This study illustrates a simple method for the detection of the ability of Aspergillus parasiticus, isolated from peanut seeds, for the production of aflatoxins. The indicator of aflatoxins production ability is the appearance of colony reverse yellow color of the fungus on the agar media and the natural fluorescence of aflatoxin around the colony when observed under UV (black light 350BL) after three days of incubation at 28°C. The morphological identification of A. parasiticus was confirmed by molecular identification rDNA sequencing. The addition of β-Cyclodextrin to media enhanced the natural fluorescence of aflatoxin around the colony under UV. The extract of Thymus vulgaris had an inhibitory effect on the growth of A. parasiticus. The minimum inhibitory concentration (MIC) of Thymus extract against A. parasiticus was 80µL of Thymus extract /10 ml of YSA medium. The effective concentration of Thymus extract causing a 50% inhibition of mycelial growth (EC50) was 20µL of Thymus extract /10mL of YSA medium. The chemical analysis of Thymus extract by Gas Chromatography-Mass Spectroscopy (GC-MS) illustrated that the thymol has a retention time (RT) (min) of 37.538 at the highest percent area (13.8717 Area %).

Keywords: Aflatoxin, Aspergillus parasiticus, Blue fluorescence, Extract, Thymus vulgaris.

Introduction

Fungi are divided into two distinct groups; a group that invades crops before plant harvesting and the other that invades after harvest so the contamination with aflatoxins can occur before and after harvest (Augusto, 2004). Furthermore, Aspergillus spp. section flavi is divided into two groups, one that includes the aflatoxigenic species; A. flavus, A. parasiticus and A. nomius; and the second group includes the non-aflatoxigenic species; A. oryzae, A. sojae and A. tamari; traditionally used for the production of fermented food (Lin & Dianese, 1976; Cotty, 1989; Rodrigues et al., 2007). Aspergillus section flavi includes 22 species grouped into seven clades. Aspergillus pseudocaelatus. Nov. and A. pseudonomius. Nov. are the two newly discovered aflatoxin-producing species according to Varga et al. (2011). Aflatoxins are probably produced by Aspergillus species. The important sources of contamination is during production and handling (Ouf et al., 2019). Aflatoxins are secondary metabolites, highly toxic and the most carcinogenic are produced by some strains of A. flavus and A. parasiticus. Aspergillus flavus produces aflatoxins B1 and B2 while A. parasiticus produces G1 and G2 aflatoxins. The presence of these fungi is enhanced by a number of factors such as inadequate storage conditions (El Koury et al., 2011; Ouattara-Sourabie et al., 2012). Crop rotations influence the quantity of aflatoxins (Jaime-Garcia et al., 2006). Different treatments are used to reduce the quantities of aflatoxins such as double atmospheric pressure cold plasma (DAPCP) (Ouf et al., 2016) and treatment of fruits with ozonized water (Ouf et al., 2019). The main six aflatoxins types are designated as B1, B2, G1, G2, M1 and M2. B1 aflatoxin is the most common and most spread in the world. It accounted for 75% of the contaminated food and feed in the world (Wacoo et al., 2014). Aflatoxin B1 is one of the most common toxins found in wheat grains (Sadharasan et al., 2017).

Different media were used for the differentiation between aflatoxin-producing or non-aflatoxin-producing Aspergillus species.
Lin & Dianese (1976) were the first to indicate the bright yellow pigment production with aflatoxigenic *Aspergillus* species on the reverse side of colonies grown on semitransparent agar media. The degree of yellow pigmentation was proportional to blue fluorescence in media (Davis et al., 1987), but the yellow pigment production was not a reliable predictor of the amount of aflatoxin in media (Cotty, 1989).

The formation of bright blue or blue-green fluorescent area surrounding the colonies when subjected to UV light (365nm), is the simple and fast method to detect the aflatoxin, (Fente et al., 2001; Corry et al., 2003; Augusto, 2004; Ouattara-Sourabie et al., 2012). Agar fluorescence is proportional to the total aflatoxins content in culture of *Aspergillus* spp. (Davis et al., 1987; Cotty, 1989). The blue fluorescence of media under UV is a standard method for the differentiation between groups, which produce aflatoxins and the others non-aflatoxigenic groups. Ouattara-Sourabie et al. (2012) stated that “aflatoxins was detected from isolates of *A. parasiticus* which has fluorescence under UV and not detected from isolates which have no fluorescence” (Okwa et al., 2010). Fluorescence under UV is observed for B₁, B₂, G₁ and G₂ (Augusto, 2004).

The inhibitory effect of plant extracts of *Thymus vulgaris* on the growth of fungi was investigated by many authors (Zekovic et al., 2002; Al-Maatari et al., 2011; Moghtader, 2012; Mousavi & Raftos, 2012).

The aim of this article is the isolation of *Aspergillus parasiticus* from infected peanut seeds and studying the colony fluorescence of the investigated fungus when exposed to UV (320nm). Moreover, to examine the effect of *Thymus vulgaris* extract on the growth of *A. parasiticus*.

**Material and Methods**

**Isolation of Aspergillus parasiticus**

After surface sterilization, the peanuts seeds were wetted with sterilized water and maintained in glass Petri dishes at room temperature (25±1°C) in incubator until the appearance of mold on seeds. After one week, the *Aspergillus* sp. were purified on potatoes dextrose agar medium (PDA; gm/L distilled water: 200gm potatoes, 20gm dextrose and 17gm agar) according to Pitt & Hocking (2009), and maintained until used on slants of Czapek yeast extract agar (CYA; gm/L distilled water: NaNO₃: 3gm, KH₂PO₄: 1gm, KCl: 0.5gm, MgSO₄: 0.5gm, FeSO₄·7H₂O: 0.1gm, Sucrose: 30gm, Yeast extract: 5gm, agar: 15gm) (Pitt & Hocking, 2009; Ouattara-Sourabie et al., 2012).

**Morphological analysis**

For morphological observation the isolates were grown on PDA, Malt extract agar (MEA; gm/L distilled water: 20gm malt extract, 1gm peptone, 20gm sucrose, 15gm agar (Pitt & Hocking, 2009), and yeast extract sucrose agar (YSA; gm/L distilled water: 2gm yeast extract, 20gm sucrose and 17gm agar (Ehrlich et al., 2004). They were incubated at 25±1°C for 7 days and then microscopic study was performed (Varga et al., 2011).

**Molecular identification of A. parasiticus**

The rDNA sequencing of actively growing mycelium on potatoes dextrose broth (PDB) medium at room temperature (25±1°C) was studied to confirm morphological identification. It was maintained at-80°C until the use of DNA extraction. Polymerase chain reaction (PCR) was performed followed by Gel electrophoresis for the results of PCR, and the internal transcribed spacer of DNA: ITS1 (5’-TCCGTTTGTAACCCACGGG-3’) and ITS4 (5’-TCCTCCGCTTATTGATATGC-3’) were compared with the sequencing of other organisms belonging to the genus *Aspergillus*, according to White et al. (1990). Consequently, the trimmed sequences were identified using the database searches of the National Center for Biotechnology Information (NCBI).

**Simple methods to study the ability of A. parasiticus for the production of aflatoxins**

According to Lin & Dianese (1976), Corry et al. (2003), and Sudini et al. (2015), the fungus was growing on Yersinia Selective Medium (YSA). The appearance of the yellow color on the reverse side of the plates after three days was considered as the primary indicator for the production of aflatoxins. Another method is by growing the fungus in the center of a Petri dish containing potato dextrose agar. The dish was inverted, and 1 or 2 drops of concentrated ammonium hydroxide solution were placed on the lid of the Petri dish then the color on the inverted Petri dish was recorded (Abbas et al., 2004a). According to Davis et al. (1966), the fungus was cultivated on YSA at 30±1°C and was examined under UV (360nm) for the presence
or absence of blue fluorescence surrounding the colonies.

The effect of the type of media on A. parasiticus biomass
To study the effect of Potatoes dextrose broth (PDB), Czapek yeast broth (CYB) and yeast sucrose broth (YSB) media on fresh and dry biomass of the studied fungus, 25mL of each medium was dispensed in autoclaved flasks. The flasks were incubated at room temperature on orbital shaker at 125rpm, for 13 days. The fungal growth was filtered through Whatman No. 1 filter paper with a known weight. The fresh and dry weights were measured (Corry et al., 2003; Sudini et al., 2015).

Effect of the addition of β-cyclodextrin
For increasing the detection of aflatoxins, β-Cyclodextrin (β-CyD) was added to the media according to the methods used by Fente et al. (2001). The plates were incubated at 25±1°C from 1 to 7 days on YSA and PDA media. Fluorescent and non-fluorescent colonies were recorded as +ve or -ve.

Effect of different concentration of Thymus vulgaris extract on the growth of A. parasiticus
Preparation of spore suspensions
A. parasiticus was grown on Czapek yeast extract agar (CYA) slant for 10 days at 30±1°C. The harvested spores were kept in sterilized water containing 0.01% (v/v) Tween 80 was added according to Ouattara- Sorousie et al. (2012).

Preparation of T. vulgaris methanolic extract
Thymus vulgaris (leaves and stems) was extracted by 70% methanol according to Al-Rahmah et al. (2013). The antifungal activity was studied by growing the fungi on YSA plates containing different concentrations of plant extract of T. vulgaris, as follows: 0, 10, 20, 30, 40, 50, 60, 70, 80, 100μL/10mL of medium. Ten microliters of 10^3 spore suspension of A. parasiticus were prepared from seven days old culture and placed on YSA plates (9cm). Plates were incubated for 7 days at 30±1°C. The diameters of treated and control colonies were measured when the fungal growth in the control plates had covered the surface of medium. The experiment was carried out in three replicates. The percentage of relative mycelium inhibition (RMI) by the plant extract was calculated using the following formula:

\[ \text{RMI} = \left(\frac{C - T}{C}\right) \times 100 \]

where C represents the mean colony diameter of control plates, and T represents the mean colony diameter of treated plates. The colony diameter was measured in millimeters. Minimum inhibitory concentration (MIC) of Thymus vulgaris was measured, which was defined as the lowest concentration of extract that allowed no more than 20% (or 50%) of fungus growth, and the effective concentration of the sample which caused a 50% inhibition of mycelial growth (EC50).

Analysis of Thymus vulgaris extract by GC-MS
The gas chromatography mass spectrometry (GC-MS) analysis of Thymus vulgaris methanolic extract was carried out at the Central Lab., Faculty of Science, Ain Shams University. GC–MS, Agilent Technologies 7890B GC Systems combined with 5977A Mass Selective Detector, Capillary column was used (HP-5MS Capillary; 30.0m × 0.25mm ID × 0.25μm film) and the carrier gas was helium at a rate of flow of 1.9 mL/min with 1μL injection. The sample was analyzed with the column held initially for 3min.

Statistical analysis
All tests were conducted in three replicates for each treatment and the data were reported as mean ± standard deviation (SD) using Excel 2010 program.

Results
Isolation and characterization of Aspergillus parasiticus from peanut seeds
Two Aspergillus species were isolated from peanut seeds. They were A. parasiticus and A. flavus. Aspergillus parasiticus was used to study its ability for aflatoxin production by simple method (Fig. 1).
A. parasiticus was grown on YSA, PDA and CYA media, the inverted colony appeared dark yellowish green with yellow color on MEA medium after three days of incubation at room temperature (25±1°C) (Fig. 1A). The mycelium appears as dark yellowish green on YSA and dark green on PDA medium (Figs. 2, 3).

Microscopic examination of Aspergillus parasiticus

The microscopic examination of A. parasiticus showed the presence of uni-seriate phialides, which cover about two thirds of their globose vesicles with dark circular rough conidia. While A. flavus showed bi-seriate phialides, which cover all the elliptical vesicle, with slightly rough-oval conidia with noticeable papilla. The morphological identification and microscopic study of A. parasiticus were confirmed by Assiut University Mycological Center (AUMC) and A. parasiticus was identified as A. parasiticus Speare, No.: 13623.

Molecular identification of Aspergillus parasiticus

The Comparison of the sequencing of the rDNA internal transcribed spacer of ITS1 (5′-TCCGTTG GTGAACCA G CGG- 3′) and ITS4 (5′-TCCTCCG TTATGTAT GC-3′) with the sequencing of other organisms belonging to the genus Aspergillus in NCBI in GenBank, showed that the isolate is a Closest Match to Aspergillus parasiticus DTO 046-C2, with accession number: MW485607 (Fig. 4).

Simple and rapid methods to study the ability of A. parasiticus for aflatoxins production

When A. parasiticus was grown on YSA and Aspergillus differentiated medium (ADM), it had a yellow color reverse colony after three days of incubation on YSA, and orange-yellow reverse color colony on ADM. Another simple method was the exposure of isolates growing in the center of the PDA plates to 27% ammonium hydroxide.
vapor for 30min. The reverse side of the colony of *A. parasiticus* became pink to reddish color after few seconds compared with the *A. flavus* isolate. Conflict of interest when *A. parasiticus* was cultivated on YSA and exposed to UV (black light 350BL), we noted the appearance of blue fluorescence hollow surrounding the colonies (Fig. 5).

Fig. 5. Slightly blue hollow around the colony of *A. parasiticus* on PDA medium (A) and blue fluorescence around the colony of the same fungus under UV light in closed chamber

The effect of media types on *A. parasiticus* biomass

Mycelial biomass of *A. parasiticus* was different according to the type of medium. Three types of media were used: PDB, CYB and YSB media. The means fresh mycelial biomass were: 3.97±0.1, 2.99±0.07 and 7.91±0.11gm/25mL of medium, and the mean dry weights were: 2.55±0.3, 1.31±0.25 and 5.70±0.21gm/25mL of medium for dry mycelial biomass for MEB, CYB and YSB, respectively. The results indicated that YSA was the most suitable medium for the growth of *A. parasiticus* (Fig. 6).

![Fig. 6. The mean fresh and dry weight of mycelium of *A. parasiticus* on three types of media; potatoes dextrose broth (PDB), Czapek yeast broth (CYB) and yeast sucrose broth (YSB)](image)

Effect of β-Cyclodextrin on the degree of fluorescence as an indicator for aflatoxins production

The blue fluorescence area surrounding the colonies under UV (black light 350BL) was increased by the addition of β-Cyclodextrin (β-Cyd; 0.3gm/100mL of media). The addition of β-Cyd enhanced the fluorescence as an indicator of *A. parasiticus* ability for aflatoxins production. The blue fluorescence started to appear clearly on the fourth day of incubation at room temperature (25°C±1º), but the best appearance of fluorescence was at the sixth day. After three days of incubation, it appeared after one week on YSA only. At the seventh day of incubation, the growth of mycelium, which covered the surface of the agar plates, made the blue hollow not visible. These results indicated that the incubation time is among the factors affecting the appearance of the blue fluorescence hollow around the fungal colony (Table 1).

### TABLE 1. The effect of addition of β- cyd on fluorescence of colony.

<table>
<thead>
<tr>
<th>Incubation time</th>
<th>Degree of fluorescence by addition of β- cyd</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>YSA</td>
</tr>
<tr>
<td>First day</td>
<td>-</td>
</tr>
<tr>
<td>Second day</td>
<td>-</td>
</tr>
<tr>
<td>Third day</td>
<td>+</td>
</tr>
<tr>
<td>Fourth day</td>
<td>+++</td>
</tr>
<tr>
<td>Fifth day</td>
<td>+++</td>
</tr>
<tr>
<td>Sixth day</td>
<td>+++</td>
</tr>
<tr>
<td>Seventh day</td>
<td>+++</td>
</tr>
</tbody>
</table>

Effect of *Thymus vulgaris* methanolic extract on *A. parasiticus* growth

When growing *A. parasiticus* on plates containing different concentrations of *T. vulgaris* extract, there were inhibition of fungal growth compared with control plates. The mean diameter of the colony of *A. parasiticus* decreased by increasing the concentration of the plant extract. We noted that the mycelium had white color at 80 and 100µL of *Thymus* extract/10mL of YSA medium. The relative mycelial inhibition (RMI) increased by increasing the concentration of *Thymus* extract. The means diameter of colony of *A. parasiticus* were; 9±0, 4.7±0.1, 4.03±0.05, 3.73±0.11, 3.33±0.11, 2.96±0.05, 2.76±0.11, 2.16±0.05, 1.76±0.05, 1.5±0.14, 1.3±0.05cm and the RMI values of *A. parasiticus* were; 0, 47.7±1.1, 55.18±0.6, 58.51±0.2, 62.96±1.2, 67.03±0.6, 69.25±1.2, 75.92±0.6, 80.37±0.6, 84.07±1.2, and 85.18±0.6%, respectively at different concentrations 0, 10, 20, 30, 40, 50, 60, 70, 80, 90 and 100µL of *Thymus vulgaris*.
extract /10mL of YSA medium respectively. The lowest concentration of extract that allowed no more than 20% growth of the fungus (MIC) was 80 µl of Thymus extract /10mL of YSA medium. The effective concentration of the Thymus extracts which caused a 50% inhibition of mycelial growth (EC$_{50}$) was 20µL of Thymus extract /10mL of YSA medium (Fig. 7).

GC-MS analysis of T. vulgaris

Fifty-five phenolic and carbohydrate derivative compounds were obtained from the analysis of the methanolic extract of Thymus vulgaris by Gas-Mass spectroscopy. One sharp peak appeared for Thymol at retention time (RT) (min) 37.538 which covered 3.8717 % area. The RT and area percentages are illustrated in Table 2.

Discussion

Mycotoxins produced by different genera of toxic fungi, cause human health problems and economic loss (Ouf et al., 2015). Aflatoxins are produced by some strains of A. parasiticus, which are the main aflatoxin-producing Aspergillus species, through the contamination of foods, fruits, and vegetables (Rodrigues et al., 2007; El Koury et al., 2011; Rajarajan et al., 2013).

The mycelium of A. parasiticus appeared compact with dark yellowish-green color on YSA medium, dark green on PDA medium, and dark green to slightly yellowish on MEA medium. Aspergillus parasiticus under a microscope had uniseriate phialides, which covered about two-thirds of their globose vesicles with dark green circular rough conidia. These characters of A. parasiticus are in agreement with those given by Rodrigues et al. (2007).

To confirm the morphological identification, the molecular identification of Aspergillus was performed through DNA extraction (Ehrlich et al., 2004; El Koury et al., 2011; Sadharsan et al., 2017).

YSA, PDA and CYA media are used to study the ability of A. parasiticus for the production and quantification of aflatoxins according to Fente et al. (2001), Abbas et al. (2004) and Sudini et al. (2015). Therefore, we studied the effect of the type of media on the fungal biomass. The mycelial biomass of A. parasiticus varied according to the type of media. YSA medium was the best for the growth of A. parasiticus.

Different simple and rapid methods were used for the differentiation between Aspergillus species in their ability for the production of aflatoxin. Firstly, by the reversed side color of colony on YSA and ADM media (after three days of incubation); secondly, by the pink-red color of the reversed colony when exposed to 27% ammonium hydroxide vapors. The secretion of yellow pigments into the medium was considered as the first step showing their ability to produce aflatoxin. These results agreed with Lin & Dianese (1976), Saito & Machida (1999), Corry et al. (2003), Abbas et al. (2004), Abbas et al. (2004a), Yazdani et al. (2010) and Abo Dahab et al. (2016).

![Fig. 7. The percentage of mycelial inhibition of Aspergillus parasiticus by different concentrations of Thymus vulgaris extract](image-url)
TABLE 2. GC-MS analysis for *T. vulgaris* extract.

<table>
<thead>
<tr>
<th>RT</th>
<th>Area %</th>
<th>Library/ID (S2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.1415</td>
<td>4.4635</td>
<td>Ethanimidic acid, ethyl ester</td>
</tr>
<tr>
<td>8.5087</td>
<td>2.6057</td>
<td>Acetamide</td>
</tr>
<tr>
<td>8.771</td>
<td>3.2831</td>
<td>3,7-Diacetamido-7H-s-triazolo[5,1-c]-s-triazole</td>
</tr>
<tr>
<td>37.538</td>
<td>13.8717</td>
<td>Thymol</td>
</tr>
<tr>
<td>17.9792</td>
<td>8.7767</td>
<td>1-Propanol</td>
</tr>
<tr>
<td>9.0858</td>
<td>3.7385</td>
<td>Ethanimidic acid, ethyl ester</td>
</tr>
<tr>
<td>9.1441</td>
<td>6.5171</td>
<td>Acetaldoxime</td>
</tr>
<tr>
<td>9.2898</td>
<td>0.4561</td>
<td>Phenol, 2-methyl-5-(1-methyl-1H)-</td>
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<tr>
<td>9.692</td>
<td>1.228</td>
<td>Phenol, 2,3,5,6-tetramethyl-</td>
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<td>0.0468</td>
<td>Dibenzo[a,h]anthracene, 5,6-dihydro-</td>
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<td>10.5429</td>
<td>0.0083</td>
<td>2-Hydroxy-4-methylanthraquinone, O-trimethylsilyl</td>
</tr>
<tr>
<td>10.6653</td>
<td>0.0131</td>
<td>3-Isopropoxy-1,1,1,5,5,5-hexamethyl-3-((trimethylsiloxy)trisiloxane</td>
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<tr>
<td>10.8402</td>
<td>0.1498</td>
<td>3-Tetradec-5-ynyl, (Z)-</td>
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<tr>
<td>10.9684</td>
<td>0.0357</td>
<td>2-Naphthalenol, 2,3,4,4a,5,6,7-octahydro-1,4a-dimethyl-7-(2-hydroxy-1-methyl)ethyl)</td>
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<tr>
<td>11.1957</td>
<td>0.0088</td>
<td>Naphthalene, 1,2,3,5,6,7,8a-octahydro-1,8a-dimethyl-7-(1-methylethenyl)-, [1S-(1.alpha.,7.alpha.,8a.alpha.,8a.alpha.)]-</td>
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<tr>
<td>12.0351</td>
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<td>12.1342</td>
<td>0.0293</td>
<td>2-Hydroxy-3-methylbenzaldehyde</td>
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<td>Benzene, (ethenylthio)-</td>
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<td>12.6063</td>
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<tr>
<td>19.5365</td>
<td>0.1361</td>
<td>Gamma-.sitosterol</td>
</tr>
</tbody>
</table>

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After four days of the experiment, slightly blue fluorescence appeared around the colony, these results were following Lin & Dianese (1976). The production of blue fluorescence around the colony of *A. parasiticus*, when exposed to UV, was an indicator of the ability of this isolate to produce aflatoxins. These results concurred with Hara et al. (1974), Cotty (1988), Fente et al. (2001), Abbas et al. (2004a), Augusto (2004), Ouattara-Sourabie et al. (2012), and Abo Dahab et al. (2016). On the other hand, they disagreed with Yazdani et al. (2010) who stated that “this method was not sensitive to all *Aspergillus* species”.

The natural blue fluorescence area surrounding the colony on the exposure to UV was enhanced by the addition of β-Cyclodextrin. These results were supported by many authors: Davis et al. (1987), Fente et al. (2001), Abbas et al. (2004) and Augusto (2004). The diameter of the colony was the same with and without the addition of β-Cyclodextrin. Hence, it has no effect on fungal growth. This result agreed with Fente et al. (2001). After three days of incubation, a blue fluorescence appeared around the colony on YSA medium. These results are matching with the study of Davis et al. (1987), which illustrated that; “for the appearance of blue fluorescence the colony must be incubated from three to five days” and this was also supported by Ouattara-Sourabie et al. (2012). The blue fluorescence hollow increased by the increase of the incubation time. Davis et al. (1987) claimed that after seven days of *A. parasiticus* incubation, the growth of the colony covered all the surface of the agar, this is why it was not easy to observe the blue fluorescence.

The addition of different concentrations of *Thymus vulgaris* extract to the medium inhibited *A. parasiticus* growth compared with the control plates. The inhibitory effect of *Thymus* against the studied fungi was investigated by many authors: Ewais et al. (2014), Ibrahim & Al-EBady (2014), and Mossa & Abdul Wahid (2014). In addition, the analysis of *Thymus* extract by GC-Mass spectroscopy was illustrated by many authors; Pinto et al. (2006) and Ewais et al. (2014). Thymol is the main constituent of *T. vulgaris* extract and its antifungal activity may be of major importance as confirmed earlier by Miladi et al. (2013) and Kohiyama et al. (2015).

**Conclusion**

*Aspergillus parasiticus* is one of the aflatoxin-producing fungi. A simple and rapid method for the detection of aflatoxin-producing species is by fluorescence at UV (320 - 360nm). The methanolic extract of *Thymus vulgaris* has antifungal effect on the growth of aflatoxigenic fungi.

**Ethical approval:** Not applicable.

**References**


دراسة التأثير الضد فطري لمستخلص الميثانول لنبات الزعتر على نمو الأسبرجيلس
بارازيتيكس المنتج للسموم الفطرية

منجيه إبراهيم موسى
قسم النبات - كلية العلوم بالعريش - جامعة العريش - شمال سيناء - مصر.

توضح هذه الدراسة إحدى الطرق البسيطة المستخدمة لقياس مدى قدرة فيطر الأسبرجيلس بارازيتيكس على إنتاج الافلاتوكسينات. فاتifact مع الموصفات لمقادير اللفظ على اللافتوكسين هو لون ظاهر المستعمرة باللون الأصفر وكذلك توقف اللفظ عند تعرضه لأشعة فوق البنفسجية، و الحياء بها لبLKة زرقاء اللون. تم تعريف اللفظ اعتمادًا على الشكل الظاهري ثم تأكيد ذلك بدراسة الحمض النووي الديوكسي ريبوزي لتعرفه والمقارنة بالعزلات المتاحة بقواعد البيانات. وجد أن إضافة بعض المواد مثل بيتا سيكلو دكسترين (0.3%) إلى الوسط الغذائي قد أدت إلى زيادة الحالة الزرقاء حول النمو الفطرى عند تعرضها لأشعة فوق البنفسجية. تم تأكيد تعريف اللفظ اعتمادًا على الشكل الظاهري بالتعرف على طرق دراسة التتابع النيوكليوتيدى للحمض النووي لللفظ. عند دراسة تأثير المستخلص الميثانولي لنبات الزعتر (الثور كاملا ما عدا الجذر) وجد أن أقل تركيز أدى إلى تقليل النمو إلى أقل من 20% مقارنة بالكنترول وهو 80 ميكروليتر من المستخلص/10 مليلتر من الوسط الغذائي وكذلك تم قياس تركيز المستخلصات البيانية الذي أدى إلى تقليل نمو الفطرة إلى النصف مقارنة بالكنترول وهو 20 ميكروليتر من المستخلص البياني/10 مليلتر من الوسط الغذائي عن التحليل الكيميائي (جهاز GC-MS). للمستخلص البياني. للزعتر وجد أن أعلى تركيز للمركبات التي تم الحصول عليها كانت مركب الثايمول وهو من المركبات الفينولية المعروفة بخصائصه التثبيطية للفطريات. ومن ذلك يوضح تأثير المستخلص الميثانولي لنبات الزعتر على نمو فطرة الأسبرجيلس بارازيتيكس الذي له الدور الكبير في نمو الكثير من الأطعمة بالسموم الفطرية.

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