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Original Paper

Isolation and identification of toxigenic fungi from foodstuffs at Sohag Governorate, Egypt

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Abstract

The common fungi contaminated different 25 foodstuffs collected from Sohag Governorate were isolated and their ability to produce mycotoxins were examined. A total of 150 fungal isolates belonging to 57 species in addition to two species varieties of 13 genera were isolated and identified. The genus *Aspergillus* was represented by 23 species in addition to two species-varieties followed by *Penicillium* which was represented by 11 species. The genus *Fusarium* was represented by 6 species followed by *Alternaria* (4), *Mucor* (3), *Trichoderma* (2) and *Achremonium* (2 species). The remaining 6 genera were represented by only one species for each genus. All the 150 collected fungal isolates were screened for their ability to produce mycotoxins. The results indicated that 53 out of the 150 fungal isolates (35%) were able to produce one or more of eight mycotoxins (aflatoxin, ochratoxin, fuminisin, sterigmatocystin, patulin, zearalenone, alternariol and diacetoxyscirpenol).

Key words: food sources, moulds, mycotoxins.

Introduction

Mycobiota are found in a wide range of environments due to their capability to utilize a variety of substrates and to their relative tolerance to low pH, low water activity, and low temperature (Huis in't Veld, 1996). Generally, foods have essential nutrients for fungal growth, thus fungi can appear and spoil different foods. Fungal spoilage of food causes economic losses worldwide (Dantigny *et al*., 2005). In addition, some fungi synthesize mycotoxins, which can be a hazard for human health. Pitt (1996) defined mycotoxins as fungal metabolites that when ingested, inhaled or absorbed through the skin cause illness on human and animal death.

Mycotoxin is produced during the growth of fungi and can be found out or in the hyphae and spores of these organisms (Zucchi and Melo, 2009; Köppen *et al*., 2010). If ingested, mycotoxins may cause acute or chronic disease episodes, termed mycotoxicosis (Köppen *et al*., 2010; Medeiros *et al*., 2012). Mycotoxin long-term exposure has also been related to several mycotoxicosis, such as carcinogenic, mutagenic, teratogenic, estrogenic, hemorrhagic, immunotoxic, nephrotoxic, hepatotoxic, dermotoxic neurotoxic and immunosuppressive (Richard, 2007; Medeiros *et al*., 2012).

Currently, more than 500 different mycotoxins have been discovered and this number do not stop increasing. Among the most economically and toxicologically important mycotoxins that pose greatest potential risk to human and animal health as food and feed contaminants are: aflatoxins, strigmatocystin, trichothecenes, fumonisins, zearalenone, ochratoxin, alternariol, patulin, and certain ergot alkaloids (CAST, 2003; Bennett and Klich, 2003; Richard, 2007; Köppen *et al*., 2010).

The aim of this study was designed to isolate, collect and identified common fungi contaminated different foodstuffs in Sohag Governorate, Egypt. Also, the ability of the collected fungal isolates for mycotoxins production was aimed**.**

Materials and Methods

Collection of Different Food Samples:

A suitable weight or volume of samples as sources for food borne fungi of different 25 foodstuffs including fruits (bananas, lemon, orange, pomegranate, strawberry, tangerine and tomato), canned juices (apple,

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guava, orange and pineapple), fresh juices (orange and tomato), seeds or grains (broad bean, lentils, maize, millet, peanut, phaseolus, rice and wheat) and others (carrot, luncheon, potato and spud) were collected from different shops and markets at Sohag Governorate, Egypt. The samples were brought to the laboratory and kept in a refrigerator (3–5ºC) till isolation of fungi.

Isolation and idintification of fungi:

Isolation of fungi was made by using the dilution plate method (Tournas *et al*., 2006) or direct plate method (Pitt *et al*., 1992) according to the nature of samples. The medium used for isolation of fungi was modified Czapeks Dox agar medium with a pH 6.5 (Al-Doory, 1980). The plates were incubated at 28 ±ºC for 7-10 days. Purified fungal isolates were identified based on macro- and microscopic characteristics on standard media according to different identification references (Reper and Fennell, 1965; Ainsworth, 1971; Ellis, 1976; Booth, 1977; Pitt, 1979; Klich and Pitt, 1992; Moubasher, 1993; Domsch *et al*., 2007; Pitt and Hocking, 2009).

Screening of selected fungal isolates for mycotoxin formation:

A total of 150 different fungal isolates collected from different foodstuffs during this study belonging to *Aspergillus*, *Penicillium*, *Fusarium*, *Alternaria*, *Mucor*, *Trichoderma*, *Acremonium*, *Stachybotrys*, *Ulocladium*, *Drechslera*, *Trichurus* and *Neurospora* were examined for their ability to produce mycotoxins. All fungal isolates were cultivated on potato-dextrose broth (200g potato& 20g dextrose per liter of distilled water) at 28 ±ºC for 10 days as static cultures. Only *Fusarium* and *Stachybotrys* cultures were then incubated at 10 ºC for another 10 days. At the end of incubation, each culture was homogenized for five minutes in a high speed blender (1600 rpm) with double volume of chloroform. The chloroform extracts were washed with equal volume of distilled water, dried over anhydrous sodium sulphate, filtered then concentrated to near dryness and purified by column chromatography (AOAC, 1980). Mycotoxins were identified by thin layer chromatographic technique on precoated silica gel plate 60 F_{254} (Merck) as described by (El-Kady and Moubasher, 1982). Different mycotoxins were identified by comparison with reference standards (Scott *et al*., 1970; Schroeder and Kelton, 1975; Gimno, 1979).

Results and Discussion

Fungi are able to grow on different kinds of food: cereals, meat, milk, fruit, vegetables, nuts, fats and their products. The fungal growth may result in several kinds of food-spoilage, off-flavours, toxins, discolouration, rotting and formation of pathogenic or allergenic propagules (Chelkowski, 1991; Tipples, 1995; Filtenborg *et al*., 1996). Toxigenic fungi, under favorable conditions could produce mycotoxin in foods. Mycotoxins are very hazardous to human health. As dangerous metabolites, their clinical effect range between carcinogenic (aflatoxins), estrogenic (zearalenone), nephratoxic (ochratoxin A), neurotoxic (fuminisin B) dermatotoxic (trichothecenes) and immunosuppressive (aflatoxin B_1). Mycotoxins have four basic kinds of toxicity: acute, chronic, mutagenic and teratogenic. The occurrence of fungi in different foodstuffs collected from the shops and markets of different sanitation levels in Sohag Governorate were identified and tested for their ability to produce mycotoxins. A total of 57 species in addition to two species varieties belonging to 13 genera of filamentous fungi were isolated and identified. Genus *Aspergillus* came first by 23 species in addition to two species-varieties followed by *Penicillium* (11 species) as shown in table (1). These results are in agreement with those obtained by (Njobeh *et al*., 2009). who revealed the predominance of *Aspergillus* and *Penicillium* with 96% of food samples.

The genus *Fusarium* was represented by 6 species followed by *Alternaria* (4 species), *Mucor* (3), *Trichoderma* (2) and *Achremonium* (2). The remaining 6 genera were represented by only one species for each genus (Table, 1). Similarly, (Toffa *et al*. 2013). revealed the occurrence of a large number of fungi in food commodities from the Republic of Niger. They found that among the most important genera: *Aspergillus* (in 63% of samples), *Fusarium* (9.7%) and *Penicillium* (3.3%).

The most common species of *Aspergillus* were *A. flavus* and *A. flavus* var. *columnaris*.

They isolated with high frequencies (16 and 12 out of 25 tested foodstuffs, respectively (Table, 1). (Njobeh *et al*., 2009). reported that the predominance species from the genus *Aspergillus* was *Aspergillus flavus* (in 85% of maize and peanuts). **(**Ruadrew *et al*., 2013) studied the mycobiota of different food commodities (Jasmine brown rice, long grain rice, fragrant rice, peanut, black bean, black pepper, crushed chilli and five spice powder) and revealed the occurrence of various genera of fungi from which: *Aspergillus* spp. (55%), *Penicillium* spp. (15%), *Rhizopus* spp. (11%), *Mucor* spp. (3%), *Monascus* spp. (1%) and *Eurotium* spp. (1%). All of fungal species isolated in this study were also isolated from different food sources in Egypt (Youssef, 1986; Zohri *et al*., 1992; 1995; El-Maghraby *et al*., 1995; Abdel-Kareem, 2010; Obied-Allah; 2011).

The 150 collected fungal isolates were screened for their ability to produce mycotoxins. The results indicated that 53 isolates (35%) were able to produce eight mycotoxins (Aflatoxins, Ochratoxins, Fuminisins, Sterigmatocystin, Patulin, Zearalenone, Alternariol and Diacetoxyscirpenol) as shown in table (2). Twenty-seven out of 38 isolates of *A. flavus* group were recorded as aflatoxin producers (71 %). Three out of 19 *A. flavus* isolates produced the four aflatoxins: B_1, B_2, G_1 & G_2. Aflatoxin B_1 was produced by 8 out of 14 *A. flavus* var. *columnaris* isolates, 1 out of 19 *A. flavus*, 1 out of 2 *A. flavo-forcatis* and 2 out of 3 *A. parasiticus*. . Aflatoxins B_1 & B_2 were produced by 3 isolates (one of each of *A. flavus* , *A. flavus* var. *columnaris* and *A. parasiticus*). Aflatoxins B_1& G_1 were produced by 6 out of 19 *A. flavus* isolates and 2 of 14 *A. flavus* var. *columnaris*. Aflatoxins G_1 & G_2 were produced by only one isolate of *A. flavus* (Table, 2).

(Alborch *et al*., 2012). recorded that 31% (13 out of 42) of *A. flavus* strains and the two *A. parasiticus* strains isolated from maize were able to produce aflatoxins. It has been estimated that only about 30-40% of known isolates of *A. flavus* produce aflatoxins and virtually all isolates of *A. parasiticus* are toxigenic (Varga *et al*., 2011; Diner and Davis 1966). reported that 23 isolates of *A. flavus* out of 26 produced aflatoxin B_1. (El-Maraghy and Zohri, 1988). recorded the production of aflatoxin by two out of four tested isolates of *A. flavus* var. *columnaris*. (Sanchez-Hervas *et al*., 2008). reported that 64.1 % of 120 tested *A. flavus* had the ability to produce aflatoxin B. Aflatoxins have been detected in various food commodities from many parts of the world (Ariño *et al*., 2009; Reddy *et al*., 2009)**.** and are presently considered as one of the most dangerous contaminants of food and feed. Aflatoxin B_1 is the most potent. Aflatoxins are immunosuppressive, carcinogenic, teratogenic, and mutogenic (Miller and Wilson, 1994).

In the present study, ochratoxins A & B were produced by the three tested isolates of *A. ochraceus* group (Table, 2). Ochratoxin is primarily a kidney toxin but in sufficiently high concentration it can damage the liver as well. It is a carcinogen in rats and mice and is suspect as the causative agent of human disease (Richard, 2007). Patulin was produced by 8 out of 17 *Penicillium* isolates examined in this study. Patulin has been reported to be mutagenic, naurotoxic, genotoxic , immuntoxic and able to cause gastrointestinal effects in rodents but little is know about its carcinogenic effect in the case of human beings (Delage *et al*., 2003).

Two tested isolates of *Aspergillus nidulans* and *A. caespitosus* have the ability to produce sterigmatocystin (Table, 2). Production of sterigmatocystin by *Aspergillus nidulans* is agrees with earlier results. (Schroeder and Kelton, 1975) and (El-Maraghy and Zohri, 1988). found that all the isolates tested of *Aspergillus nidulans* (= *E. nidulans*) produced this toxin. Also, *E. nidulans* was recorded as sterigamatocystin producer in several other studies (Bennett *et al*., 1989; Zohri and Ismail, 1994). Sterigmatocystin was reported to be both hepatotoxic and carcinogenic (Lillehoj and Ciegler, 1968).

Zearalenone, in the present study, was produced by 2 isolates of *Stachybotrys chartarum*, in addition to one of each of *Acremonium strictum* and *Fusarium semitectum*. Fuminisin was produced by one isolate of *Fusarium solani*. Only one isolate of *Fusarium reticulatum* was able to produce diacetoxyscirpenol. The genus *Fusarium* contains important mycotoxin-producing species that have been implicated in human diseases (Marasas *et al*., 1984; Nelson *et al*., 1993). Alternariol was produced by 6

isolates of *Alternaria* spp. and one *Drechslera rostrata*. It has been suggested that *A. alternata* might be one of the etiological factors for human esophageal cancer in Linxian, China (Dong *et al.*, 1987). Alternariol and A1ternariol monomethyl ether are mutagenic (Schrader *et al.*, 2001).

In conclusion, the present results forward an evidence of potential hazard to human health in Sohag Governorate may exist due to the presence of large number of toxigenic fungi in different foodstuffs consumed in this area. Also, owing to the adverse effect of mycotoxins, it is necessary to continue monitoring the toxigenic fungi in different foodstuffs to safeguard the health of consumers and to generate data for future planning of food safety issues. Also, precautions must be adopted during processing, handling, transporting and storage different foodstuffs to avoid contamination by toxigenic fungi.

Source / Fungal species or variety	Bananas	Broad bean	Canned apple juice	Canned guava juice	Canned orange juice	Canned Pineapple juice	Carrot	Fresh orange juice	Fresh Tomato juice	Lemon	Lentils	Lunchoan	Maize
Acremonium	-	-	+	-	-	-	-	-	-	-	-	-	-
Acremonium rutilum Gams	-	-		-	-	-	-	-	-	-	-	-	-
Acremonium strictum Gams	-	-	+	-	-	-	-	-	-	-	-	-	-
Alternaria	-	-	-	-	-	-	-	+	+	-	-	-	-
A. alternata (Fries) Keissler	-	-	-	-	-	-	-	+	+	-	-	-	-
A. brassicicola (Schw.) Wiltshire	-	-	-	-	-	-	-	+	-	-	-	-	-
A. longipes (Ellis and Everch.) Mason	-	-	-	-	-	-	-	-	-	-	-	-	-
A. solani Ellis and Martin	-	-	-	-	-	-	-	-	+	-	-	-	-
Aspergillus	+	+	+	+	+	+	+	+	+	+	+	+	+
A. awamorii Nakazawa	-	-	-	+	-	-	-	-	-	-	+	-	+
A. caespitosus Raper and Thom	-	-	-	-	-	-	-	-	-	-	-	-	-
A. ficuum (Reich.) Hennings	-	-	-	+	-	+	-	-	-	-	-	+	-
A. flavo-forcatis Batista and Maia	-	-	-	-	-	-	-	-	-	-	-	+	+
A. flavus Link	+	+	-	+	+	-	-	-	+	+	+	+	+
A. flavus var. *columnaris* Raper & Fennel	+	-	-	++	++	-	-	+	+	+	+	+	+
A. foetidus (Nakazawa) Thom and Raper	-	-	-	-	-	-	+	-	-	+	-	-	-
A. foetidus var. *pallidus* Nakazaw	-	-	-	+	-	-	-	-	-	-	-	-	-
A. fumigatus Fresenius	-	-	-	-	-	-	-	-	-	+	-	-	-
A. granulosus Raper and Thom	-	-	-	-	-	-	-	-	-	+	-	-	-
A. heteromorphus Batista and Maia	+	-	-	-	-	-	-	-	-	-	-	-	-
A. japonicus Saito	-	-	-	-	-	-	-	-	-	-	-	-	-
A. nidulans (Eidam) Wint.	-	-	-	-	-	-	-	-	-	-	-	-	-
A. niger Van Tieghem	-	-	-	-	-	-	-	-	+	-	-	+	-
A. ochraceus Wilhelm	-	-	-	-	-	-	-	-	-	+	-	-	-
A. parasiticus Speare	-	-	-	-	-	-	-	-	-	-	-	+	-
A. phonicis (Cda.) Thom	-	-	+	-	-	-	-	-	-	-	-	-	-
A. pulverulentus (McAlpine) Thom	-	-	-	-	-	-	-	-	-	+	-	-	-
A. pulvinus Kwon and Fennell	-	-	-	-	-	-	-	-	-	-	-	-	-
A. sclerotiorum Huber	-	-	-	-	-	-	-	-	-	-	-	-	-
A. sulphureus (Fres.) Thom and Church	-	-	-	-	-	-	-	-	-	+	-	-	-
A. sydowii (Bain & Sart) Thom and Church	+	-	-	-	+	-	-	-	+	-	-	+	-
A. terreus Thom	-	-	+	-	+	-	-	-	+	-	-	-	-
A. tubingensis (Schöber) Mosseray	+	-	+	-	+	-	-	-	-	+	-	+	-
A. versicolor (Vuillemin) Tiraboschi	-	-	-	+	-	-	-	-	-	-	-	-	-
Drechslera	-	-	-	-	-	-	-	-	-	+	-	-	-
D. rostrata Richardson and Fraser	-	-	-	-	-	-	-	-	-	+	-	-	-
Fusarium	-	-	-	-	-	-	+	+	-	-	-	-	+
F. equiseti (Corda) Saccardo	-	-	-	-	-	-	+	-	-	-	-	-	-

Table (1): Different fungal isolates collected and identified in this study from different foodstuffs in Sohag Governorate, Egypt.

Source / Fungal genera & species	Bananas	Broad bean	Canned apple juice	Canned guava juice	Canned orange juice	Canned Pineapple juice	Carrot	Fresh orange juice	Fresh Tomato juice	Lemon	Lentils	Lunchoan	Maize
F. proliferatum **(Matsushima) Nirenberg**	-	-	-	-	-	-	-	-	-	-	-	-	-
F. reticulatum **Montagne**	-	-	-	-	-	-	-	-	-	-	-	-	-
F. semitectum **Berkeley and Ravenel**	-	-	-	-	-	-	-	+	-	-	-	-	-
F. solani **(Mart.) Saccardo**	-	-	-	-	-	-	-	+	-	-	-	-	+
F. verticillioides **Sacc. Nirenberg**	-	-	-	-	-	-	-	-		-	-	-	+
Mucor	+	-	-	-	-	-	-	-	-	-	-	+	-
M. circinelloides **Van Tieghem**	-	-	-	-	-	-	-	-	-	-	-	-	-
M. hiemalis **Wehmer**	-	-	-	-	-	-	-	-	-	-	-	-	-
M. racemosus **Fresenius**	+	-	-	-	-	-	-	-	-	-	-	+	-
Neurospora	-	+	-	-	-	-	-	-	-	-	-	-	-
N. crassa **Shear and Dodge**	-	+	-	-	-	-	-	-	-	-	-	-	-
Penicillium	+	-	-	-	-	+	+	-	-	+	-	+	-
P. chrysogenum **Thom**	-	-	-	-	-	-	-	-	-	+	-	-	-
P. corylophilum **Dierckx**	+	-	-	-	-	-	-	-	-	-	-	-	-
P. cyclopium **Westling**	+	-	-	-	-	-	-	-	-	-	-	-	-
P. digitatum **(Pers. Ex Fr.) Sacc.**	-	-	-	-	-	-	-	-	-	-	-	-	-
P. duclauxii **Delacroix**	-	-	-	-	-	+	-	-	-	-	-	-	-
P. expansum **Link ex Gray**	+	-	-	-	-	-	-	-	-	+	-	-	-
p. italicum **Wehmer**	-	-	-	-	-	-	-	-	-	+	-	-	-
P. purpurogenum **Stoll**	-	-	-	-	-	-	-	-	-	-	-	-	-
P. rugulosum **Thom**	-	-	-	-	-	-	+	-	-	-	-	-	-
P. oxalicum **Currie and Thom**	-	-	-	-	-	-	-	-	-	-	-	-	-
P. vermiculatum **Dangeard**	-	-	-	-	-	-	-	-	-	-	-	+	-
Rhizopus	-	-	-	-	-	-	-	-	-	-	-	-	-
R. oryzae **Went & Geerlings**	-	-	-	-	-	-	-	-	-	-	-	-	-
Stachybotrys	-	-	-	-	-	-	-	-	-	-	-	-	-
S. chartarum **(Ehrenb.) Hughes**	-	-	-	-	-	-	-	-	-	-	-	-	-
Trichoderma	-	-	-	-	+	-	-	-	-	-	-	-	-
T. hamatum **(Bonord.) Bain**	-	-	-	-	+	-	-	-	-	-	-	-	-
T. gansus **yumenensis**	-	-	-	-	-	-	-	-	-	-	-	-	-
Trichurus	-	-	-	-	-	-	-	-	-	-	-	-	-
T. spiralis **Hasselbr**	-	-	-	-	-	-	-	-	-	-	-	-	-
Ulocladium	-	-	-	-	-	-	-	-	-	-	-	-	-
U. atrum **Preuss**	-	-	-	-	-	-	-	-	-	-	-	-	-
Total genera (13)	3	2	2	1	2	2	3	3	2	3	1	3	2
Total species (57)	8	2	4	4	5	2	3	4	6	12	2	9	5
Total varieties (2)	1	-	-	2	1	-	-	1	1	1	1	1	1

Table (1): continued.

Source / Fungal species or variety	Millet	Orange	Peanuts	Phaseolus	Pomegranate	Potato	Rice	Spud	Strawberry	Tangerine	Tomato	Wheat
Acremonium	-	-	-	-	-	-	-	+	-	-	-	-
Acremonium rutilum **Gams**	-	-	-	-	-	-	-	+	-	-	-	-
Acremonium strictum **Gams**	-	-	-	-	-	-	-	-	-	-	-	-
Alternaria	-	+	-	-	+	-	-	-	-	-	+	-
A. alternata **(Fries) Keissler**	-	+	-	-	+	-	-	-	-	-	-	-
A. brassicicola **(Schw.) Wiltshire**	-	-	-	-	-	-	-	-	-	-	-	-
A. longipes **(Ellis and Everch.) Mason**	-	+	-	-	-	-	-	-	-	-	-	-
A. solani **Ellis and Martin**	-	-	-	-	-	-	-	-	-	-	+	-
Aspergillus	-	+	+	+	+	+	+	+	+	+	+	+
A. awamorii **Nakazawa**	-	-	-	+	-	-		+	-	-	-	-
A. caespitosus **Raper and Thom**	-	+	-	-	-	-	-	-	-	-	-	-
A. ficuum **(Reich.)Hennings**	-	+	+	-	-	-	-	-	+	-	+	-
A. flavo-forcatis **Batista and Maia**	-	-		-	-	-	-	-	-	-		-
A. flavus **Link**	-	+	++	+++	+	-	+	-	-	-	+	+
A. flavus var. *columnaris* **Raper &Fennel**	-	-	-	+	-	-	-	-	-	+	+	-
A. foetidus **(Nakazawa) Thom and Raper**	-	-	-		-	-	-	-	-	-	-	-
A. foetidus var. *pallidus* **Nakazaw**	-	-	-	+	-	-	-	-	-	-	-	-
A. fumigatus **Fresenius**	-	-	-	-	-	+	-	-	-	-	-	-
A. granulosus **Raper and Thom**	-	-	-	-	-	-	-	-	-	-	-	-
A. heteromorphus **Batista and Maia**	-	-	-	-	-	-	-	-	-	-	-	-
A. japonicus **Saito**	-	-	-	-	-	-	-	-	+		+	-
A. nidulans **(Eidam) Wint.**	-	+	-	-	-	-	-	-		-	-	-
A. niger **Van Tieghem**	-	-	+	+	-	-	-	-	+	-	-	+
A. ochraceus **Wilhelm**	-	-	-		-	-	-	-	-	-	-	-
A. parasiticus **Speare**	-	+	-	+	-	-	-	-	-	-	-	-
A. phonicis **(Cda.) Thom**	-	-	-	-	-	-	-	-	-	+	-	-
A. pulverulentus **(McAlpine) Thom**	-	-	-	-	-	-	-	-	-	-	-	-
A. pulvinus **Kwon and Fennell**	-	-	+	-	-	-	-	-	-	-	-	-
A. sclerotiorum **Huber**	-	-	-	-	-	-	-	+	-	-	-	-
A. sulphureus **(Fres.) Thom and Church**	-	-	-	-	-	-	-	-	-	-	-	-
A. sydowii **(Bain & Sart) Thom and Church**	-	-	-	-	-	-	-	-	-	-	-	-
A. terreus **Thom**	-	+	-	-	-	-	-	-	-	-	-	-
A. tubingensis **(Schöber) Mosseray**	-	+	-	-	+	-	-	-	-	-	-	-
A. versicolor **(Vuillemin) Tiraboschi**	-	-	-	-	-	-	-	-	-	-	-	-
Drechslera	-	-	-	-	-	-	-	-	-	-	-	-
D. rostrata **Richardson and Fraser**	-	-	-	-	-	-	-	-	-	-	-	-
Fusarium	+	+	+	-	-	-	-	+	-	+	-	+
F. equiseti **(Corda) Saccardo**	-	-	-	-	-	-	-	-	-	-	-	+

Table (1): continued.

Source / Fungal species or variety	Millet	Orange	Peanuts	Phaseolus	Pomegranate	Potato	Rice	Spud	Strawberry	Tangerine	Tomato	Wheat
F. proliferatum **(Matsushima) Nirenberg**	-	-	-	-	-	-	-	+	-	-	-	-
F. reticulatum **Montagne**	-	-	+	-	-	-	-	-	-	-	-	-
F. semitectum **Berkeley and Ravenel**	-	-	-	-	-	-	-	-	-	-	-	-
F. solani **(Mart.) Saccardo**	+	+	-	-	-	-	-	-	-	-	-	+
F. verticillioides **Sacc. Nirenberg**	-	-	-	-	-	-				+		
Mucor	-	+	-	+	+	+	+	+	-	-	-	-
M. circinelloides **Van Tieghem**	-	+	-		-	-	-	-	-	-	-	-
M. hiemalis **Wehmer**	-		-	+	+	-	+		-	-	-	-
M. racemosus **Fresenius**	-	+	-	+	-	+	-	+	-	-	-	-
Neurospora	-	-	-	-	-	-	-	-	-	-	-	-
N. crassa **Shear and Dodge**	-	-	-	-	-	-	-	-	-	-	-	-
Penicillium	-	+	+	-	-	-	+	-	+	+	+	-
P. chrysogenum **Thom**	-	-		-	-	-	-	-	-	-	-	-
P. corylophilum **Dierckx**	-	-	+	-	-	-	-	-	-	-	-	-
P. cyclopium **Westling**	-	-	-	-	-	-	-	-	-	-	-	-
P. digitatum **(Pers. Ex Fr.) Sacc.**	-	+	-	-	-	-	-	-	-	+		-
P. duclauxii **Delacroix**	-	+	-	-	-	-	-	-	-	-	+	-
P. expansum **Link ex Gray**	-	-	-	-	-	-	-	-	-	-	-	-
p. italicum **Wehmer**	-	-	-	-	-	-	-	-	-	-	-	-
P. purpurogenum **Stoll**	-	+	-	-	-	-	-	-	-	-	-	-
P. rugulosum **Thom**	-	-	-	-	-	-	-	-	-	-	-	-
P. oxalicum **Currie and Thom**	-	-	-	-	-	-	+	-	+	-	-	-
P. vermiculatum **Dangeard**	-	-	-	-	-	-	-	-	-	-	-	-
Rhizopus	-	-	-	-	-	-	-	-	+	-	-	-
R. oryzae **Went & Geerlings**	-	-		-	-	-	-	-	+	-	-	-
Stachybotrys	+	-	+	-	-	-	-	-	+	-	-	-
S. chartarum **(Ehrenb.) Hughes**	+	-	+	-	-	-	-	-	+	-	-	-
Trichoderma	-	-	-	-	-	-	-	+	-	-	-	-
T. hamatum **(Bonord.) Bain**	-	-	-	-	-	-	-		-	-	-	-
T. gansus **yumenensis**	-	-	-	-	-	-	-	+	-	-	-	-
Trichurus	-	-	-	-	-	+	-	-	-	-	-	-
T. spiralis **Hasselbr**	-	-	-	-	-	+	-	-	-	-	-	-
Ulocladium	-	-	-	-	-	-	-	-	+	-	-	-
U. atrum **Preuss**	-	-	-	-	-	-	-	-	+	-	-	-
Total genera (13)	2	5	4	2	3	3	3	5	5	3	3	2
Total species (57)	2	15	7	6	4	3	3	6	7	3	5	4
Total varieties (2)	-	-	-	2	-	-	-	-	-	1	1	-

Table (1): continued.

Fungal species and variety	Isolate No.	Source	Mycotoxin production	
			Kind of Toxin	*Level
Acremonium rutilum	**1**	Spud	-	N
Acremonium strictum	**2**	Canned apple juice	Zearalenone	H
Alternaria alternata	**3**	Orange	Alternariol	H
A. alternata	**4**	Orange juice	Alternariol	H
A. alternata	**5**	Pomegranate	Alternariol	H
A. alternata	**6**	Tomato juice	-	N
A. brassicicol	**7**	Orange juice	Alternariol	H
A. longipes	**8**	Orange	Alternariol	H
A. solani	**9**	Tomato	Alternariol	H
A. solani	**10**	Tomato juice	-	N
Aspergillus awamorii	**11**	Canned guava juice	-	N
A. awamorii	**12**	Lentils	-	N
A. awamorii	**13**	Maize	-	N
A. awamorii	**14**	Phaseolus	-	N
A. awamorii	**15**	Spud	-	N
A. caespitosus	**16**	Orange	Sterigmatocystin	L
A. ficuum	**17**	Canned guava juice	-	N
A. ficuum	**18**	Lunchoan	-	N
A. ficuum	**19**	Orange	-	N
A. ficuum	**20**	Peanuts	-	N
A. ficuum	**21**	Pineapple	-	N
A. ficuum	**22**	Strawberry	-	N
A. ficuum	**23**	Tomato	-	N
A. flavo-forcatis	**24**	Lunchaon	Aflatoxin B_1	M
A. flavo-forcatis	**25**	Maize	-	N

Table (2): Mycotoxins screening potential of 150 different isolates of filamentous fungi isolated from foodstuffs in Sohag Governorate, Egypt.

Fungal species and variety	Isolate No.	Source	Mycotoxin production	
			Kind of Toxin	*Level
A. flavus	**26**	Bananas	-	N
A. flavus	**27**	Broad bean	-	N
A. flavus	**28**	Canned guava juice	Aflatoxins B_1, G_1	L
A. flavus	**29**	Canned orange juice	Aflatoxin B_1	L
A. flavus	**30**	Lemon	Aflatoxins B_1, B_2, G_1, G_2	H
A. flavus	**31**	Lentils	Aflatoxins B_1, G_1	M
A. flavus	**32**	Lunchoan	Aflatoxins B_1, B_2, G_1, G_2	M
A. flavus	**33**	Maize	-	N
A. flavus	**34**	Orange	Aflatoxins G_1, G_2	L
A. flavus	**35**	Peanuts	Aflatoxins B_1, G_1	M
A. flavus	**36**	Peanuts	-	N
A. flavus	**37**	Phaseolus	Aflatoxins B_1, B_2	M, L
A. flavus	**38**	Phaseolus	Aflatoxins B_1, G_1	M
A. flavus	**39**	Phaseolus	-	N
A. flavus	**40**	Pomegranate	-	N
A. flavus	**41**	Rice	-	N
A. flavus	**42**	Tomato	Aflatoxins B_1, B_2, G_1,	H
A. flavus	**43**	Tomato juice	Aflatoxins B_1, G_1	M
A. flavus	**44**	Wheat	Aflatoxins B_1, G_1	L
A. flavus var. *columnaris*	**45**	Bananas	Aflatoxins B_1, G_1	L
A. flavus var. *columnaris*	**46**	Canned guava juice	-	N
A. flavus var. *columnaris*	**47**	Canned guava juice	Aflatoxin B_1	L
A. flavus var. *columnaris*	**48**	Canned orange juice	Aflatoxin B_1	L
A. flavus var. *columnaris*	**49**	Canned orange juice	Aflatoxins B_1, G_1	M
A. flavus var. *columnaris*	**50**	Lemon	Aflatoxin B_1	L

Table (2): Continued.

Fungal species and variety	Isolate No.	Source	Mycotoxin production	
			Kind of Toxin	*Level
A. flavus var. *columnaris*	**51**	Lentils	Aflatoxin B_1	M
A. flavus var. *columnaris*	**52**	Lunchaon	Aflatoxin B_1	M
A. flavus var. *columnaris*	**53**	Maize	Aflatoxin B_1	M
A. flavus var. *columnaris*	**54**	Orange juice	Aflatoxin B_1	M
A. flavus var.	**55**	Phaseolus	Aflatoxins B_1, B_2	L
A. flavus var. *columnaris*	**56**	Tangerine	Aflatoxins B_1	L
A. flavus var. *columnaris*	**57**	Tomato	-	N
A. flavus var. *columnaris*	**58**	Tomato juice	-	N
A. foetidus	**59**	Carrot	-	N
A. foetidus	**60**	Lemon	-	N
A. foetidus var. *pallidus*	**61**	Canned guava juice	-	N
A. foetidus var. *pallidus*	**62**	Phaseolus	-	N
A. fumigatus	**63**	Lemon	-	N
A. fumigatus	**64**	Potato	-	N
A. granulosus	**65**	Lemon	-	N
A. heteromorphus	**66**	Bananas	-	N
A. japonicus	**67**	Strawberry	-	N
A. japonicus	**68**	Tomato	-	N
A. nidulans	**69**	Orange	Sterigmatocystin	H
A. niger	**70**	Lunchaon	-	N
A. niger	**71**	Peanuts	-	N
A. niger	**72**	Phaseolus	-	N
A. niger	**73**	Strawberry	-	N
A. niger	**74**	Tomato juice	-	N
A. niger	**75**	Wheat	-	N

Table (2): Continued.

Fungal species and variety	Isolate No.	Source	Mycotoxin production	
			Kind of Toxin	*Level
A. ochraceus	**76**	Lemon	Ochratoxins A, B	H, M
A. parasiticus	**77**	Lunchaon	Aflatoxin B_1	M
A. parasiticus	**78**	Orange	Aflatoxin B_1	L
A. parasiticus	**79**	Phaseolus	Aflatoxins B_1, B_2	L
A. phonicis	**80**	Canned apple juice	-	N
A. phonicis	**81**	Tangerine	-	N
A. pulverulentus	**82**	Lemon	-	N
A. pulvinus	**83**	Peanuts	-	N
A. sclerotiorum	**84**	Spud	Ochratoxins A, B	H
A. sulphureus	**85**	Lemon	Ochratoxins A, B	M
A. sydowii	**86**	Bananas	-	N
A. sydowii	**87**	Canned orange juice	-	N
A. sydowii	**88**	Lunchaon	-	N
A. sydowii	**89**	Tomato juice	-	N
A. terreus	**90**	Canned apple juice	-	N
A. terreus	**91**	Canned orange juice	-	N
A. terreus	**92**	Orange	-	N
A. terreus	**93**	Tomato juice	-	N
A. tubingensis	**94**	Bananas	-	N
A. tubingensis	**95**	Canned apple juice	-	N
A. tubingensis	**96**	Canned orange juice	-	N
A. tubingensis	**97**	Lemon	-	N
A. tubingensis	**98**	Lunchaon	-	N
A. tubingensis	**99**	Orange	-	N
A. tubingensis	**100**	Pomegranate	-	N
A. versicolor	**101**	Canned guava juice	-	N
Drechslera rostrata	**102**	Lemon	Alternariol	M

Table (2): Continued.

Fungal species and variety	Isolate No.	Source	Mycotoxin production	
			Kind of Toxin	*Level
Fusarium equiseti	**103**	Carrot	-	N
F. equiseti	**104**	Wheat	-	N
F. proliferatum	**105**	Spud	-	N
F. reticulatum	**106**	Peanuts	Diacetoxyscirpenol	M
F. semitectum	**107**	Orange juice	Zearalenone	M
F. solani	**108**	Maize	-	N
F. solani	**109**	Millet	-	N
F. solani	**110**	Orange	-	N
F. solani	**111**	Orange juice	-	N
F. solani	**112**	Wheat	Fuminisins B_1, B_2	L
F. verticillioides	**113**	Maize	-	N
F. verticillioides	**114**	Tangerine	-	N
Mucor circinelloides	**115**	Orange	-	N
M. hiemalis	**116**	Phaseolus	-	N
M. hiemalis	**117**	Pomegranate	-	N
M. hiemalis	**118**	Rice	-	N
M. racemosus	**119**	Bananas	-	N
M. racemosus	**120**	Lunchoan	-	N
M. racemosus	**121**	Orange	-	N
M. racemosus	**122**	Phaseolus	-	N
M. racemosus	**123**	Potato	-	N
M. racemosus	**124**	Spud	-	N
Nurospora crassa	**125**	Broad bean	-	N
Penicillium chrysogenum	**126**	Lemon	-	N
P. corylophilum	**127**	Bananas	Patulin	M
P. corylophilum	**128**	Peanuts	Patulin	M
P. cyclopium	**129**	Bananas	Patulin	H

Table (2): Continued.

Fungal species and variety	Isolate No.	Source	Mycotoxin production	
			Kind of Toxin	*Level
P. digitatum	**130**	Orange	-	N
P. digitatum	**131**	Tangerine	Patulin	H
P. duclauxii	**132**	Orange	Patulin	H
P. duclauxii	**133**	Pineapple juice	-	N
P. duclauxii	**134**	Tomato	-	N
P. expansum	**135**	Bananas	Patulin	H
P. expansum	**136**	Lemon	-	N
p. italicum	**137**	Lemon	Patulin	M
P. purpurogenum	**138**	Orange	-	N
P. rugulosum	**139**	Carrot	-	N
P. oxalicum	**140**	Rice	-	N
P. oxalicum	**141**	Strawberry	-	N
P. vermiculatum	**142**	Lunchoan	Patulin	H
Rhizopus oryzae	**143**	Strawberry	-	N
Stachybotrys charatarum	**144**	Millet	Zearalenone	M
S. charatarum	**145**	Peanuts	Zearalenone	M
S. charatarum	**146**	Strawberry	-	N
Trichoderma hamatum	**147**	Canned orange juice	-	N
T. gansus	**148**	Spud	-	N
Trichurus spiralis	**149**	Potato	-	N
Ulocladium atrum	**150**	Strawberry	-	N

Table (2): Continued**.**

* The level of mycotoxin production:
H= High level; more than 500 µg/ L medium.
M= Moderate level; ranged from 200- 500 µg/ L medium.
L= Low level; less than 200 µg/ L medium.
N= No detectable toxin level.

References:

Abdel-Kareem, M.M. (2010). Microbiota and mycotoxins occurrence in some Egyptian fruit juices. M Sc Thesis, Department of Botany, Faculty of Science, Sohag University, Sohag, Egypt.

Ainsworth, G.C. (1971). Ainsworth and Bishy´s Dictionary of fungi: (P. 412) Commonwealth Mycological Institute, Kew, Surry, England.

Alborch, L., Bragulat, M.R., Castellá, G., Abarca, M.L. and Cabañes, F.J. (2012). Mycobiota and mycotoxin contamination of maize flours and popcorn kernels for human consumption commercialized in Spain. Food Microbiology. 32:97-103.

Al-Doory, Y. (1980). Laboratory Medical Mycology. London Lea and Febiger, p. 410.

Ariňo, A., Herrera, M., Estopañan, G., Rota, M.C., Carramiňana, J.J. and Juan, T. (2009). Aflatoxins in bulk and pre-packed pistachios sold in Spain and effect of roasting. Food Control. 20: 811–814.

Bennett, J.W. and Klich, M. (2003). Mycotoxins. Clin. Microbiol. Rev. 16: 497–516.

Bennett, J.W. Henderberg, A. and Grossman, K. (1989). Sterigmatocystin production on complex and defined substrates. Mycopathologia 105: 35 – 38.

Booth, C. (1977). *Fusarium* laboratory guide to the indentification of the major species. (P. 58) Commonwealth Mycological Institute, Kew, Surrey, England.

CAST, (2003). Mycotoxins: Risks in Plant, Animal and Human Systems. Report No. 139. Council for Agricultural Science and Technology, Ames, Iowa, USA.

Chelkowski, J. (editor), (1991). Cereal grain. Mycotoxins, Fungi and Quality in Drying and Storage.Elsevier, Amsterdam.

Dantigny, P., Guilmart, A. and Bensoussan, M. (2005). Basis of predictive mycology. Int. J. Food Microbiol. 100: 187–196.

Delage, N., Harlingue, A.d., Colonna Ceccaldi, B. and Bompeix, G. (2003). Occurrence of mycotoxins in fruit juices and wine. Food Control 14: 225 – 227.

Diener, U.L. and Davis, N.D. (1966). Aflatoxin production by isolates of *Aspergillus flavus*. Phytopathology 56: 1390 – 129.

Domsch, K.H., Gams, W. and Anderson, T. (2007). Compendium of fungi. 2nd Edition, IHW Verlag, Eching, Germany.

Dong, Z., Liu, G., Dong, Z., Qian, Y., An, Y., Miao, J. and Zhen, Y. (1987). Carcinogenesis 8: 989.

El-Maraghy, S.S. and Zohri, A.A. (1988). Mycotoxin – producing potential of aspergilli and penicillia of broad beans in Egypt. Bull. Faculty of Science, Assiut Univ. Egypt 17: 91 – 102.

El-Maghraby, O.M., El-Kady, I.A. and Soliman, S. (1995). Mycoflora and *Fusarium* toxins of three types of corn grains in Egypt with special reference to production of trichothecene-toxins. Microbiol. Res. 150 (3): 225-232.

El-Kady, I.A. and Moubasher, M.H. (1982). Toxigenicity and toxin of *Stachybotrys chartarum* isolates from wheat straw samples in Egypt. Experimental Mycology 6: 25 – 31.

Ellis, M.B. (1976). More Dematiaceous Hyphomycetes. (p. 507) Commonwealth Mycological Institute, Kew, Surrey, England.

Filtenborg, O., Frisvad, J.C. and Thrane, U. (1996). Moulds in food spoilage. International Journal of Food Microbiology. 33: 85-102.

Gimeno, A. (1979). Thin-layer chromatographic determination of

aflatoxins, ochratoxins, sterigmatocystin, zearalenone, citrinin, T-2 toxin, diacetoxyscirpenol, penicillic acid and penitrem ¨A¨. J. Assoc. Off. Anal. Chem. 62: (579- 585).

Huis in't Veld, J.H.J. (1996). Microbial and biochemical spoilage of foods: an overview.Int.J.Food Microbiol. 33: 1–18.

Klich, M.A. and Pitt, J.I. (1992). A laboratory guide to the common *Aspergillus* species and their teleomorphs. Common Wealth Scientific and Industrial Research Organization, Division of Food Processing, North Ryde, Australia.

Köppen, R., Koch, M., Siegel, D., Merkel, S. and Maul, R. (2010). Determination of mycotoxins in foods: current state of analylical methods and limitations. Applied Microbiology and Biotechnology, New York. 86:1595-1612.

Lillehoj, E.B. and Ciegler, A. (1968). Biological activity of sterigmatocystin. Mycopathol. Mycol. Appl. 35: 373 – 376.

Marasas, W.F.O., Nelson, P.E. and Tousson, T.A. (1984). Toxtgenic *Fusanum* species. identity and mycotoxicology. University Park, PA: Pennsylvania State University Press 350.

Medeiros, F.H.V., Martins, S.J. and Zucchi, T.D. (2012). Biological control of mycotoxin-producing molds. Ciênc. agrotec.36 (5): 483-497.

Moubasher, A.H. (1993). Soil fungi in Qatar and other Arab countries. Published by the Scientific and Applied Rrsearch Center, University of Qatar, Qatar.

Miller, D.M. and Wilson, D.M. (1994). Veterinary diseases related to aflatoxins. In Eaton, D. L. and Groopman, J. D. (Eds.). The Toxicology of Aflatoxins. Academic Press, Inc., New York, pp. 347–364.

Nelson, P.E., Desjardins, A.E. and Plattner, R.D. (1993). Ann. Rev. Phytopathol. 31: 233 – 252. Cited in Aboul-Enien, A. M.; Amra, H. A., Ragab, A. A. and Mohamed, M. I. (2000): The occurrence of fumonisin B_1 in Egyptian market corn, screening, processing and toxicology. First Symposium on Food Safety, Oct. 9 – 11, Coll. Agri. & Food Sci., King Faisal Univ. Saudi Arabia, Proceedings 256 – 271.

Njobeh, P.B., Dutton, M.F., Koch, S.H., Chuturgoon, A., Stoev, S. and Seifert, K. (2009): Contamination with storage fungi of human food from Cameroon. International Journal of Food Microbiology. 135: 193–198.

Obied-Allah, M.R. (2011). Mycotoxigenic *Fusarium* species and natural occurrence of fumonisin in corn (*Zea mays* L.) in Sohag Governorate. MSc Thesis, Department of Botany, Faculty of Science, Sohag University, Sohag, Egypt.

Pitt, J.I. (1979). The genus *Penicullium* and its teleomorphic states *Eupenicillium* and *Talaromyces*. (p. 634) Academic Press. Inc. (London).

Pitt, J.I. (1996): What are mycotoxins? Aus. Mycotoxin Newslett.7: 1.

Pitt, J.I., Hocking, A.D., Samson, R.A. and King, A.D. (1992). Recommended methods for mycological examination of foods, 1992. In: Samson R. A., Hocking A. D., Pitt J. I., and King A. D. (editors), Modern Methods in Food Mycology. Elsevier, Amsterdam, pp. 365-368.

Pitt, J.I. and Hocking, A.D. (2009). Fungi and food spoilage. 3rd Edition, Spinger Science and Business Media.

Raper, K.B. and Fennel, P.I. (1965). The genus *Aspergillus* (p. 686) Williams and Wilkins Baltimore U. S. A.

Reddy, K.R.N., Reddy, C.S. and Muralidharan, K. (2009). Detection of *Aspergillus* spp. and aflatoxin B_1 in rice in India. Food Microbiology, 26, 27–31.

Richard, J.L. (2007). Some major mycotoxins and their

mycotoxicosis - An overview. International Journal of Food Microbiology, Amsterdam.119: 3-10.

Ruadrew, S., Craft, J. and Aidoo, K. (2013). Occurrence of toxigenic *Aspergillus* spp. and aflatoxins in selected food commodities of Asian origin sourced in the West of Scotland. Food and Chemical Toxicology. 55: 653–658.

Sánchez-Hervás, M., Gil, J.V., Bisbal, F., Ramón, D. and Martínez-Culebras, P.V. (2008). Mycobiota and mycotoxin producing fungi from cocoa beans. International Journal of Food Microbiology 125: 336 –340.

Schrader, T.J., Cherry, W., Soper, K., Langlois, I. and Vijay, H.M. (2001). Teratogen. Carcinogen. Mutagen.21: 261.

Schroeder, H.W. and Kelton, W.H. (1975). Production of sterigm- atocystin by some species of the genus *Aspergillus flavus* and its toxicity to chicken embryos. Appl. Microbiol 50: 583 – 585.

Scott, P.M., Lawrence, J.W. and Van Walbeak, W. (1970). Detection of mycotoxins by thin-layer chromatography: Application to screening of fungal extracts. Appl. Microbiol 20: 839 – 842.

Tipples, K.H. (1995). Quality and nutrItional changes in stored grain. In: Jnyas, D. S.; White, N. D. G. and Muir, W. E. (editors). Stored Grain Ecosystems. Marcel Dekker. Neh York. pp. 325-351.

Toffa, D.D., Mahnine, N., Ouaffak, L., El Abidi, A., El Alaoui Faris, F.Z. and Zinedine, A. (2013). First survey on the presence of ochratoxin A and fungi in raw cereals and peanut available in the Republic of Niger. Food Control. 32: 558-562.

Tournas, V.H., Heeres, J. and Burgess, L. (2006). Moulds and yeasts in fruit salads and fruit juices. Food Microbiology 23: 684 – 688.

Youssef, M.S. (1986). Mycoflora and mycotoxin of soybean seeds in Egypt. MSc Thesis, Department of Botany, Faculty of Science, Sohag University, Sohag, Egypt.

Varga, J., Frisvad, J.C. and Samson, R.A. (2011). Two new aflatoxins producing species, and an overview of *Aspergillus* section Flavi. Studies in Mycology. 69: 57-80.

Zohri, A.A. and Ismail, M.A. (1994). Based on biochemical and physiological behavior, where is *Aspergillus egyptiacus* better placed? .Folia Microbiol. 39 (5): 415 – 419.

Zohri, A.A., Saber, S.M. and Abdel-Gawad, K.M. (1992). Fungal flora and mycotoxins associated with onion (*Allium cepa* L.) in Egypt. Kor. J. Mycol. 20: 302-308.

Zohri, A.A., Abdel-Sater, M.A. and Ismail, M.A. (1995). Incidence of aflatoxins and mould flora in corn snacks. J. Food Science & Technology. 32 (4): 289-294.

Zucchi, T.D. and Melo, I.S. (2009). Controle biológico de fungos aflatoxigênicos. In: Bettiol, W. and Morandi, M. A. B. editores. Biocontrole de Doenças de Plantas: Uso e Perspectivas. 1: 69-74.

الملخص العربى

اهتم هذا البحث بدراسة الفطريات الملوثة لخمسة وعشرون نوع من المواد الغذائية والتى تم تجميعها من محافظة سوهاج ومدى قدرة هذه الفطريات على انتاج السموم الفطرية. تم عزل وتعريف ١٥٠ عزلة فطرية تنتمى الى ٥٧ نوع بالاضافة الى صنفين تنتمى الى ١٥ جنس. مثل جنس الاسبرجلس بثلاث وعشرون نوع بالاضافة الى صنفين وهو من اكثر الاجناس انتشارا يتبعه جنس البنسليوم والذى مثل باحد عشرة نوع. مثل جنس الفيوزاريوم بستة انواع يتبعه جنس الالترناريا (٤)، الميوكر (٣)، التريكودرما (٢) و الاكريمونيم (نوعين). مثلت الاجناس الاخرى (٦ اجناس) بنوع واحد فقط اكل جنس. تم اختبار مدى مقدرة العزلات الفطرية (١٥٠ عزلة) على انتاج السموم واوضحت النتائج قدرة ٥٣ عزلة فطرية (٣٥%) على انتاج نوع واحد من ثمانية سموم وهى (الافلاتوكسين، الاوكراتوكسين، الفيومونيسين، الاستيريجماتوسستين، الباتيولين، الزيرالينون، الالترانويل و الدااسيتوكسسكيربينول).