The Effect of Mycotoxins on Human

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Abstracts

The aim of the current study is, what are mycotoxins, where are mycotoxins found in nature, what are the risks of mycotoxins to human health. What is the meaning of strabismus, what are the causes of strabismus in children, what are the types of strabismus, what is the treatment for vision correction in strabismus children, the questionnaire was created electronically via the Google Drive program, and then it was distributed via mobile phone on the social networking program (WhatsApp). using e-mail for all participants to respond to the questionnaire 560 questionnaires were distributed to all mobile groups, and 550 questionnaires were received on the researcher's e-mail. (the target group is residents of the city of Mecca, aged 25-55 years). It is concluded that mycotoxins are very danger on human health and brings a lot of trouble to him. It has also been shown that there is a relationship linking some diseases and aflatoxin toxins, and are these diseases viral liver diseases, by 82.8% according to participates.

Keywords: effect of mycotoxins, on human.

1. Introduction

Fungi produce a wide range of chemical compounds, containing some that are useful in industry, such as making types of cheese, and others that are important from a health standpoint, such as antibiotics resulting from some types of fungi and many others. Some fungi also produce compounds that are highly toxic to animals and humans, and some of them may cause cancerous tumors. It is worth noting that mycotoxins have been known for a long time, but serious studies on these toxins did not begin until the early sixties of this century (1). A mycotoxin (Greek μύκης mykes, "mushroom" and τοξικόν Toxicon, "poison") is a toxic secondary metabolite produced by organisms of the kingdom Fungi and capable of causing illness and death in both humans and other animals. The term "mycotoxins" is usually reserved for toxic chemical products produced by fungi that easily colonize crops. A single mold species may produce many different mycotoxins, and several species may produce the same mycotoxin. Most fungi are aerobic (use oxygen) and are found almost everywhere in very small quantities due to the small size of their spores. Consume organic matter anywhere there is adequate humidity and temperature. When conditions are right, the fungi multiply into colonies and mycotoxin levels become high. The cause of mycotoxin production is not yet known. It is not necessary for the growth or development of fungi. Because mycotoxins weaken the recipient host, fungi may use them as a strategy to improve the environment for further fungal spread. The production of toxins depends on the surrounding internal and external environments, and these substances vary greatly in their toxicity, depending on the affected organism, its sensitivity, metabolism and defense mechanisms. Main groups: Aflatoxins are a type of mycotoxin produced by Aspergillus species of fungi, such as A. flavus and A. parasiticus. The umbrella term aflatoxin refers to four different types of mycotoxins produced, namely B1, B2, G1, and G2. Aflatoxin B1, the most toxic, is a potent carcinogen and is directly linked to adverse health effects, such as liver cancer, in many animal species. Aflatoxins are largely associated with commodities produced in tropical and subtropical regions, such as cotton, peanuts, spices, pistachios, and corn. Ochratoxin is a mycotoxin that comes in three secondary metabolite forms, A, B, and C. It is produced by both Penicillium and Aspergillus species. The three forms differ in that Ochratoxin B (OTB) is the non-chlorinated form of Ochratoxin A (OTA) and that Ochratoxin C (OTC) is the ester form of Ochratoxin A. Aspergillus ochraceus is found as a contaminant of a wide range of goods including beverages such as beer and wine. Aspergillus carbonarius is the main species found in grape fruit, which releases the toxin during the juice-making process. Citrinin is a toxin that was first isolated from Penicillium citrinum, but has been identified in more than a dozen species of Penicillium and several species of Aspergillus. Some of these species are used for human food production such as cheese (Penicillium camemberti), sake, miso, and soy sauce (Aspergillus oryzae). Citrinin is associated with rice yellow disease in Japan and acts as a nephrotoxicant in all animal species tested. Although they are associated with many human foods (wheat, rice, corn, barley, oats, rye, and foods colored with Monasco), their full importance to human health is not known. Citrinin can also act synergistically with Ochratoxin A to decrease RNA synthesis in rat kidneys. Ergot poisoning is a compound produced as a toxic mixture of alkaloids in ergot by pinworm species, which are common pathogens of various grass species. Ingestion of ergot spores from infected grains, usually in the form of bread produced from contaminated flour, causes ergotism, a human disease known historically as St. Anthony's Fire. There are two forms

of ergotism: gangrenous, affecting blood supply to the extremities, and spastic, affecting the central nervous system. Modern methods of grain cleaning have greatly reduced ergotism as a human disease. However, it remains an important veterinary problem. Ergot alkaloids have been used pharmaceutically. Patulin is a toxin produced by P. expansum, Aspergillus, Penicillium, and Paecilomyces fungal species. P. expansum is particularly associated with a range of moldy fruits and vegetables, especially moldy apples and figs. They are destroyed by the fermentation process and are not even found in apple drinks, such as apple juice. Although patulin has not been shown to be carcinogenic, it has been reported to damage the immune system in animals. In 2004, the European Community set limits for patulin concentrations in food products. It currently stands at 50 µg/kg in all fruit juice concentrations, at 25 µg/kg in solid apple products used for direct consumption, and at 10 µg/kg for children's apple products, including apple juice (2). Fusarium toxin is produced by more than 50 species of fungi and has a history of infecting developing grains such as wheat and corn. They include a group of mycotoxins, such as fumonisins, which affect the nervous systems of horses and can cause cancer in rodents. trichothecenes, which is closely associated with chronic and fatal toxic effects in animals and humans; and zearalenone, which is not associated with any fatal toxic effects in animals or humans. Some other major types of Fusarium toxins include: beauvercin and enniatins, butenolide, equisetin, and fusarins. Some of the health effects found in animals and humans include death, specific diseases or health problems, and weakened immune systems without specificity to toxins, allergens or irritants. Some mycotoxins are harmful to other microorganisms such as other fungi or even bacteria. Penicillin is one example. It has been suggested that mycotoxins in stored animal feed are the cause of rare stereotypical sex changes in chickens that cause them to look and act male (3).

2. Material and Methods:

The study started in (the holy city of Mecca in Saudi Arabia), began writing the research and then recording the questionnaire January 2024, and the study ended with data collection in July 2024. The researcher used the descriptive analytical approach that uses a quantitative or qualitative description of the social phenomenon (The effect of mycotoxins on human health) The independent variable (the percentage of mycotoxins present in human health) and the dependent variable (the percentage of mycotoxins that affect human health). This kind of study is characterized by analysis, reason, objectivity, and reality, as it is concerned with individuals and societies, as it studies the variables and their effects on the health of the individual, society, and consumer, the spread of diseases and their relationship to demographic variables such as age, gender, nationality, and marital status. Status, occupation (4), And use the Excel 2010 Office suite histogram to arrange the results using: frequency tables Percentages (5). A questionnaire is a remarkable and helpful tool for collecting a huge amount of data, however, researchers were not able to personally interview participants on the online survey, only answered the questionnaire electronically, it consisted of ten questions, all were closed.

3. Results and discussion:

The percentage of those who agreed to participate in the research questionnaire was 98.9% and those who refused was 1.1%. The percentage of participants' ages was from 25-55 years as follows: 25-34 (44.3%), and from 35-44 years of age it was (also the same percentage), while those from 45- 55 years (the percentage was 11.4%). Their gender was as follows: 44.3% male and 55.7% female. Their nationalities are as follows: the percentage of Saudis was 87.4%, and non-Saudis were 12.6%. As for educational status, it was as follows: student 15.9%, government employee 45.5%, private sector employee 15.9%, self-employed 5.5%, housewife 14.8%, career worker 2.4%. As for the distribution of the questionnaire to the participants and their responses to it, their answers (yes or no) were as follows: The first question: Are mycotoxins secondary metabolic compounds produced by many fungi that are capable of causing disease in humans? Yes 100% and no 0%. The second question: Is the production of mycotoxins limited to several types of fungi, as there are more than 100 types of pathogenic fungi that have the ability to produce toxic compounds that cause pathological effects in humans? Yes 94.3% and No 5.7% The third question about which of the most famous fungal toxins is Aflatoxin? Yes 88.6% No 11.4%. The fourth question: What is the advantage of mycotoxins being their ability to resist heat to a degree? It is difficult for these toxins to be destroyed by traditional heat treatments used in cooking and manufacturing processes? Yes 85.1% and no 14.9%. The fifth question: do mycotoxins have a cumulative effect that does not appear quickly, but rather appears after 10-20 years of eating food contaminated with them? Yes 70.5% and no 29.5%. The sixth question: do mycotoxins differ depending on the type of growing mushroom, the food material, and the availability of conditions in terms of temperature, humidity, oxygen, and pH? Yes 93.1% and No 6.9%. Question 7: Most fungi are aerobic (use oxygen)? Yes 72.7% and no 27.3%. The eighth question is about mycotoxins. Are they a comprehensive group of toxins that can grow in nuts - grains - spices - dried fruits - coffee beans? Yes 83.3% and no 17%. The ninth question: It has been proven that some fungal toxins, including aflatoxin, which is one of the most important fungal toxins, lead to liver cancer, as it was found that there is a relationship linking some diseases and aflatoxin toxins, and one of these diseases is viral liver disease? Yes 82.8% and no 17.2%. The last question about the ways to avoid the risk of mycotoxins is: buying nuts as fresh as possible, ensuring that food is stored appropriately, and not keeping food for long periods? Yes 94.3% and no 5.7%.(table.no.1)(table.no.2)(figure.no.1).

Table.no.1: percentage of males and females

males	females
44.3%	55.7%

Table.no.2: the nationality of participtes

Saudi	Non-saudi
87.4%	12.6%

Figure No.1: the effect of mycotoxins(viral liver diseae) on human according to participtes

Yes	No
82.8%	17.2%

4. Conclusion:

Mycotoxins are capable of causing disease in humans. Yes, 100%. The production of mycotoxins is limited to several types of fungi, as there are more than 100 species of disease-causing fungi that have the ability to produce toxic compounds that cause disease effects in humans, 94.3%. The danger of mycotoxins lies in their ability to resist heat to a certain degree, and it is difficult to destroy these toxins with traditional heat treatments used in cooking and manufacturing processes, 85.1%. Mycotoxins have a cumulative effect that does not appear quickly, but rather appears after 10-20 years of eating food contaminated with them, 70.5%. Mycotoxins vary depending on the type of mushroom growing, the food material, and the availability of conditions in terms of temperature, humidity, oxygen, and pH, Yes 93.1%, most fungi are aerobic (use oxygen) 72.7%. Is it a comprehensive group of toxins that can grow in nuts - grains - spices - dried fruits - coffee beans? Yes, 83.3%, it has been proven that some fungal toxins, including aflatoxin, which is one of the most important fungal toxins, lead to liver cancer. It has also been shown that there is a relationship linking some diseases and aflatoxin toxins, one of which is: Are these diseases viral liver diseases, Yes 82.8%.

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