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Original Article

Effect of Lipidium darba Plant Powder on the Growth of Isolates of Fusarium spp and Inhibition of Their Ability to Produce Their Toxic Metabolites

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Abstract:- This study was conducted to detect the ability of Three species of Fusarium to produce Phytotoxic compounds, and to detect them by bioassay test, the detection of ability of Fusarium species experiment showed that Fusarium verticilliod , F. moilliforme and F. grameanarium had a significant efficiency in ratio of phyto toxin the leafs of Dutora plant deletereus: 67, 61 and 47 % frequently. Lipidium darba plant powder has a sginficant inhibition ratio to radial growth of pervious species: 33, 37 and 45 % frequently. Lipidium darba plant powder has achieved a significant reduction in the intensity of toxicity on the datura plant from the metabolites produced by the fungi by a percentage:46, 50 and 55 frequently.

Keywords: Lipidium darba, Plant

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Introduction:

The toxic metabolites produced by fungi are one of the important challenges facing food and feed production in human life (Miri et, al. 2020). The operations of detecting toxic fungal compounds and estimating their concentrations in food and feed are difficult operations because they are classified as stressful and costly and that take a period of time (Sweet . 2012). Therefore, research tends to find simple, easy and inexpensive means, and that biological tests are characterized by the aforementioned characteristics (Gwinner, 2021). The Datura plant has been used extensively in the pharmaceutical industries, and it was found that its leaves are very sensitive to the toxicity of the metabolic secretions of Fusarium species that produce mycotoxins under laboratory conditions (King. et, al 2018). Modern research has tended to rely on natural products and plant preparations to combat mycotoxins with food and feed (Chyad. 2017). Lipidium darba plant has long been known to be one of the plants used as an anti-bacterial and anti-fungal substance, and it has been used a lot in the pharmaceutical industries and in food products (Vasilakoglou. et.al, 2016). Fusarium spp are characterized by their high efficiency in secreting many metabolic products, such as extracellular enzymes,Mergan . 2024), It is also characterized by the production of many metabolites that are toxic to eukaryotic cells(Merjan et. al. 2023) The study aimed to evaluate the dry powder of the Lipidium darba plants in inhibiting the ability of selected isolates of Fusarium to produce its toxic metabolic compounds in vitro condition.

Material and Methods:

Fungal isolates collocation:

Samples of 250 gm of wheat barley corn were collected from the grain stores which are used to feed the poultry taken from Babil Governorate and placed in papers bags to transport into the microbiology of Biotechnology Labrotary. One hundred grains of each a kind of grain cereal namely rice, wheat, millet, sorghum, oats and corn were first surface sterilize by 1% chloral sterilizing solution, these grains were the scattered randomly on PDA plats and the later were incubated at 28 C for 5 days. The fungal isolates were cultured on PDA plates and then their types were determined by(Leslie and Summerell. 2006.

Plant Materials: Thus, the Lipidium darba plant part samples were transprocessed using a coffee grinder, in paper bags after leaving in the air to dry. Bernoulli state the samples collected were from a field sown with wheat. Fusarium spp. toxic metabolite detection using Datura stramonium leaves:To determine the toxic metabolite in Fusarium spp., datura stramonium leaf assay can be used. Identification of fungi All Fusarium isolates were cultured in Czapek's dox broth at 25°C for 21 days, which was then sterilised with the help of Buchner funnel and was stored in the refrigerator until the test was performed. Following harvesting and washing the fully developed plants of Dutora with leaves, the surface was sterile by culturing in Redial petri dishes. They plants were then irrigated with the filtrate broth of each of the fusarium isolate three times. Control treatment was also integrated in which diluted Czapek's dox was applied without any fungal isolate applied. Finally, after 24 hours of the treatment, the degree of phytotoxicity coefficient to the affected zones of the leaf lamina was estimated.

An experiment was carried out by pourd to es tablish the extent of growth inhibition of redia by the Lipidium darba plant powder towards the Fusarium isolates. This experiment took place by having 9 cm redial petri dishes that have 1% Lipidium darba plant powder incorporated. The same PDA medium however was left untreated without any addition of any agent and this was also established as a control. The diameters of each plat were measured as well as calculated after 5 days of the control treatment, when the agar plats were filled. On the utilization of Lipidium darba plant powder in reducing the phytotoxicity metabolite of Fusarium spp. was also investigated.

One percent Lipidium darba plant powder was prepared in Czapek's dox broth medium and 250 conical flasks were autoclaved for 20 minutes. Following that we, inoculated each flask with a different Fusarium isolate in triplicate manner. In the control, Czapek's dox broth was employed without any supplements. Raised at 28 Co. for each flask The Buchner funnel helped in scooping all the flasks in the filing. 24 hours later, percentage of phytotoxicity ratio by measuring the area of damaged part over the total leaf area was calculated. The plants were raised in a Controlled Environment inside petri dishes on filtrates broth of each fusarium isolate each done with 3 replications. Similarly, a comparative therapy was done on Czapek's dox broth medium without any isolate.

From the statistics standpoint, the experiments were performed on a Completes Random Design (CRD) with P>0. 5.

Means of the scores were obtained and for the comparison of the results least significant differences was used. D. L. S.

Results:

A number of fungal isolates were identified by MALDI TOF PCR to be of the following species: Various fungal species have been identified during the field inspection, as listed below: These are some of the varieties of Aspergillus; nigra, flavus, ochraceus, alternative, curvelaria. Notably, there are varieties of the organism namely; Fusarium oxysporum, Fusarium graminearum and Fusarium moniliform. Multifertum (F.) Aspergillus solani which is present in decaying vegetation, Fusarium verticillioides that is found in soil and decaying straw, and Varicella sp. This has resulted into emergence of several attempts to isolate Fusariu graminearum, Fusariu moniliform and Fusariu verticillioides, all types of fungus. This is why these fungus were the object of the several researches that followed it. The main purpose of this study was to evaluate the effectiveness of Datura stramonium leaves in the identification of tod, a toxic metabolite of Fusarium spp. Table 1 obtained indicates that mentioned metabolic secretions of all Fusarium species are umpteen times toxic to plants with z = 0, where again probability level is controlled with a very low level of 0 for the control treatment. The phytotoxicity ratio of the effect of Datura plant leaves was possible to evaluate early May.

Table 1. Phytotoxicity efficiency of *Fusarium* spp metabolic active compounds on dutora leaf plants.

Fusarium species	% phytotoxicity of Datura leaf
*F. graminearum**	47
F. moniliforme	61
F. verticillioides	67
Control treatment	0
L.S.D. $p \leq 0.05$	6. 286

- each value referring to three replication

Table 2 : radial growth of *Fusarium* spp inhibition by effect fo1% concentration of *Lipidium darba* plant powder

Fusarium species	% Radial growth inhibition
*F. graminearum**	45
F. moniliforme	37
F. verticillioides	33
Control treatment	0
L.S.D. $p \leq 0.05$	3. 531

- each value referring to three replication

Table 3: The effect of 1 % of *Lipidium darba* plant powder in the efficiency disruption producing of *Fusarium* spp active metabolic compounds.

Fusarium species	% phytotoxicity of Datura leaf
*F. graminearum**	21
F. moniliforme	33
F. verticillioides	33
Control treatment	0
L.S.D. $p \leq 0.05$	5. 175

- each value referring to three replication

In this case, the Fusarium verticillioides was the most phytotoxic of the three produced in this study though both the control group and the two species used as reference, were all phytotoxic to the datura leaf plant.

The results of redial growth of Fusarium isolates exposed to the plant powder known as Lipidium darba:The results of redial growth of Fusarium isolates exposed to the plant powder known as Lipidium darba:

In vitro development of Fusarium isolates in the presence of lipidium darba plant powder:In vitro development of Fusarium isolates in the presence of lipidium darba plant powder:

In a study presented in table 2, it was realised that the radial growth of Fusarium species on agar plates maybe reduced antagonistically by lipidium darba plant powder and at the same time generates fatal metabolites. Accordingly, Fusarium graminearum is the most sensitive fungus to a partial quantity of 1% powder Lipidium darba that suppresses the radial growth in 45 percent compared to the control treatment. F. fmoniliforme, and F. verticillioides germinated only when planted with 1% Lipidium darba powder it retarded the radial growth. Outcome of the research on the use of lipedium darba plant powder in the suppression of phytotoxicit metabolites by the Fusarium spp. are summarized in table 3. This clearly shows that the plant powder which was prepared by mixing it to form 1%, Czapek's dox broth removed the potency of all Fusarium spp. to create further metabolites of a poisonous nature.

Of all the types of bacteria exposed to 1% Lipidium darba plant power, F. graminearum was the most severely affected showing a toxicity level statistically significantly higher than the other types of bacteria and reducing its ability to produce toxic metabolites by 55% on an average. Comparing the control and the end of the experiment, F. verticillioides population density was reduced by 50% while that of F. moniliforme was reduced by 46%.

Discussion:

There is a negative conflict and competition between organisms as they fight for survival as the life conflict with other living beings indeed persists(Du. et, al. 2018), Most species of the fungus Fusarium contain non-ideal actions of parasitism to plants because it parasitically feeds on them to acquire food(Shovan. et, al . 2018). It has a high degree of mechanisms for causing death to the tissues of the host plant and these mechanisms are notorious, one of them is the plant toxins. (King. et, al 2018). Mycotaxins vary in how they affect the plant with the results found in research that has been presented to you showing howthe Lipidium darba plants can affect the Fusarium friars ability to produce mycotaxins on their own(Vasilakoglou. et. al, 2016) while, on the other side, the compounds had significance impact on the datura leaves. As indicated in section 3, toxic metabolism of the studied fungi Specify the author name, year of publication and the page number if the work has been published in a book or periodical Sources: Sharma et. al 2021

Conclusion:

- Many species of fungi of the Fusarium group are characterized by their high capacity for the synthesis of toxic metabolite with the name mycotoxins.
- Dutors leaf olant can could be used as a bioassay to provide an index of an infected area in order to detect fusarium toxic metabolic compounds.
- As powder of Lipidium darba plant, can be considered a good tool to damned the ability of species belonging to Fusarium fungus toxic compounds even in low concentration.

Recommendations:

- It is highly possible to incorporate Lipidium darba plant powder in an attempt to disorganise the production of Fusarium species mycotoxines. In food and feed.
- Further research has to be conducted on use of Lipidium darba plant in order to establish that How many other less rich active components can be harnessed to be developed as medications against mycotoxins of fungi.

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