbarum*
Sakha 8	*Aspergillus flavus II, Fusarium solani II,*
Giza 163	*Aspergillus flavus III, Penicillium caryophillum III* *Penicillium caryophillum IV, Alternaria alternata II,* *Stemphyllium verractosum III, Nigrospora sphaerica,* *Chaetomium SP.*
Giza 160	*Aspergillus niger, Alternaria alternata III,*
Giza 155	*Penicillium funiculosum.*
Gemiza I	*Fusarium solani I*
Sohag 2	*Stemphyllium verractosum II*

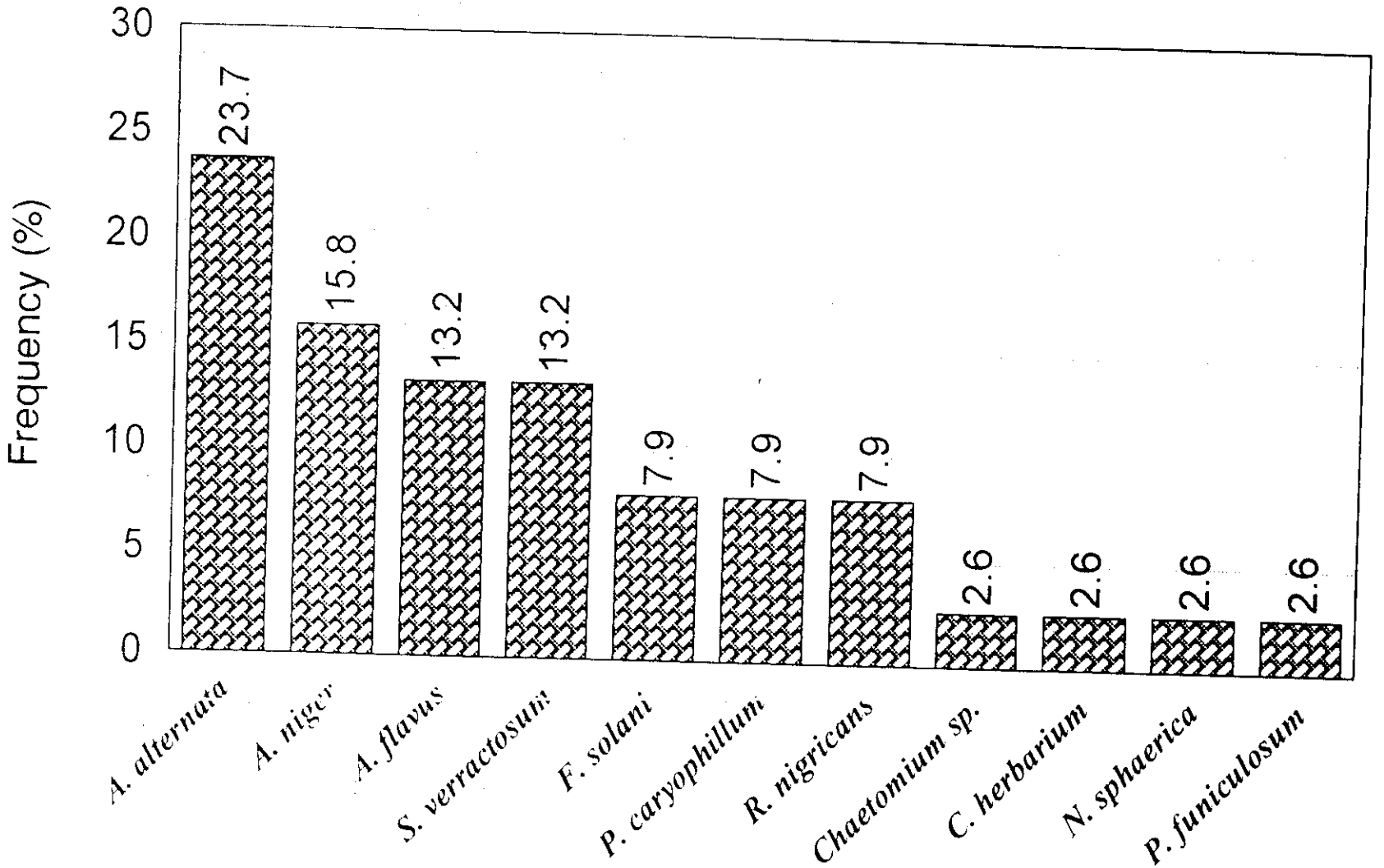


Fig Frequency of fungi associated with wheat grains.

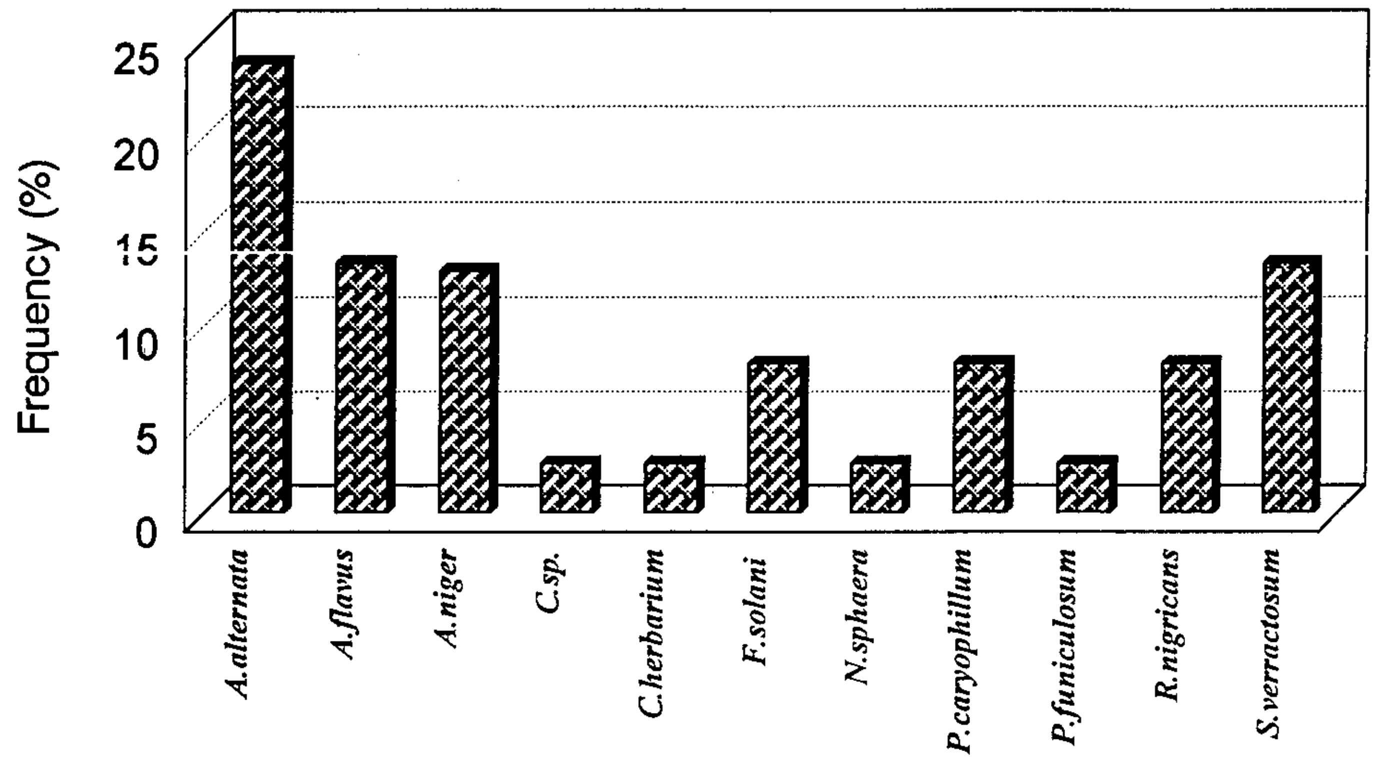


Fig. (1): Frequency of fungi associated with wheat grains.

Pathogenicity test of the isolated fungi:

Pathogenicity of the previously isolated fungi was tested against 2 cultivars of wheat and the obtained results are tabulated in **Table (4).**

Data tabulated in **Table (4)** and **Fig. (2)** show that, the most virulent fungi for Sakha 69 cultivar was *A. flavus* 1 and *F. solani* 1 with 30% infection followed by *P. caryophillum* IV with 26.7% infection and *A. flavus* III, *A. niger, A. alternata* 1, *S. verractosum* 1 and III and *R. nigricans* with 23.3% infection. The least infection percentage was caused by *Chaetomium sp.* that was equal to the control (3.3%).

With regards to Giza 163 cultivar, isolates I and III of *A. flavus* were the most virulent and caused the highest percentage of infection (30%) followed by *A. flavus* II and *A. niger* (26.7%). *Stemphyllium verractosum* III and *R. nigricans* were moderately virulent with 23.3% infection. On the other hand, *Chaetomium sp.*, *C. herbarium* and *F. solani* II showed low percentage of infection equal to the control (3.3%).

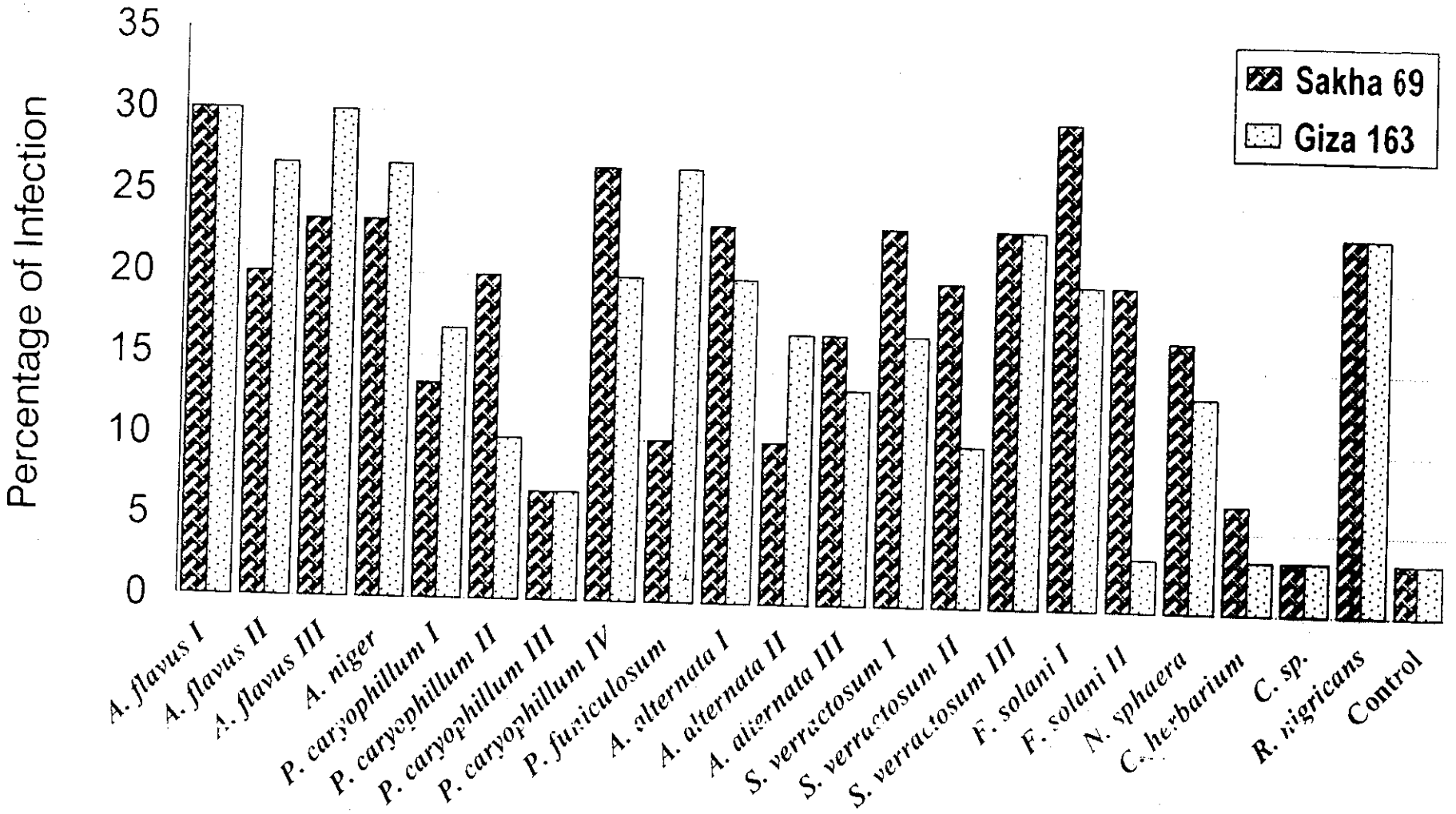


Fig. (2): Pathogenicity test of isolated fungi on local wheat cvs.

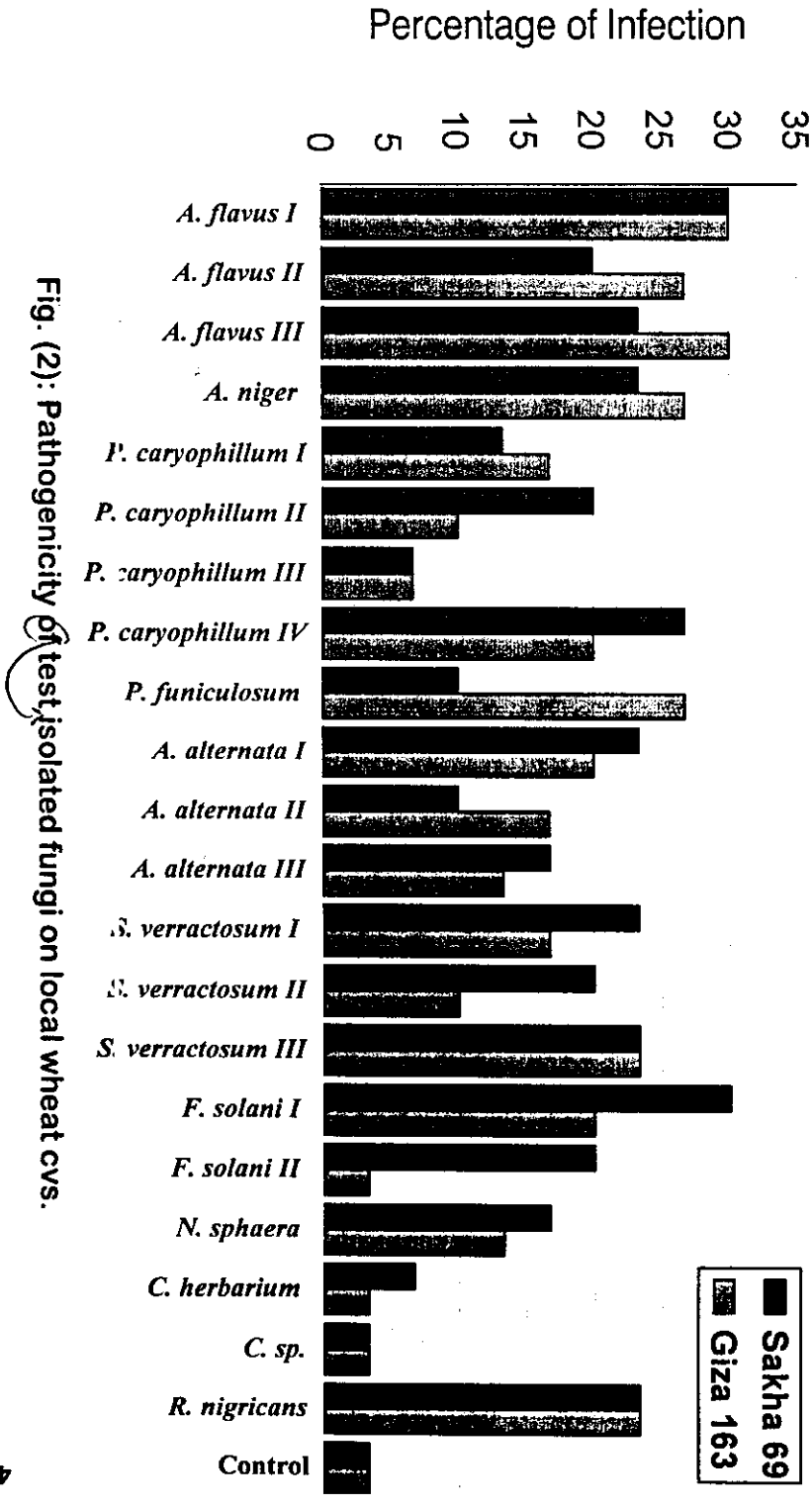


Fig. (2): Pathogenicity of test isolated fungi on local wheat cvs.

Effect of storing grains of some wheat cultivars for 3-months under Lab. condition on moisture content, weight of 100-grains, percentage of infection with mold fungi and germination of grains :

Data of moisture content, weight of 100- grains, percentage of infection with fungi and germination of some wheat cultivars stored for 3 months under Lab. condition are tabulated in **Table (5).**

Data in **Table (5)** and **Fig. (3)** show that, moisture content of the wheat cultivars was high. After 3 months Sakha 69 cv. showed the highest moisture content (22.8) followed by Giza 163 (15.1).

The percentage of infected grains was also high wheat cultivars. Sakha 92 and Giza 163 cvs. showed the highest infection percentage with 14.2 and 13.1, respectively.

All tested grains of Giza 162 and 163 cvs germinated (100%) while the germination was 90% in case of Sakha 69 cv. Other cultivars showed lower germination percentage ranged from 13 to 30%.

Percentage of fungi associated with grains of 5 wheat cultivars :

Percentage of fungi isolated from grains of five wheat cultivars are shown in **Table (6).**

Data show that the non-surface sterilized grains were more occupied by the fungus *A. alternata* than the surface sterilized ones. This trend was found in 4 of the 5 wheat cultivars (Sakha 8, Sakha 61, Giza 163 and Giza 165). On the opposite, *A. niger* was more present in the surface sterilized grains of the 5 wheat cultivars than the non- surface sterilized one. Percentage of other fungi fluctuated between zero to 23.3 and zero to 12.1 in the non- surface sterilized and surface sterilized grains, respectively.

Table (5) : Moisture content, weight of 100-grains, percentage of infection with mould fungi and germination of some local wheat cultivars stored for 3-months in open air.

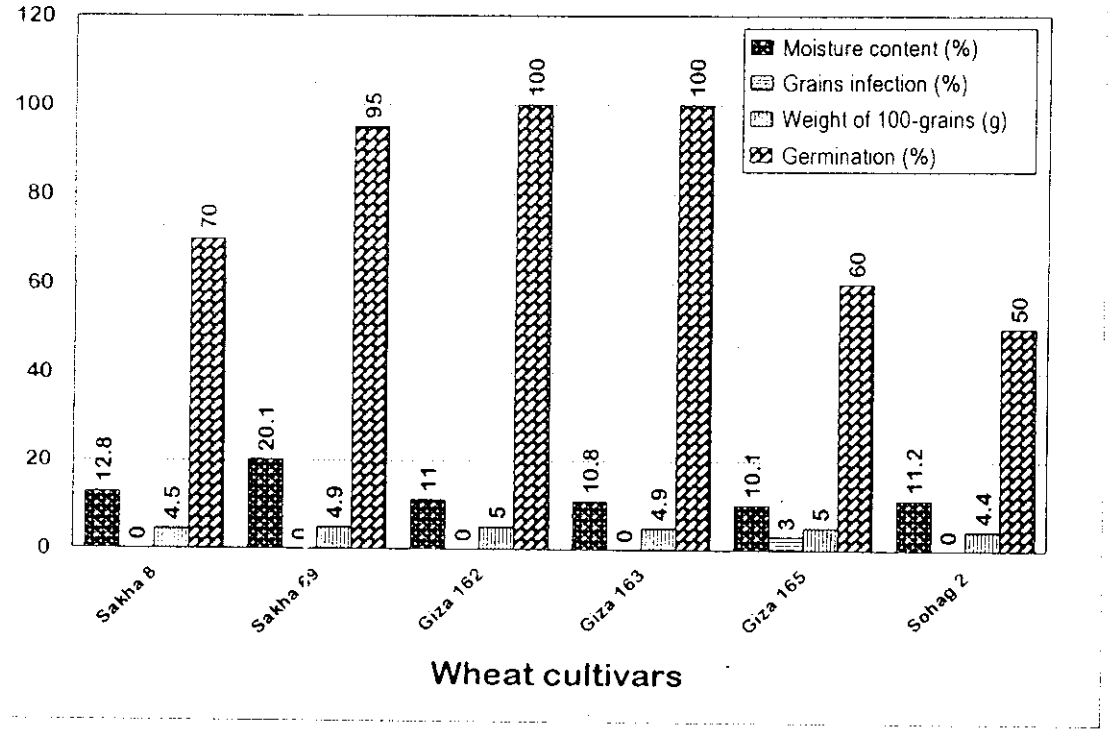
Cultivars	At zero time				After 3 months			
	% of moisture content	weight of 100- grains	% of grains infection	% of germination	% of moisture content	weight of 100- grains	% of grains infection	% of germination
Sakha 8	12.8	4.5	0	70	13.1	3.9	10.3	30
Sakha 69	20.1	4.9	0	95	22.8	4.4	7.3	90
Giza 162	11.0	5	0	100	12.0	4.7	4.0	100
Giza 163	10.8	4.9	0	100	15.1	4.0	13.1	100
Giza 165	10.1	5	3	60	12.9	4.3	10.3	25
Sohag 2	11.2	4.4	0	50	13.4	3.9	5.6	13
L.S.D at 5%	3.2	1.2	N.S	22.9	4.4	0.9	2.1	10.6

Table (6) : Percentage of associated fungi with grains of some local wheat cultivars.

Fungi	% Isolated Fungi									
	Sakha 8		Sakha 61		Sakha 69		Giza 163		Giza 165	
	N	S	N	S	N	S	N	S	N	S
Alternaria alternata	24.3	6.7	37.8	20.0	27.2	29.3	36.3	33.9	38.6	20.0
Aspergillus flavus	0	6.7	0	3.3	0	3.3	0	12.1	3.7	10.0
Aspergillus niger	0	60.7	5.5	50.0	8.3	53.2	4.5	27.9	0	43.3
Cladosporium herbarium	11.4	3.3	23.3	6.7	18.6	0	4.5	0	19.0	6.7
Fusarium spp.	4.8	0	0	0	7.9	0	0	0	4.8	0
P. caryophillum	0	6.7	6.7	10.0	0	7.5	12.7	9.4	8.5	6.7
S. verructosum	0	0	12.6	10.0	22.7	3.3	11.3	9.9	8.5	6.7
Other fungi	59.5	9.9	14.1	0	0	3.4	30.4	6.8	16.4	6.6

- N = Non - surface sterilized grains
- S = Surface sterilized grains
- Other fungi = *Epicoccum sp./ Mucor sp./ Nigrospora sphaerica / Rhizopus sp.*

At zero time



After 3-months

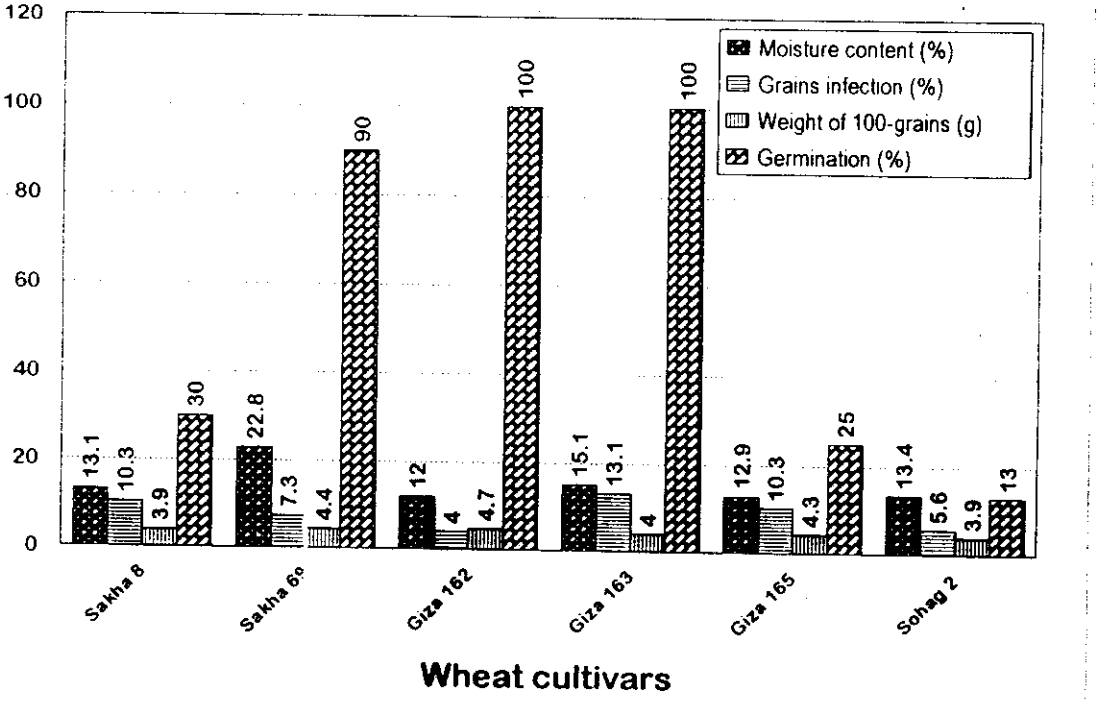


Fig. (3): Moisture content, weight of 100-grains, percentage of infection with mould fungi and germination of some wheat cultivars stored at laboratory conditions.

Effect of methods of storage for 6 months on weight of 100 grains, moisture content, % of infection with mould fungi, % of germination and associated fungi :

The effect of methods of storage for 6 months on some characters of wheat grains of Sakha 69 was studied and the results are tabulated in **Table (7).**

Data showed that the storage method have an influence on grains moisture content. Grains stored in a closed warehouse still have the highest moisture content (12.4) after 6 months followed by grains stored in metal silos (11.8) and grains stored in sacks in open and covered with waterproof canavas sheets (11.2). No significant differences were observed on the effect of storage method and weight of 100 grains. Method of storage influenced also the percentage of infection which was the highest in case of storage in a closed warehouse (have the highest moisture content 12.4). Concerning the percentage of germination, no significant differences were found between the different methods of storage. However, the percentage of germination was very high and ranged from 89% to 98%, except in case of storing in sacks under concrete shed 59 %.

In regard to the effect of storage method on fungi associated with wheat grains of Sakha 69 cv. It is obvious that the fungi *A. flavus*, *A. niger* and *A. alternata* can grew under the circumstances of the different storage method. Storage in metal silos was the best method for the growth of *A. flavus* (41.2%) and *A. niger* (47.1%), while storage under a concrete shed was the best method for the growth of *A. alternata* (33.3%). Only in one method (storage in sacks in open and covered with waterproof canavas sheets), *Rhizopus sp.* was isolated from grains of Saka 69 cv. after 6 months.

Table (7) : Effect of storage method for 6 months on weight of 100 grains, moisture content, % of infection with mould fungi % of germination of Sakha 69.

Method of storage	Associated Fungi									
	Weight of 100-grain	% of moisture content	% of infection	% of germination	Asp. flavus	A. niger	A. alternata	Rhizopus sp.	P. caryo-phyllum	Other fungi
In metal silos 2b	4.4	11.8	7.3	90	41.2	47.1	11.7	0	0	0
In mud silos 2a	3.9	10.2	4.0	89	30.0	40.0	30.0	0	0	0
In sacks: in open and water-proof canvas sheets 1a	4.5	11.2	7.0	93	23.8	42.9	9.5	22.2	0	0
Under a concerteshed 1b	4.1	10.7	5.3	89	22.2	44.4	33.3	0	0	0
In a closed warehouse 1c	4.2	12.4	9.5	98	37.5	43.8	18.7	0	0	0
Zero Time	5.9	13.1	6.3	99.2	3.3	53.2	29.3	3.9	7.5	3.4
L.S.D. at 5%	N.S.	1.2	1.8	N.S.	-	-	-	-	-	-

Other fungi : *F. oxysporum*, / *Epicoccum* sp.

Effect of storage for different periods and different temperature degrees on some characters of 2 wheat cultivars after direct post harvest :

The effects of storage for different periods and at 4 temperature degrees on some characters of 2 wheat cultivars after direct post harvest are shown in **Table (8).**

Data showed that the weight of 100-grain was decreased with the prolongation of storage time. This trend was found for both cultivars under study (Sakha 69 and Giza 163) and at the four tested temperature degrees (5, 9, 18 and 27°C). However, this decrease was greater at 27°C for both cultivars than the other temp. degrees and reached 2, 2.3 gram for S.69 and G. 163 cvs., respectively.

Also, grain moisture content was decreased with the prolongation of storage time up to 4 months. This was true for both cultivars at 5, 9 and 18°C. At 27°C the opposite trend was found i.e. the moisture content was increased with the prolongation of storage time (up to 6 months). This was true for both cvs. under study.

Percentage of grain infection was increased with the prolongation of storage time. This trend was found in both cvs. at the 4 tested temperature degrees. However, at 27°C infection percentage was raised very quickly and reached 100% after 4 months storage for both cultivars.

Percentage of grain germination was stable from the beginning to the end of storage time. This was true for both cvs. at 5, 9 and 18°C.

Table (8): Effect of storage for different periods and at different temperature degrees on some characters of 2 wheat cultivars after direct post harvest.

Temp.	cvs.	Zero time				Two months				Four months				Six months			
		W. of 100 G	Moisture content	% of n	% of ger. mination	W. of 100 G	Moisture content	% of infection	% of ger. mination	W. of 100 G	Moisture content	% of infection	% of ger. mination	W. of 100 G	Moisture content	% of infection	% of ger. mination
5 °C	S 69	6.8	13.3	6.0	99.2	6.4	12.3	7.30	99.2	6.20	12.20	7.80	99.2	5.50	12.8	8.20	99.2
	G 163	6.3	13.1	7.0	97.6	5.6	12.7	7.30	97.6	5.30	12.08	7.60	97.6	5.60	12.2	8.00	97.6
9 °C	S 69	6.4	13.2	8.8	99.2	5.4	12.6	9.20	98.8	5.04	12.30	10.4	98.8	5.90	12.9	11.3	95.8
	G 163	6.1	13.7	6.0	97.6	5.6	13.8	7.00	96.4	5.20	12.80	7.40	94.4	5.20	12.1	12.2	94.4
18 °C	S 69	5.9	14.7	6.3	99.2	5.3	14.0	7.40	98.8	5.02	13.40	12.0	88.5	5.08	13.1	12.8	88.5
	G163	6.2	14.3	6.6	97.6	5.9	14.8	7.60	94	5.80	13.20	13.6	86	5.50	13.6	14.4	85
27 °C	S 69	6.3	14.7	12.4	99.2	5.0	15.5	15.0	95	4.80	16.10	100	80	4.30	18.5	100	65
	G 163	6.4	15.2	16.2	97.6	5.4	16.0	18.2	92	4.30	16.60	100	78	4.10	18.9	100	55

S = Sakha 69 G = Giza 163

1- W. of 100-grains

L.S.D 5 %

Storage	**= 0.13**
Temp. (T)	**= 0.13**
Var. (V)	**= 0.9**
T x V	**= 0.18**

2- Moisture

L.S.D 5 %

Storage	**= 0.15**
Temp. (T)	**= 0.15**
Var. (V)	**= 0.11**
T x V	**= 0.29**

3- % of infection

L.S.D

Storage	**= 1.35**
Temp. (T)	**= 1.35**
Var. (V)	**= 0.96**
T x V	**= 1.95**

4- Germination

L.S.D

Storage	**= 1.75**
Temp. (T)	**= 1.75**
Var. (V)	**= 1.24**
T x V	**= N.S**

Effect of Storage at Different Temperature Degrees on the Fungi Associated with Wheat Grains After 6 Months of Storage :

Effect of storage at different temperature degrees on fungi isolated from wheat grains after 6 months of storage are presented in **Table (9)** and **Fig. (4)**. Obtained results show that low temperature degrees (5, 9 and 18 °C) were more suitable for the appearance of the associated fungi of wheat grains of the 2 cvs. than the higher degree (27°C). At 5°C, the appearance percentage of *A. alternata* from Sakha 69cv. grains was 54.5%. *Aspergillus flavus* was more active at 9°C, whereas its appearance percentage reached 62.5%, while 18°C was the optimum temp for *A. flavus* with 66.7% appearance.

The same trend was found with Giza 163cv. At 5°C, the appearance percentage of *A. flavus* reached 46.7%, while 9°C was the optimum temp for *A. niger* and *A. alternata* with 44.4% appearance for every fungus.

Table (9) : Effect of storage for 6 months at different temperature degrees on the associated fungi of wheat grains of Sakha 69 and Giza 163 cvs.

Isolated Fungi	Sakha 69					Giza 163				
	Zero time	5	9	18	27	Zero time	5	9	18	27
A. flavus	3.3	27.3	25.0	66.7	50.0	12.1	46.7	22.2	44.4	15.4
A. niger	53.2	18.2	62.5	33.3	16.7	27.9	13.3	44.4	16.7	23.1
A. alternata	29.3	54.5	12.5	0	0	33.9	13.3	44.4	16.7	23.1
Rhizopus sp.	3.4	0	0	0	0	6.8	0	0	0	0
Other fungi	59.5	0	0	0	33.3	30.4	0	0	0	30.7

Other fungi : *Fusarium roseum* / *Nigrospora* sp. / *Epicoccum* sp. *Penicillium caryophillum.*

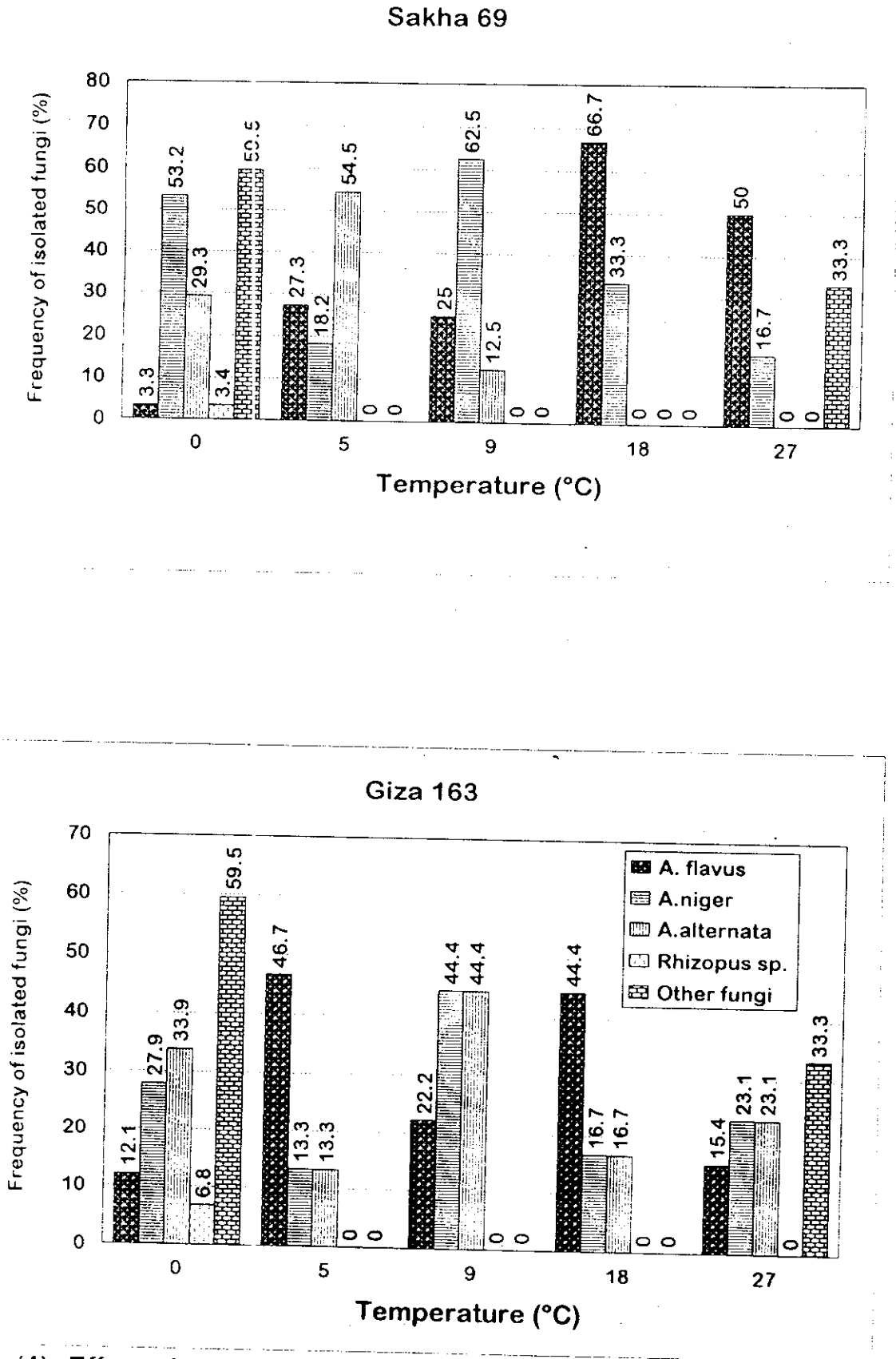


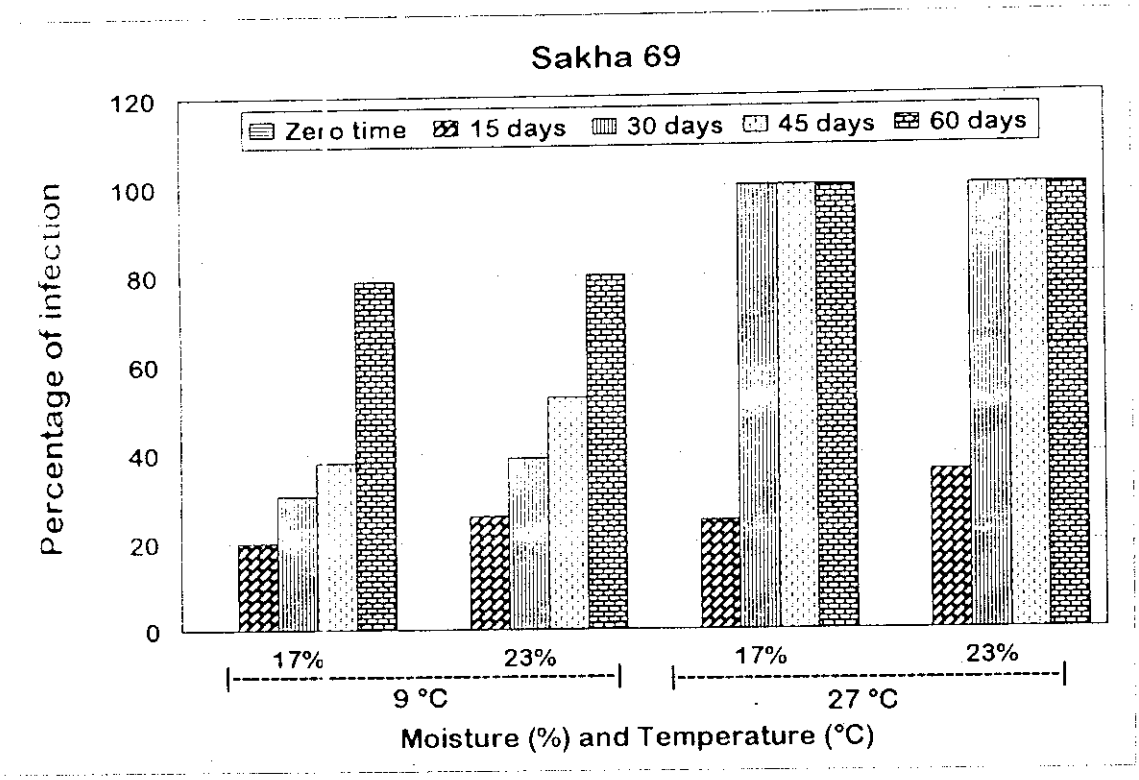
Fig. (4): Effect of storage for 6 months in different temperature degrees on associated fungi of wheat grains of Sakha 69 and Giza 163 cvs.

Table (10): Effect of storage temperature, moisture and storage period on percentage of infection of wheat grains (two cvs.) inoculated with *A. flavus*.

Cultivars	Temp.	Moist.	Percentages of infection after (days)				
			Zero time	15 days	30 days	45 days	60 days
Sakha 69	9 °C	17 %	0	20	30.66	38	78.66
		Control	0	2.5	11.2	15	20
		23 %	0	26	39	52.66	80
		Control	0	6	11.8	18.2	26
	27°C	17 %	0	25	100	100	100
		Control	0	5	15	20	38
		23 %	0	36	100	100	100
		Control	0	12	21	26	42
Giza 163	9 °C	17 %	0	27.33	42.33	54.66	83.66
		Control	0	3.1	14	16	20
		23 %	0	28.33	56	75	87.33
		Control	0	7	15	20	31
	27°C	17 %	0	33	100	100	100
		Control	0	11.5	17	23	55
		23 %	0	46	100	100	100
		Control	0	13	19	37	62

L.S.D. at 5% For :

cvs. (C)	= 2.42		
Temp. (T)	= 2.42	C x S	= 5.41
Mois. (M)	= 2.42	T x M	= N.S
Storage (S)	= 3.83	T x S	= 5.41
C x T	= N.S	M x S	= 5.41
C x M	= N.S	C x T x M x S	= 10.82



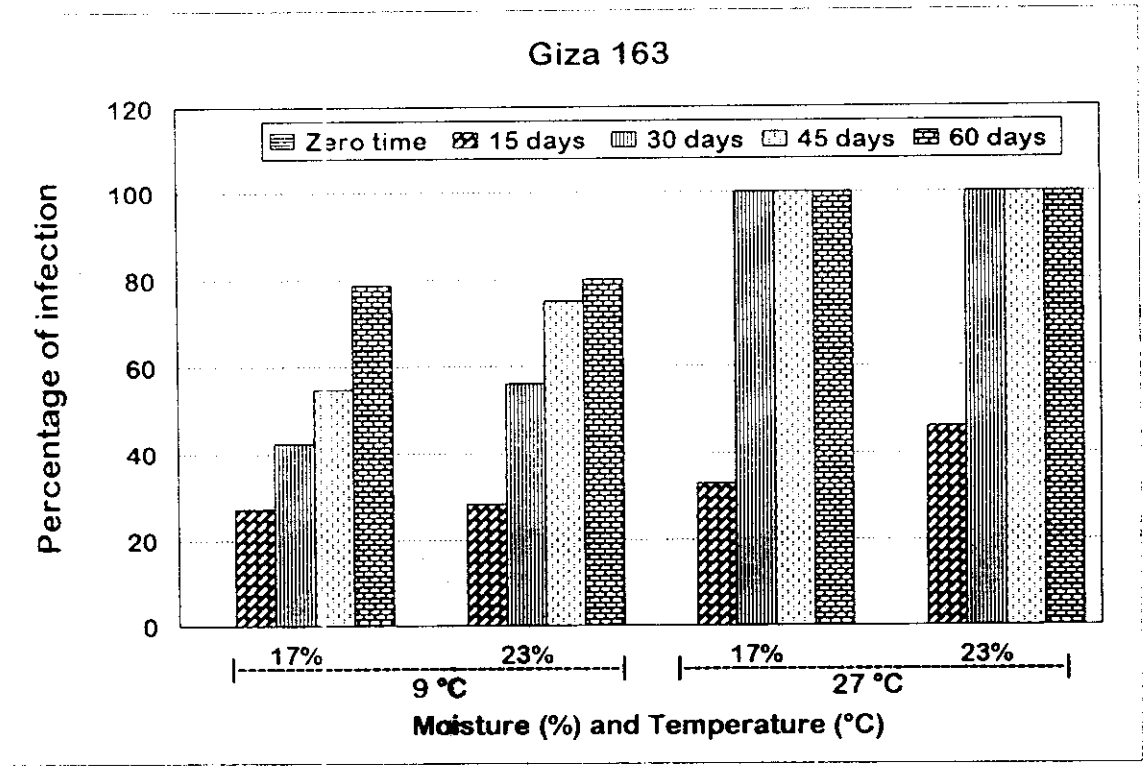


Fig. (5): Effect of storage temperature, moisture content and storage period on percentage of infection of wheat grains (two cvs.) inoculated with *A. flavus*.

Effect of storage temperature, moisture and storage period on aflatoxin production in wheat grains inoculated with *A. flavus*.

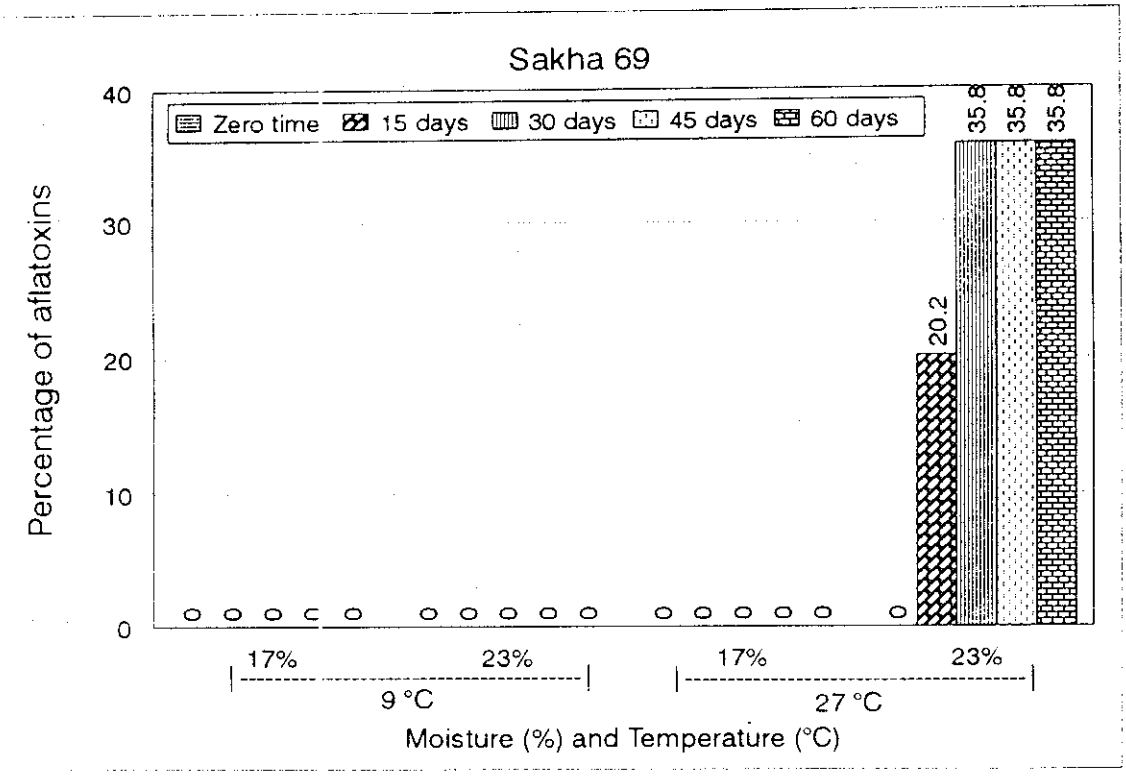
Two storage temperatures (9 and 27°C), 2 grain moisture contents (17 and 23%) and 5 storage periods (0 , 15, 30, 45 and 60 days) were tested to study their effect on aflatoxin production with *A. flavus* and the obtained data are shown in **Table (11)** and **Fig (6).**

Results indicated that no aflatoxins were detected at 9°C neither at 17% grain moisture content nor at 23 %. After 15 days storage at 27°C and 23% grain moisture content, aflatoxins were detected (20.2 µg/kg). The percentage of aflatoxins was increased to 35.8 mg/kg after 30 days storage then stayed constant to the end of the experiment. This was true for wheat cultivar Sakha 69.

The same trend was also found with cultivar Giza 163. However, aflatoxin production was higher with cultivar Sakha 69 compared with cultivar Giza 163.

Table (11): Effect of storage temperature, moisture and storage period on aflatoxin production in wheat grains inoculated with *A. flavus*.

cvs.	Temp.	Moisture	Aflatoxins (µg/kg sample)				
			zero time	15 days	30 days	45 days	60 days
Sakha 69	9 °C	17 %	0	0	0	0	0
		23 %	0	0	0	0	0
	27°C	17 %	0	0	0	0	0
		23 %	0	20.2	35.8	35.8	35.8
	Control		0	0	0	0	0
Giza 163	9 °C	17 %	0	0	0	0	0
		23 %	0	0	0	0	0
	27°C	17 %	0	0	0	0	0
		23 %	0	14.28	28.97	28.97	28.97
	Control		0	0	0	0	0



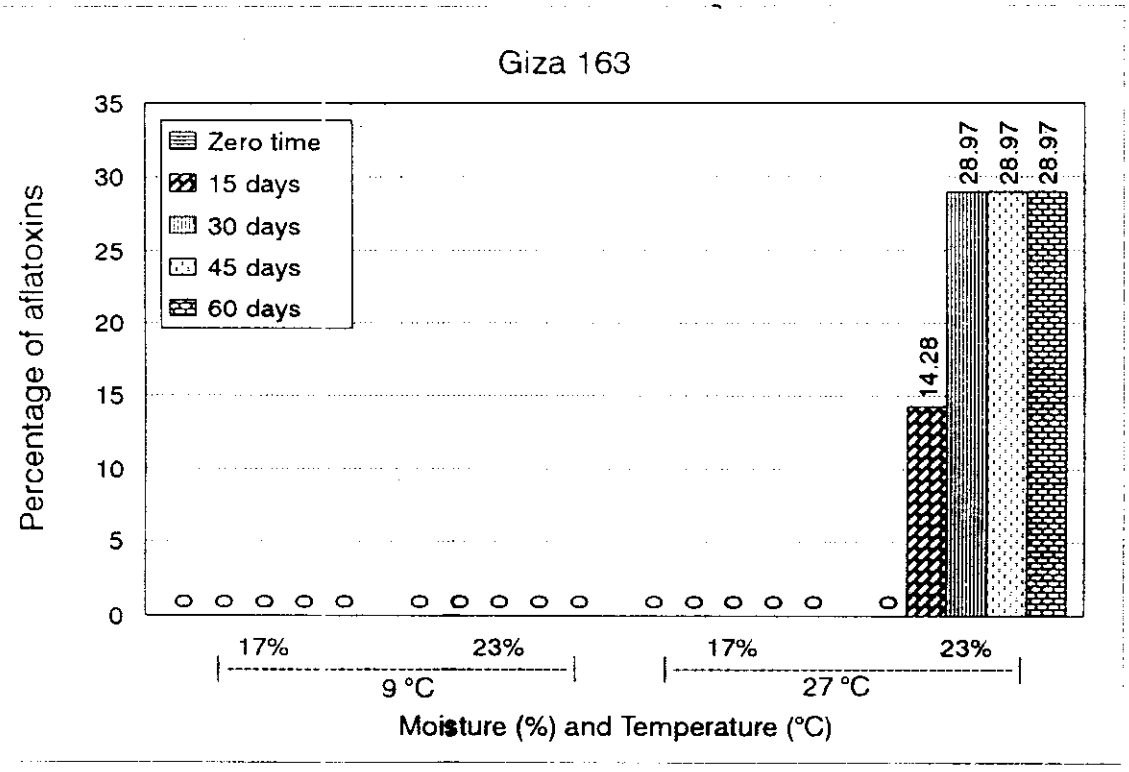
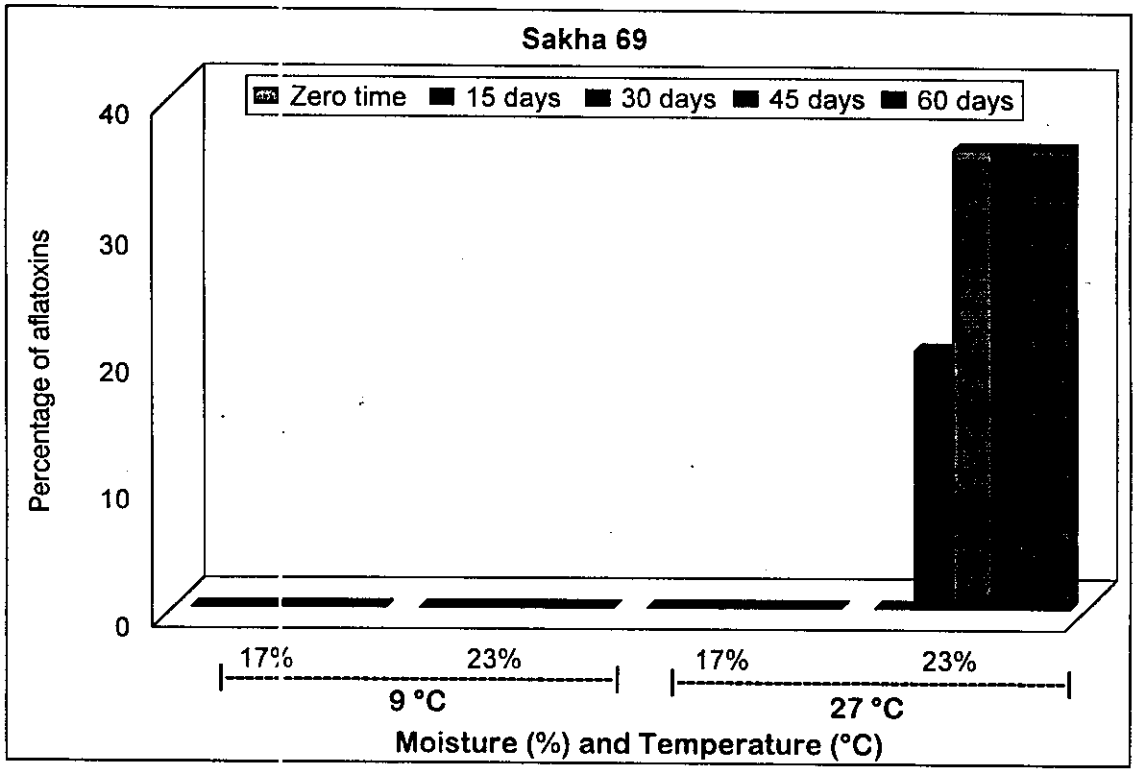


Fig. (6): Effect of storage temperature, moisture content and storage period on percentage of aflatoxins in inoculated wheat grains with *A. flavus*.



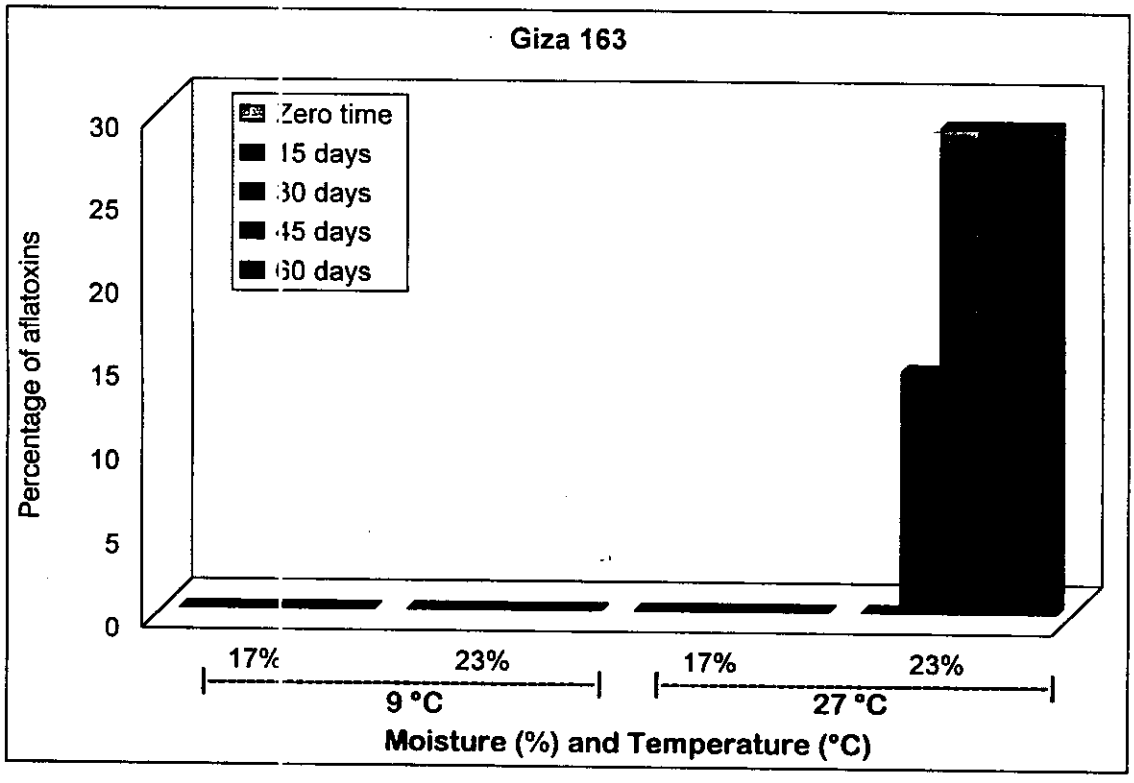


Fig. (6): Effect of storage temperature, moisture content and storage period on percentage of aflatoxins in inoculated wheat grains with A. flavus.

Effect of storage temperature, moisture and storage period on protein content in wheat grains inoculated with *A. flavus*.

The effect of 2 storage temperatures (9 and 27°C), 2 grain moisture contents (17 and 23%) and 5 storage periods (0 , 15, 30,45, and 60 days) on the protein content of 2 wheat cultivars (Sakha 69 and Giza 163) was studied and the obtained data are presented in **Table (12)** and **Fig. (7).**

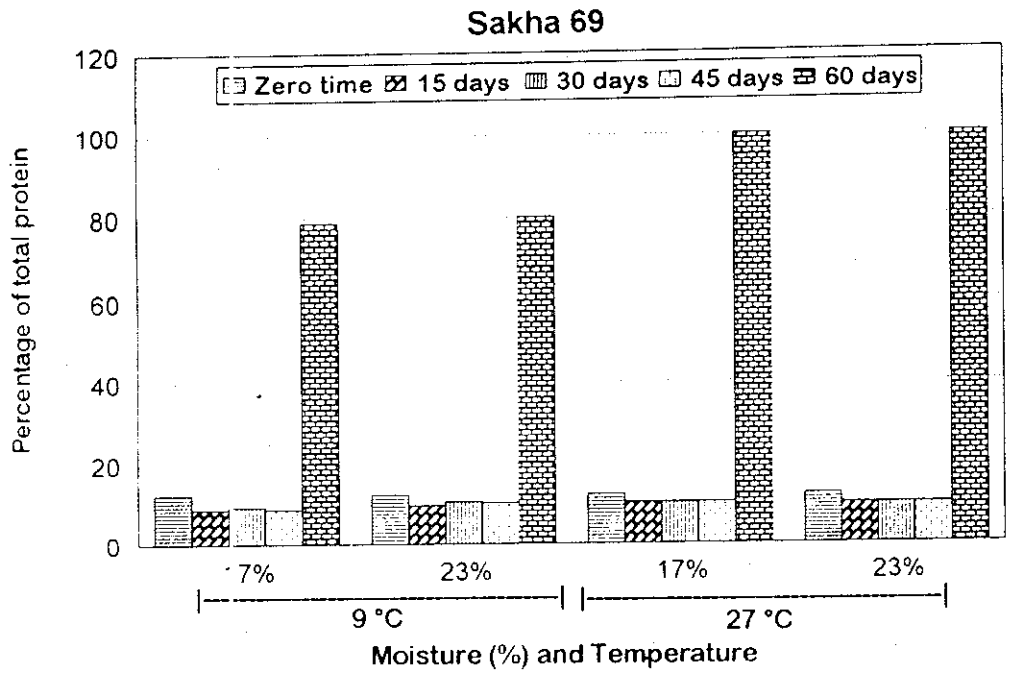
Results indicated that, at 9 and 27°C the protein content was lower than the Zero time throughout the whole experiment. Protein content the opposite was found at 27°C whereas the protein content was higher at 17% grain moisture content. This was true for cultivar Sakha 69.

Concerning cultivar Giza 163, the same trend was also found at both tested temperature degrees (9 and 27°C) and grain moisture content (17 and 23%).

It is remarkable that although the protein content was higher at the Zero time for Cv. Giza 163 than for Cv. Sakha 69, the opposite was found at the different storage periods.

Table (12): Effect of storage temperature, moisture and storage period on protein content in wheat grains inoculated with *A. flavus*.

Cultivars	e Temp.	re t	% of Total Protein				
			Zero time	15 days	30 days	45 days	60 days
Sakha 69	9 °C	17 %	12.4	8.76	9.40	8.76	10.95
		Control		8.8	9.45	9.81	10.94
		23 %	12.4	9.70	10.64	10.32	9.38
		Control		9.90	10.64	10.35	9.38
	27°C	17 %	12.4	10.32	10.32	10.32	10.32
		Control		10.5	10.50	10.36	10.29
		23 %	12.4	10.01	10.01	10.01	10.01
		Control		10.01	10.04	10.05	10.01
Giza 163	9 °C	17 %	13.0	7.20	7.20	8.45	7.82
		Control		7.25	7.24	8.45	7.80
		23 %	13.0	7.51	11.57	10.32	10.64
		Control		7.55	11.57	10.35	10.64
	27°C	17 %	13.0	7.51	7.51	7.51	7.51
		Control		7.55	7.52	7.54	7.54
		23 %	13.0	7.82	7.82	7.82	7.82
		Control		7.89	7.55	7.55	7.54



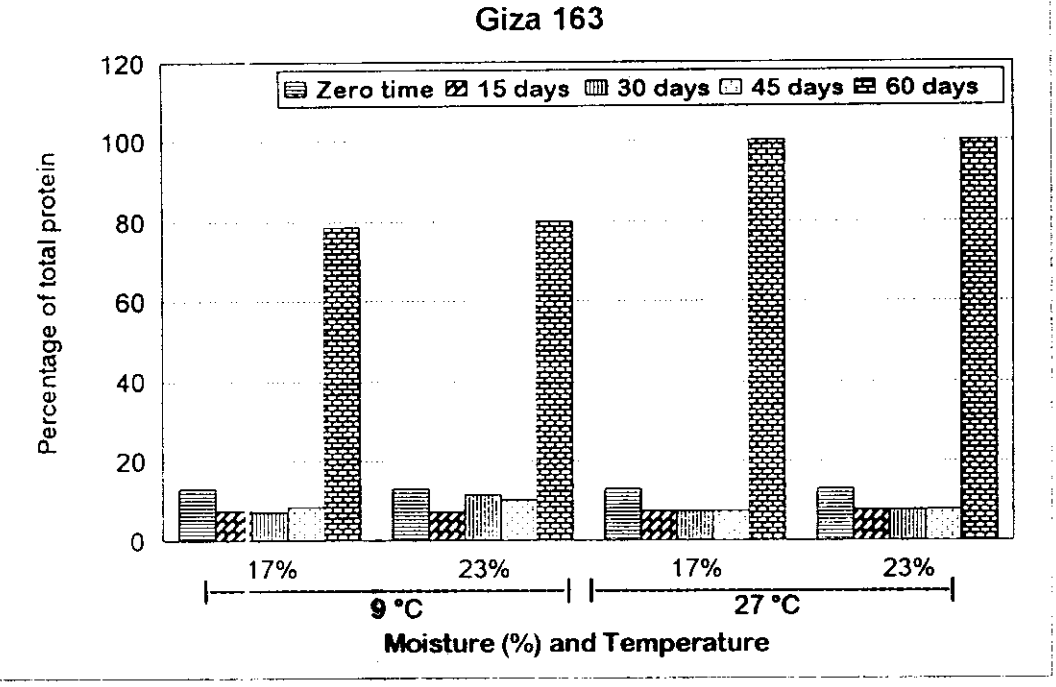


Fig. (7): **Effect of storage temperature, moisture content and storage period on** percentage of total protein in inoculated wheat grains with *A. flavus.*

Effect of storage temperature, moisture and storage period on percentage of total carbohydrate in wheat grains inoculated with *A. flavus*.

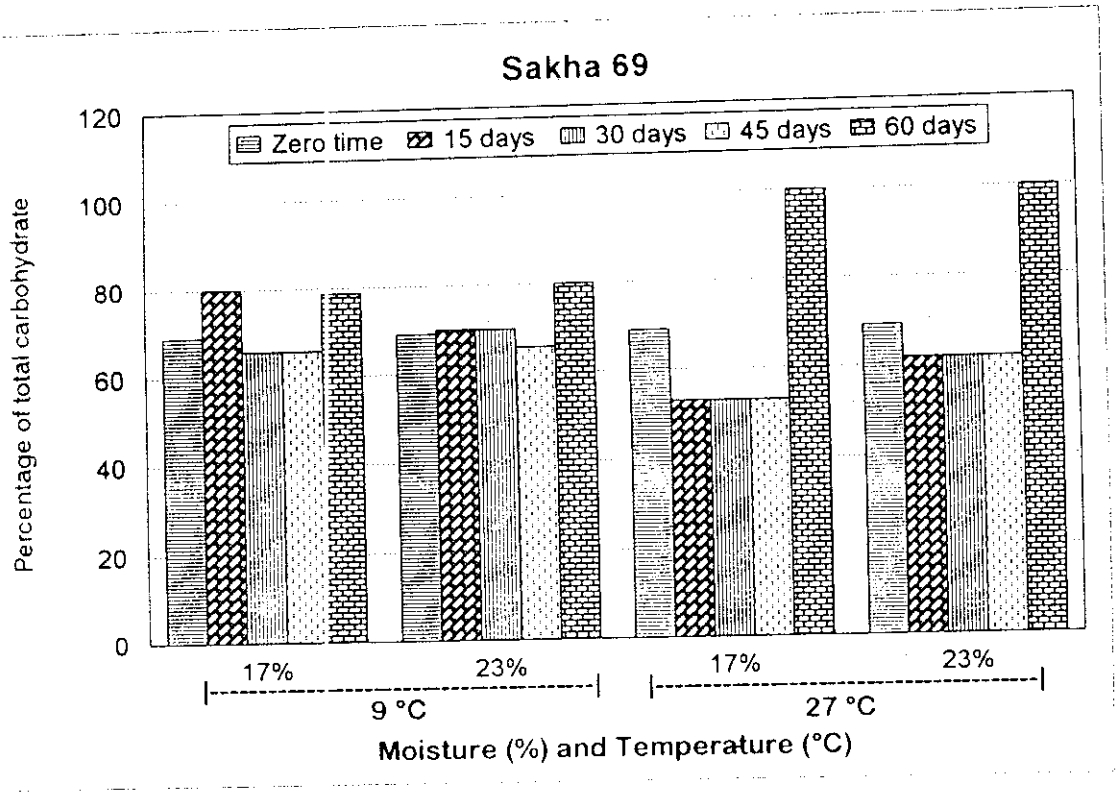
Two storage temperatures (9 and 27°C), 2 grain moisture contents (17 and 23%) and 5 storage periods (0 , 15, 30, 45 , and 60 days) were experimented to study their effect on the total carbohydrate percentage of 2 wheat cultivars (Sakha 69 and Giza 163) infected with *A. flavus* and the recorded results are presented in **Table (13)** and **Fig. (8).**

The obtained data show that, at 9°C and 15 days storage the percentage of total carbohydrate was slightly higher than at the Zero time. This percentage was then decreased till the end of the experiment at 17 and 23% grain moisture content. At 27°C, the percentage of total carbohydrate was decreased after 15 days storage and stayed constant till the end of storage time at both 17 and 23% grain moisture content. This was true for cv. .Sakha 69.

With regards to cv. Giza 163, after storage for 15 days at 9°C and 23% grain moisture content the percentage of total carbohydrate was increased than the Zero time then decreased and stayed constant till the end of storage time. At 27°C and 23% grain moisture content, the percentage of total carbohydrate was higher than the Zero time during the whole experiment.

Table (13): Effect of storage temperature, moisture and storage period on percentage of total carbohydrate in wheat grains inoculated with *A. flavus*.

Cultivars	Temp.	content	% of Total Carbohydrate				
			Zero time	15 days	30 days	45 days	60 days
Sakha 69	9 °C	17 %	69.0	80	65.7	65.7	65.7
		Control		78	63	62	62
		23 %	69.0	70	69.8	65.7	67.5
		Control		69	66	64	64
	27°C	17 %	69.0	53.1	53.1	53.1	53.1
		Control		51	52	52	52
		23 %	69.0	61.65	61.65	61.65	61.65
		Control		60.1	51	51	50
Giza 163	9 °C	17 %	66.2	61.65	69.7	61.65	65.7
		Control		60	60	52	50
		23 %	66.2	74.8	65.7	65.7	65.7
		Control		71	62	60	54
	27°C	17 %	66.2	61.65	61.65	61.65	61.65
		Control		61.65	56	52	50
		23 %	66.2	67.5	67.5	67.5	67.5
		Control		65	57	55	51



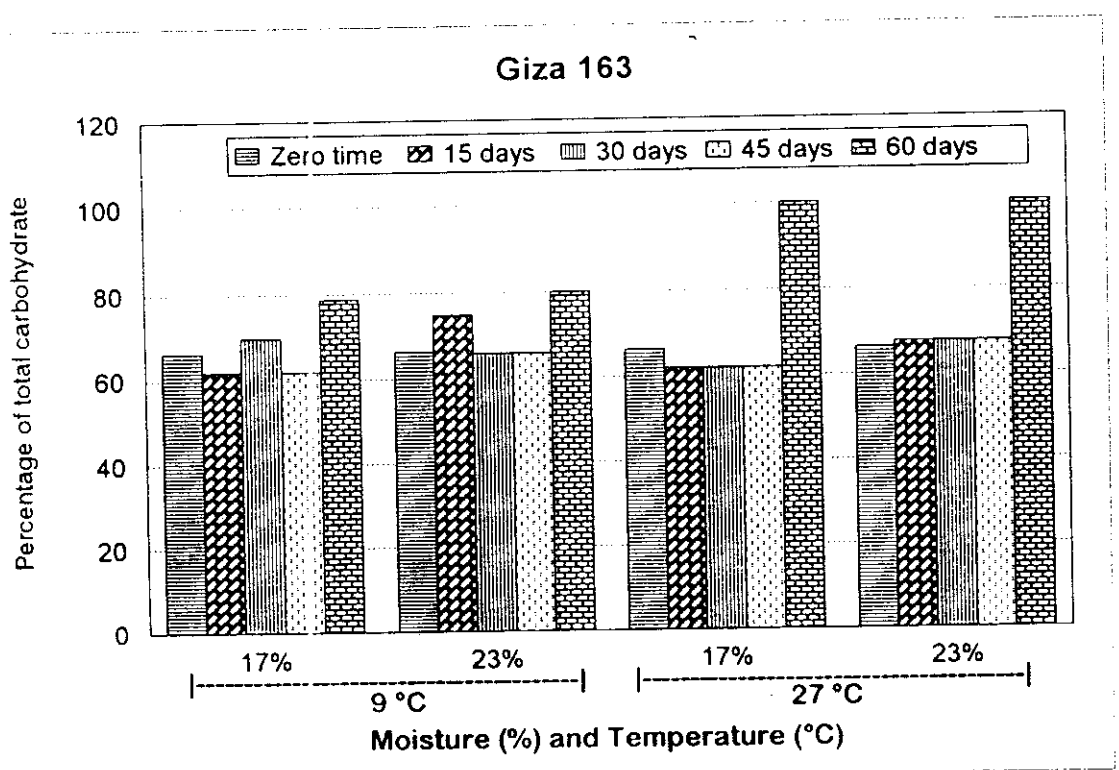


Fig. (8): **Effect of storage temperature, moisture content and storage period on percentage of total carbohydrate in wheat grains infected with *A. flavus*.**

Field Experiments :

Effect of fertilization treatments with macronutrients N and P under field conditions on weight of 1000 grains and percentage of grains infection of wheat grains stored for 6 months in 2 successive seasons 1994/ 1995 :

Field experiments were carried out to study the effect of plant treatment of 2 cvs. Sakha 69 and Giza 163 with N and P on wheat grains stored for 6 months in 2 successive seasons and the results are tabulated in **Table (14).**

It is clear from data presented in **Table (14)** that fertilization treatments increase the weight of 1000 grains than the control in season 1995, in compare with results season 1994.

Data indicated that, in the first season (1994), weight of 1000 grains for Giza 163 cv. was increased only in case of fertilization with 80 Kg N/fed. and even was higher than the control plants. In case of Sakha 69 cv., fertilization treatments showed unsignificant effect on the weight of 1000 grain. In the second season (1995), fertilization with 40 kg N/fed increased grains weight of Sakha 69 cv., while there was no increase in grains weight of Giza 163 cv.

The percentage of grains infection increased significantly by the fertilization with 16 Kg P_2O_5 /fed. and reached 11.89% for Giza 163 cv., while in case of Sakha 69 fertilization with 80 kg N+ 16 Kg P_2O_5/fed. infection of grains was increased to 10.49%. The percentage of grains infection for both cvs. in the second season was parallel with the first one and reached 9.99 and 10.36% for cvs. Sakha 69 and Giza 163 respectively.

Table (14): Effect of treatments with macronutrients on weight of 1000-grains and percentage of grains infection of wheat grains stored for 6 months in 1994 and 1995 seasons.

Treatments	1994								1995							
	At zero time				After 6 months				At zero time				After 6 months			
	Weight of 1000-grain		% of Grains Infection		Weight of 1000-grain		% of Grains Infection		Weight of 1000-grain		% of Grains Infection		Weight of 1000-grain		% of Grains Infection	
	Sakha 69	Giza 163	Sakha 69	Giza 163	Sakha 69	Giza 163	Sakha 69	Giza 163	Sakha 69	Giza 163	Sakha 69	Giza 163	Sakha 69	Giza 163	Sakha 69	Giza 163
Zero	44.5	46.0	8.2	9.4	44.7	48.2	18.7	21.3	35.2	36.1	8.6	7.1	36.2	36.3	9.9	8.8
40 Kg N/Fed	44.9	47.5	9.9	10.0	46.5	42.6	13.3	27.3	43.7	43.0	9.9	8.6	43.1	43.2	10.0	9.3
80 Kg N/ Fed	43.6	50.1	6.3	10.0	43.4	40.6	28.0	15.3	44.9	45.2	10.1	9.2	44.8	45.1	10.3	9.9
16 Kg P_2O_5/Fed	41.9	43.6	9.1	11.9	44.1	42.7	15.3	23.3	39.3	40.1	9.7	9.3	40.1	41.7	9.6	8.2
40 N + 16 P_2O_5/Fed	42.5	43.0	8.0	9.1	41.7	44.2	21.3	15.0	43.9	43.3	9.2	8.7	43.9	44.0	9.7	9.8
80 N + 16 P_2O_5/Fed	42.7	45.3	10.9	7.9	39.6	44.2	17.7	17.7	45.0	45.6	10.4	10.0	45.2	45.4	10.2	10.2

L.S.D. at 5% For Cultivars = 2.66	**= 0.567**	**L.S.D. at 5%**	Var = 0.01	0.03
Fertilization = 2.14	**= 1243**	**= 1.28**	Fert = 0.02	0.06
Var. X Fert. = N. S	**= 1.758**		Var x Fert = 0.03	0.08

Effect of Fertilization Treatments Under Field Conditions on Fungi Associated with Wheat Grains Stored to 6 Months in 2 Successive Seasons (1994/1995) :

Effect of fertilization treatments with N and P under field conditions on fungi associated with wheat grains stored for six months is presented in **Tables (15 & 16).**

Data show that fertilization reduced the percentage of the isolated fungi in some cases and increased it in the other treatment. In regards to Sakha 69 cv. it was noticed that, *A. flavus* did not appear at the Zero time in the treatments 0, 40 kg N and 80 KgN_2 while the other treatments gave high percentage of isolated *A. flavus* ranged from 50% to 75%. After 6 months storing *A. flavus* appears in all treatments except in treatment 40kg N in the first season. While using fertilizers containing P_2O_5 resulted in decreasing the percentage of this fungi.

According to *A. niger* it appears with high percentage after 6 months storing in all treatments. While *A. Alternata* did not appear at the zero time in the treatments 0 , 40 kg N/Fed and 40 kg N + 16 kg P_2O_5 / fed. at the two seasons after the storing period it differs in some treatments. *Penicillium* sp. did not appear in all treatments at the zero time, while after storing it appeared with exception in 40 kg N, 16 kg P_2O_5 and 80 kg N + 16 kg P_2O_5 in the first season and 80 kg N + 16 kg P_2O_5 in the second season. In view to *Rhizopus sp.* was noticed that after storing period disappear except in the treatment 16 kg P_2O_5 in the two seasons.

In regards to Giza 163 cv. it was noticed that *A. flavus* did not appear in case of fertilization with 16 kg P_2O_5/fed, and 40 kg N + 16 kg

P_2O_5/fed in the two seasons at the zero time. While after 6 months storing *A. flavus* appeared in all treatments with remarkable increase in treatments of *A. flavus* were decreased in the treatments 40 kg N, 80 kg N and 80 kg N + 16 kg P_2O_5/fed. According to *A. niger* disappear in the treatments 40 kg N, 16 kg P_2O_5/fed and 40 kg N + 16 kg P_2O_5/fed at zero time in the two seasons. While after storing disappear in 40 kg N + 16 kg P_2O_5/fed and 80 kg N + 16 kg P_2O_5/fed in the seasons and decreased in most of all the other treatments with an exception in the treatment 16 kg P_2O_5/fed in the two seasons. Concerning *A. alternata* appears in all treatments with high percentage except in treatment with 80 kg N + 16 kg P_2O_5/fed in the two seasons. While after storing for 6 months the percentage of *A. alternata* were decreased in all treatment at the two seasons. From previous data in **Tables (15 & 16)** it was noticed that *Penicillium sp.* did not appear at the zero time in all treatments at the two seasons. After 6 months storing *Penicillium* sp. appeared only in the case of treatment 80 kg N + 16 kg P_2O_5/fed in the two season. In regards to *Rhizopus sp.* at the zero time, all treatments including fertilization with 16 kg P_2O_5/fed increased its percentage in the two seasons, while after storing for 6 months there was a remarkable increase in the percentage of *Rhizopus sp.* in the treatments 0, 40 kg N and 80 kg N and decrease in the treatments containing 16kg P_2O_5/fed in the two seasons.

In regards to the other fungi they did not appear in the two cultivars at the zero time in all treatments and in the two seasons. While after 6 months storing they only appeared with some treatments in Giza 163 cv. with little percentage except in the case of 80 kg N + 16 kg P_2O_5/fed. in the two seasons.

Table (15) : Effect of macronutrient treatments under field conditions on fungi associated with wheat grains stored to 6 months in season 1994.

Cultivars	Fertilization	At zero time						After 6 months					
		Asp. flavus	A. niger	Alternaria alternata	Pen. sp.	Rhizopus sp.	Other fungi	Asp. flavus	A. niger	Alternaria alternata	Pen. sp.	s sp.	Other fungi
Sakha 69	Zero	0	0	0	0	100	0	25	50	0	25	0	0
	40 Kg N/Fed	0	25	0	0	75	0	0	40	20	0	0	0
	80 Kg N/ Fed	0	0	50	0	50	0	25	57.1	28.6	14.3	0	0
	16 Kg P_2O_5/Fed	50	0	50	0	0	0	25	25	16.6	0	33.3	0
	40 N + 16 P_2O_5/Fed	75	25	0	0	0	0	28.6	27.1	0	14.3	0	0
	80 N + 16 P_2O_5/Fed	50	0	50	0	0	0	28.6	28.6	42.8	0	0	0
Giza 163	Zero	33.3	33.3	33.3	0	0	0	44.4	11.1	11.1	0	22.2	11.1
	40 Kg N/Fed	50	0	50	0	0	0	11.11	22.2	11.1	0	55.6	0
	80 Kg N/ Fed	30	30	40	0	0	0	16.7	0	0	0	83.3	0
	16 Kg P_2O_5/Fed	0	0	50	0	50	0	20	40	40	0	0	0
	40 N + 16 P_2O_5/Fed	0	0	50	0	50	0	64.3	0	0	0	28.6	7.1
	80 N + 16 P_2O_5/Fed	33.3	33.3	0	0	33.3	0	16.7	0	0	50	0	33.3

Other Fungi : *Fusarium roseum/ Nigrospra sp./ Epicoccum sp.*

Table (16): Effect of macronutrient treatments under field conditions on fungi associated with wheat grains stored to 6 months in season 1995.

Cultivars	Fertilization	At Zero time						After 6 months					
		Asp. flavus	A. niger	Alternaria alternata	Pen. sp.	Rhizopus sp.	Other fungi	Asp. flavus	A. niger	Alternaria alternata	Pen. sp.	Rhizopus sp.	Other fungi
Sakha 69	Zero	1	10	0	0	100	0	30	55	0	30	0	0
	40 Kg N/Fed	0	28	0	0	80	0	10	43	30	5	0	0
	80 Kg N/ Fed	0	0	45	0	65	0	30	60	45	18	0	0
	16 Kg P_2O_5/Fed	56	0	38	0	0	0	35	35	20	5	25	0
	40 N + 16 P_2O_5/Fed	70	22	0	0	0	0	45	37	45	15	0	0
	80 N + 16 P_2O_5/Fed	65	0	45	0	0	0	35	39	35	0	0	0
Giza 163	Zero	23	23	23	0	0	0	35	13	14	0	60	5
	40 Kg N/Fed	53	0	48	0	0	0	22	32	16	0	75	0
	80 Kg N/ Fed	30	28	42	0	0	0	32	11	10	0	0	0
	16 Kg P_2O_5/Fed	0	0	50	0	45	0	10	35	36	0	11	2.4
	40 N + 16 P_2O_5/Fed	0	0	48	0	42	0	55	0	0	0	25	5.5
	80 N + 16 P_2O_5/Fed	40	35	0	0	25	0	18	0	0	12	0	25

Other Fungi : *Fusarium roseum/ Nigrospra SP./ Epicoccum SP.*

Effect of spraying with micronutrients on two wheat cultivars (on weight of 1000-grain and percentage of wheat grains infection) stored for 6 months in 2 successive seasons 1994/1995 :

In this experiment two wheat cultivars (Sakha 69 and Giza 163) and 6 fertilization treatments were studied and the results are presented in **Tables (17 & 18).** Data show that, the different fertilization treatments have no significant effect on the weight of 1000 grain for the 2 studied cultivars compared to the control. This trend was found in the first and the second season except for cv. Giza 163 in the second season where the weight of its grains was significantly higher than the control with all fertilization treatments especially in case of Fe Zn Cu and Fe Mn Cu, respectively. As regard to the percentage of grains infection after 6 months storing increased in the first season in most treatments while decreased in the second one compared to the control was clearly decreased in the second season than in the first one for the 2 cultivars.

Table (17) : Effect of micronutrients and cultivars on weight of 1000-grain and percentage of wheat grains infection that was stored for 6 months in season 1994.

Fertilization	At zero time				After 6 months			
	Weight of 1000-grain		% of grains infection		Weight of 1000-grain		% of grains infection	
	Sakha 69	Giza 163	Sakha 69	Giza 163	Sakha 69	Giza 163	Sakha 69	Giza 163
Zero	41.09	43.83	6.70	10.06	41.80	41.50	21.0	25.7
Fe Mn Cu	36.66	37.66	5.98	9.68	38.30	45.70	12.0	16.0
Fe Zn Cu	39.21	39.69	10.13	9.75	38.90	45.90	22.3	12.0
Mn Fe Zn	40.22	39.13	6.70	5.95	37.40	43.30	19.0	10.7
Zn Mn Cu	40.88	41.03	8.63	9.41	40.50	43.00	21.7	28.0
Fe Mn Zn Cu	41.48	40.70	10.11	11.81	43.70	43.80	5.0	35.0

L.S.D. at 5% for

Cultivars	**= 2.100**	**= 3.537**
Fertilization	**= N.S.**	**= 4.960**
Var. x Fert.	**= 4.513**	**= 8.590**

Table (18): Effect of micronutrients on fungi associated with wheat grains stored for 6 months under field conditions in season 1994.

Cultivars	Micronutrients	At zero time						After 6 months					
		Asp. flavus	A. niger	Alternaria alternata	P. cary-ophyllum	Rhizopus sp.	Other fungi	Asp. flavus	A. niger	Alternaria alternata	P. cary-ophyllum	Rhizopus sp.	Other fungi
Sakha 69	Zero	20	40	40	0	0	0	16	64	0	0	0	20
	Fe Mn Cu	33.3	0	33.3	0	33.3	0	0	60	40	0	0	0
	Fe Zn Cu	0	0	50	0	0	50	10	60	10	0	0	0
	Mn Fe Zn	0	50	50	0	0	0	50	25	25	0	20	0
	Zn Mn Cu	25	0	27.5	0	37.5	0	0	50	30	0	0	0
	Fe Mn Zn Cu	28.6	28.6	42.9	0	0	0	30	30	0	0	0	0
Giza 163	Zero	0	0	50	0	50	0	0	100	0	0	40	0
	Fe Mn Cu	0	0	42.9	0	28.6	28.6	20	20	50	0	0	10
	Fe Zn Cu	60	40	0	0	0	0	45	0	55	0	0	0
	Mn Fe Zn	60	20	0	0	20	0	0	7/.4	71	0	21.5	0
	Zn Mn Cu	66.7	33.3	0	0	0	0	12	32	25	0	0	6
	Fe Mn Zn Cu	60	40	0	0	0	0	0	50	50	0	0	0

Other Fungi : *Fusarium roseum/ Nigrospora sp. and Epicoccum sp.*

Effect of Spraying with Micronutrients on Fungi Associated with Wheat Grains of two cultivars Stored for 6 Months Under Field Conditions in 2 Successive Seasons 1994/1995 :

The effect of spraying wheat plants in field with 4 micronutrients on fungi associated with grains of 2 wheat cultivars at the zero time and after storing for 6 months under field conditions in 2 successive seasons is presented in **Tables (19 & 20).**

Results obtained indicated that 3 fungi, i.e. *A. flavus*, *A. niger* and *Alt. alternata* were the most isolated fungi from wheat grains at zero time and after storing for 6 months. This was true for the 2 cultivars under study in both seasons. There was no clear trend for the effect of the different treatments on the percentage of the isolated fungi for the 2 cultivars in both seasons. *Rhizopus nigricans* was more associated with wheat grains in the first season than in the second one. *Alternaria alternata* was more isolated from wheat grains in the first season than in the second one for cultivars Sakha 69. *Penicillium* sp. did not appear at the zero time or after storage on the two cvs. and in the two seasons. Some other fungi appeared only in some treatments such as FeMnCu.

Table (19) : Effect of micronutrients and cultivars on weight of 1000-grain and percentage of wheat grains infection that was stored for 6 months in season 1995.

Fertilization	At zero time				After 6 months			
	Weight of 1000-grain		% of grains infection		Weight of 1000-grain		% of grains infection	
	Sakha 69	Giza 163	Sakha 69	Giza 163	Sakha 69	Giza 163	Sakha 69	Giza 163
Zero	37.81	36.10	8.91	8.17	38.01	37.26	9.26	8.63
Fe Mn Cu	40.32	39.74	7.24	8.26	41.62	39.91	7.11	7.77
Fe Zn Cu	41.65	40.21	6.47	9.88	41.71	40.65	6.82	8.10
Mn Fe Zn	40.16	40.71	5.29	7.91	40.18	40.81	5.19	7.26
Zn Mn Cu	39.91	40.18	10.81	10.11	39.81	41.25	9.95	9.73
Fe Mn Zn Cu	43.23	41.93	8.21	9.31	43.62	42.50	8.85	8.12

L.S.D at 5% For

Var. = 0.01	0.03
Fert = 0.012	0.05
Var. x Fert = 0.02	0.07

Table (20) : Effect of micronutrients on fungi associated with wheat grains stored for 6 months under field conditions in season 1995

Cultivars	Micronutrients	At zero time						After 6 months					
		Asp. flavus	A. niger	Alternaria alternata	P. cary-ophyllum	Rhizopus sp.	Other fungi	Asp. flavus	A. niger	Alternaria alternata	P. cary-ophyllum	Rhizopus sp.	Other fungi
Sakha 69	Zero	18	35	36	0	0	0	16	50	10	0	0	18
	Fe Mn Cu	25	0	32	0	30	0	0	50	40	0	0	0
	Fe Zn Cu	0	0	45	0	0	45	10	50	15	0	0	0
	Mn Fe Zn	0	45	45	0	0	0	45	30	28	0	12	0
	Zn Mn Cu	20	0	23	0	25	0	0	35	30	0	0	0
	Fe Mn Zn Cu	28	28	40	0	0	0	25	20	9	0	0	0
Giza 163	Zero	0	0	40	0	45	0	0	83	0	0	36	0
	Fe Mn Cu	0	0	36	0	26	23	20	16	45	0	0	12
	Fe Zn Cu	50	35	0	0	0	0	42	12	45	0	0	0
	Mn Fe Zn	52	16	0	0	18	0	0	65	50	0	20	0
	Zn Mn Cu	60	25	0	0	0	0	3	25	22	0	0	6
	Fe Mn Zn Cu	55	50	0	0	0	0	0	35	40	0	0	0

Other Fungi : *Fusarium roseum/ Nigrospora sp. and Epicoccum sp.*

Effect of Fungicides on Some Characters of Wheat Grains stored for 6 months of two cvs. in 2 Successive Seasons 1994/1995 :

The effects of 5 fungicides (Tecto - Sumisclex - Rovral - Sportak- and Topsin M) and ammonium sulphate on some characters of wheat and infection with fungi in 2 successive seasons are shown in **Tables (21 & 23).**

Data in **Tables (21 & 23)** showed that all fungicides treatments have no significant effect on the germination percentage of grains in the 2 seasons. However, germination percentage was very high especially in case of ammonium sulphate at 500ppm. The weight of 1000 grain was not significantly affected by all fungicides in the first season while it was increased significantly in the second season except in case of both concentrations of the fungicide Topsin. The highest increase was achieved by ammonium sulphate salt (1000 ppm) especially after storing. The percentage of grains infection was clearly increased in the second season than the first one. The lowest infection percentage (2.6) was obtained with 1000 ppm of ammonium sulphate and the highest one (7.3%) with 500ppm of the same salt in the first season. In the second season, 500ppm of Sumisclex 50 gave the lowest infection percentage (20.7) while 500ppm of Rovral caused the highest one (42.7%). The lower percentage was obtained with 500 ppm of ammonium sulphate and the highest one with 500 ppm of Sumisclex 50. Grains moisture content was decreased with all treatments and was almost the same in both seasons. The lowest decrease in moisture content was obtained with 500 ppm of both Tecto and Sumisclex 50, while 1000 ppm of ammonium sulphate gave the highest moisture content.

Table (21) : Effect of spraying with some fungicides and ammonium sulphate on some characters of wheat in season 1994.

Treatments	At zero time					After 6 months			
	Germination %	Weight of 1000-grain	% of mold infection	Moisture content	Grain yield (Ardab/fed)	Germination %	Weight of 1000-grain	% of mold infection	Moisture content
1 A	97.3	41	4.0	10.10	12.88	99.1	41.03	21.3	11.10
1 B	96.3	40	4.2	10.23	11.65	94.5	44.50	31.3	10.20
2 A	94.3	44	3.2	10.10	13.60	95.2	44.70	20.7	11.11
2 B	94.3	40	4.8	10.33	12.19	94.5	47.53	40.3	10.2
3 A	91.7	37	3.3	10.93	14.40	92.6	46.10	42.7	11.0
3 B	95.5	42	3.2	10.43	13.60	96.7	46.40	30.0	10.90
4 A	95.5	42	5.2	10.87	12.88	96.5	45.63	29.3	10.4
4 B	97.7	39	6.4	11.43	13.95	95.8	46.60	32.0	11.8
5 A	94.7	39	4.7	11.73	14.21	95.4	42.70	33.7	12.0
5 B	93.0	38	4.0	11.03	12.61	92.3	40.20	41.0	11.5
6 A	99.0	43	7.3	11.40	14.40	97.0	45.86	42.0	11.90
6 B	94.3	41	2.0	11.00	13.87	96.5	48.83	38.7	12.10
control	94.0	39	4.5	12.10	12.00	96.0	48.40	33.0	10.10
L.S.D at 5%	N.S	N.S	1.31	0.625	N.S	N.S	3.219	12.36	0.591

1- Tecto 41.8 2- Sumisclex 50 3- Rovral 50

4- Sportak 45% 5- Topsin 6- Ammonium sulphate.

A- 500 ppm B- 1000 ppm

Table (23) : Effect of spraying with some fungicides and ammonium sulphate on associated fungi in 1994.

Treatments	At zero time						After 6 months					
	Asp. flavus	*A. niger*	*Alternaria aternata*	*F. roseum*	*Pen. sp.*	*Rhizopus sp.*	*Asp. flavus*	*A. niger*	*Alternaria aternata*	*F. roseum*	*Pen. sp.*	*Rhizopus sp.*
1 A	50	22	36	0	0	75	42.2	9.1	18.9	0	11.6	18.2
1 B	20	36	20	0	0	36	11.1	19.2	7.9	14.5	15.5	31.9
2 A	50	32	22	0	0	60	36.8	18.6	12.5	7.4	6.10	18.5
2 B	40	33	25	0	0	45	34.1	29.5	14.4	26.9	4.10	0
3 A	25	25	25	0	0	32	14.9	14.8	18.2	3.3	21.7	0
3 B	45	32	25	0	0	14	31.1	20.0	10.0	0	0	38.9
4 A	10	10	40	0	0	0	20.0	20.0	30.0	10	20.0	0
4 B	25	0	63	14.6	0	0	14.2	0	21.4	39.0	25.0	0
5 A	55	0	33	0	0	0	50.0	0	16.7	19.4	13.9	0
5 B	55	0	33	0	0	0	50.0	10.0	16.7	6.7	3.30	0
6A	30	30	25	26.9	0	0	25.7	23.3	11.6	33.8	5.60	0
6 B	30	15	0	0	0	0	22.03	8.3	0	15.8	17.8	0
Control	45	25	10	0	0	100	27.3	6.7	24.4	9.5	12.2	20

1- Tecto 41.8 2- Sumisclex 50 3- Rovral 50

4- Sportak 45% 5- Topsin 6- Ammonium sulphate.

A- 500 ppm B- 1000 ppm

Effect of Spraying with Some Fungicides and Ammonium Sulphate in the Field on Fungi Associated with Wheat Grains After Storing for 6 Months in Natural Conditions:

The percentage of different fungi isolated from wheat grains that was sprayed with fungicides in the field and stored for 6 months are presented in **Tables (22 & 24)**. Obtained results show that the percentage of the isolated fungi increased with some fungicides and decreased with others. There was no clear trend for the effect of different treatments on the percentage of the isolated fungi. However, the percentage of *A. niger* and *F. roseum* was increased with most of the tested fungicides than other isolated fungi. *Aspergillus niger* showed the highest increase percentage due to fungicide treatments, while *Rhizopus sp.* showed the lowest increase percentage, whereas, five of the six tested fungicides caused complete inhibition of fungal growth.

Table (22): Effect of spraying with some fungicides and ammonium sulphate on some characters of wheat in season 1995

Treatments	At zero time					After 6 months			
	Germination %	Weight of 1000-grain	% of mold infection	Moisture content	Grain yield (Ardab/fed)	Germination %	Weight of 1000-grain	% of mold infection	Moisture content
1 A	98.1	41.13	4.13	10.39	13.97	99.3	42.67	26.13	13.91
1 B	96.3	42.65	4.60	10.48	14.16	97.1	41.93	32.60	14.21
2 A	94.9	42.17	3.70	10.61	13.18	95.2	40.74	21.82	12.18
2 B	94.3	43.28	4.24	10.92	13.63	94.7	43.25	40.96	14.98
3 A	94.6	41.39	3.92	10.71	12.98	95.4	42.16	41.36	15.20
3 B	97.1	42.87	3.16	10.26	14.10	98.2	42.78	33.14	14.38
4 A	95.5	40.99	4.93	10.18	13.91	96.3	41.88	28.15	13.95
4 B	97.8	41.27	5.14	11.83	12.75	96.7	41.71	35.91	14.44
5 A	95.1	43.29	3.21	11.16	12.36	94.3	41.81	37.25	14.58
5 B	94.7	42.37	4.10	11.78	12.91	94.7	40.91	42.63	15.61
6 A	98.7	40.97	5.91	11.46	13.78	99.1	41.36	44.54	15.86
6 B	97.3	42.13	2.83	11.61	14.10	98.3	42.99	39.69	14.92
control	93.0	41.55	4.50	12.16	13.12	96.0	41.67	35.14	14.11
L.S.D at 5%	0.20	0.13	0.13	0.02	0.10	N.S.	0.21	0.21	0.05

1- Tecto 41.8 2- Sumisclex 50 3- Rovral 50
4- Sportak 45% 5- Topsin 6- Ammonium sulphate.
A- 500 ppm B- 1000 ppm

Table (24) : Effect of spraying with some fungicides and ammonium sulphate on associated fungi in 1995.

Treatments	At zero time						After 6 months					
	Asp. flavus	*A. niger*	*Alternaria aternata*	*F. roseum*	*Pen. sp.*	*Rhizopus sp.*	*Asp. flavus*	*A. niger*	*Alternaria aternata*	*F. roseum*	*Pen. sp.*	*Rhizopus sp.*
1 A	50	20	35	0	0	66	36	11.6	20	0	0	18
1 B	22	35	25	0	0	32	18	19.2	18.9	0	0	30
2 A	48	30	20	0	0	50	35	16	19.2	0	0	19
2 B	42	34	30	0	14.5	30	33	28	13.5	3.3	5	0
3 A	32	30	31	0	0	30	16	15.5	19	0	0	0
3 B	45	35	30	0	0	16	28	20	11	0	0	28
4 A	12	11	40	0	0	0	20	19	31	0	0	0
4 B	31	0	32	10	0	0	17	0	22	4.7	0	0
5 A	50	0	30	0	0	0	50	0	18	7.9	0	0
5 B	50	0	33	0	0	0	45	12	18	0	0	0
6A	25	22	25	9	0	0	20	19	9	8	0	0
6 B	20	14	0	0	0	0	16	7.5	0	0	0	0
Control	50	35	12	10	13.5	85	30	10	25	8	9.1	18

1- Tecto 41.8 **2- Sumisclex 50** **3- Rovral 50**
4- Sportak 45% **5- Topsin** **6- Ammonium sulphate.**
A- 500 ppm **B- 1000 ppm**

B- Effect of Micronutrients and Wheat Cultivars on Aflatoxins Produced by *A. flavus* .

The effect of four micronutrients and 2 wheat cultivars on aflatoxin production was studied and the results are shown in **Table (26).**

Data showed that, all treatments with the micronutrients caused a decrease in aflatoxins production compared to the control. However, combination included the 4 elements (Fe Mn Zn Cu) showed the lowest amount of aflatoxins which reached 10.52, 10.57 and 9.48 µg/ aflatoxins/kg for cvs. Sakha 69 and Giza 163, respectively. The combination Fe Mn Cu gave the biggest amount of aflatoxins for all cultivars which was however, less than the control.

Table (26) : Effect of micronutrients and wheat cultivars on aflatoxins produced by *A. flavus*.

Treatments		Aflatoxins conc. µg /kg Wheat)				
		B_1	B_2	G_1	G_2	Total
Control (zero)		5.22	3.93	4.34	5.96	19.50
Fe Mn Cu	Sakha 69	3.99	3.20	4.55	3.34	15.08
	Giza 163	3.77	3.27	4.98	3.22	15.21
Fe Zn Cu	Sakha 69	3.02	2.33	4.09	2.14	11.58
	Giza 163	3.10	2.31	3.34	1.99	10.74
Mn Fe Zn	Sakha 69	3.54	2.01	4.00	2.74	12.29
	Giza 163	3.39	2.34	3.75	1.59	11.07
Zn Mn Cu	Sakha 69	2.34	2.12	3.99	2.60	11.17
	Giza 163	2.46	2.14	3.63	1.42	9.72
Fe Mn Zn Cu	Sakha 69	2.25	2.08	3.81	2.43	10.57
	Giza 163	2.49	2.09	3.54	1.36	9.48

C- Effect of Fungicides on Aflatoxins Produced in Wheat Cultivars by *A. flavus* :

Effect of some fungicides and ammonium sulphate on aflatoxins production is shown in **Table (27).** Data obtained showed that all fungicides and ammonium sulphate reduced the production of aflatoxins by the fungus compared to the control. The highest reduction was achieved by Rovra. 50 with its both concentration (500 and 1000 ppm), while the lowest reduction was for Sportek 45% with its 2 concentrations. It is remarkable that the highest concentration (1000 ppm) of all tested fungicides and ammonium sulphate was better than the lowest concentration (500 ppm) in reducing the amount of aflatoxins produced by the fungus *A. flavus*.

Table (27) : Effect of fungicides on aflatoxins produced in wheat cultivars by *A. flavus*.

Treatments		Aflatoxins conc. (mg/kg wheat)				
		B_1	B_2	G_1	G_2	Total
Control		4.21	2.73	5.35	3.46	16.75
Tecto 41.8	500 ppm	2.52	1.67	3.97	2.11	10.27
	1000 ppm	2.34	1.53	3.41	2.01	9.29
Sumisclex 50	500 ppm	3.72	2.50	4.96	2.98	14.16
	1000 ppm	3.53	1.90	3.98	2.64	12.05
Rovral 50	500 ppm	2.31	0.95	2.33	1.52	7.11
	1000 ppm	2.25	0.81	2.01	1.43	6.50
Sportek 45%	500 ppm	3.77	2.54	4.81	3.98	15.10
	1000 ppm	2.79	2.28	4.24	3.25	12.56
Topsin	500 ppm	2.73	2.83	3.53	2.17	10.26
	1000 ppm	3.01	2.01	3.75	2.45	10.22
Ammonium sulphate	500 ppm	3.03	2.04	3.90	2.56	11.53
	1000 ppm	2.94	1.99	3.74	2.12	10.79