Clinical Cancer Investigation Journal-ISSN: 2278-0513

Food Microbiology

A comparative investigation on egg yolk total antioxidant capacity relativities to mycotoxins DON

Abstract

DON is a member of the trichotomy family and is mainly produced by Fusarium. Consumption of food contaminated with DON can cause anorexia, nausea, and impaired immune function in various animals. The objective of this study is a comparative assay of egg yolk's total antioxidant capacity than to mycotoxins DON. Systems were performed by the the ELISA reader and test kit based on the kit guidances. Finally, the obtained information were analyzed with descriptive statistics and SPSS software (standard and mean deviation, contamination ratio), and a one-way analysis of variance. In the analysis of WIL COXON analysis, the mean DON values of total and P / P ((Z: -1.907 / Sig: 0.056), as well as the DON, mean of total Cub (Z: -3.660 / Sig: 0.000) were observed and the findings A similar statistical correlation can be seen between the statistical mean of total DON and the number of fatty acids measured.

Keywords: *trichotoxin, DON, egg yolk, Mycotoxins*

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Introduction

Trichotoxins are the most important mycotoxins produced by the mevalonate pathway, which in addition to the genus Fusarium are also produced by other genera of fungi such as myrtsium, Trichoderma, Trichotocium, and Cephalosporum.

Mycotoxins derived from cyclic polypeptides and their derivatives:

About mycotoxins derived from polycyclic peptides, we can mention Icelandic toxin, spore desmin, gliotoxin, and ergotamine. This group of toxins is produced following the addition of amino acids to micro silicon peptides or polysilicon compounds (8).

- Mycotoxins derived from amino acids and mevalonate:

Tryptophan and possibly other amino acids bind to a group of mevalonate-derived isoprene units to form amino acid and mevalonate-derived mycotoxins, producing toxins such as after and rockfortin (5).

Mycotoxins can enter the digestive system of humans and animals indirectly or directly. Indirect pollution of human and animal feed occurs when the feed is contaminated with toxin-producing fungi at some point in the production, storage, or processing process, and the mycotoxin produced will often be present in the ultimate product. pollution of grains and oilseeds is the main route for many mycotoxins to go into the animal and human food chain. Indirect pollution, food is polluted with toxin-generating fungi, and conditions are provided for the production of toxins by the fungus (12). Almost all human and animal foods are susceptible to fungal contamination at one stage of production, processing, transport, and storage. In developed countries, the possibility of toxin spread in food is minimized by removing toxic fungi from the food chain; however, this is usually not possible in most developing countries, and moldy foods such as cereals are often an unavoidable part of the daily diet. For example, in parts of South and East Asia to Africa, the prevalence of liver cancer is associated with the persistent presence of aflatoxins and a variety of Fusarium toxins (10). Undoubtedly, the consumption of food contaminated with mycotoxins by animals will be associated with the presence of these toxins in various tissues as well as animal products such as milk. In practice, all components of animal and human food will be exposed to fungal contamination over some time, and in this case, the nature and extent of contamination with the toxin-producing fungus will determine the presence or absence of the product. As mentioned in the previous sections, although the identification of infectious fungi in cases of mycotoxicosis outbreaks is of diagnostic value, a definitive conclusion will be required to identify and identify potential toxins or toxins (12-14).

Therefore, the importance of mycotoxins such as DON in the food chain and human consumption is very important and in this study, we have studied it.

Material and Methods

Materials in the test kit

Each kit constructed via the Dutch company Europroxima contains the following materials:

A 96-well microtiter (in 12 rows of 8) coated with antibody against DON. Seven vials containing DON solution with concentrations equal to:

0ng / ml (standard zero), (0313 (ng / ml), 0/0625 (ng / ml), 0/125 (ng / ml), (0/25 (ng / ml, 0.5 / ng / ml), 1 (ng / ml) of DON.

One vial of the conjugated solution is lyophilized An antibody vial in the form of lyophilization One vial of 12 ml substrate solution One 15 ml stopping solution vial containing normal sulfuric acid. A 20 ml solution vial to dilute the sample and standard solution. One solution vial with a carpet volume of 30 ml.

Preparation of reagents

Before starting the test, some of the ingredients fabricated and some are ready to usage. After washing, it has been concentrated 20 times and to use it, 2 ml of it must be diluted with 38 ml of distilled water and a new solution must be prepared for each use.

The buffer dilution is quadrupled and to use, 20 ml of it must be diluted with 60 ml of distilled water at room temperature and shaken vigorously. Conjugate solution and antibody solution are available in a lyophilized kit and to utilize, 4 ml of dilution buffer should be poured to them and shaken strongly, and keptin a dark location till utilize .The chromogenic substrate solution in the kit is ready to usage and should be kept at room temperature before usage.

Statistical analysis method

The obtained information were analyzed with SPSS software using descriptive statistics (standard and mean deviation, contamination ratio) and a one-way analysis of variance.

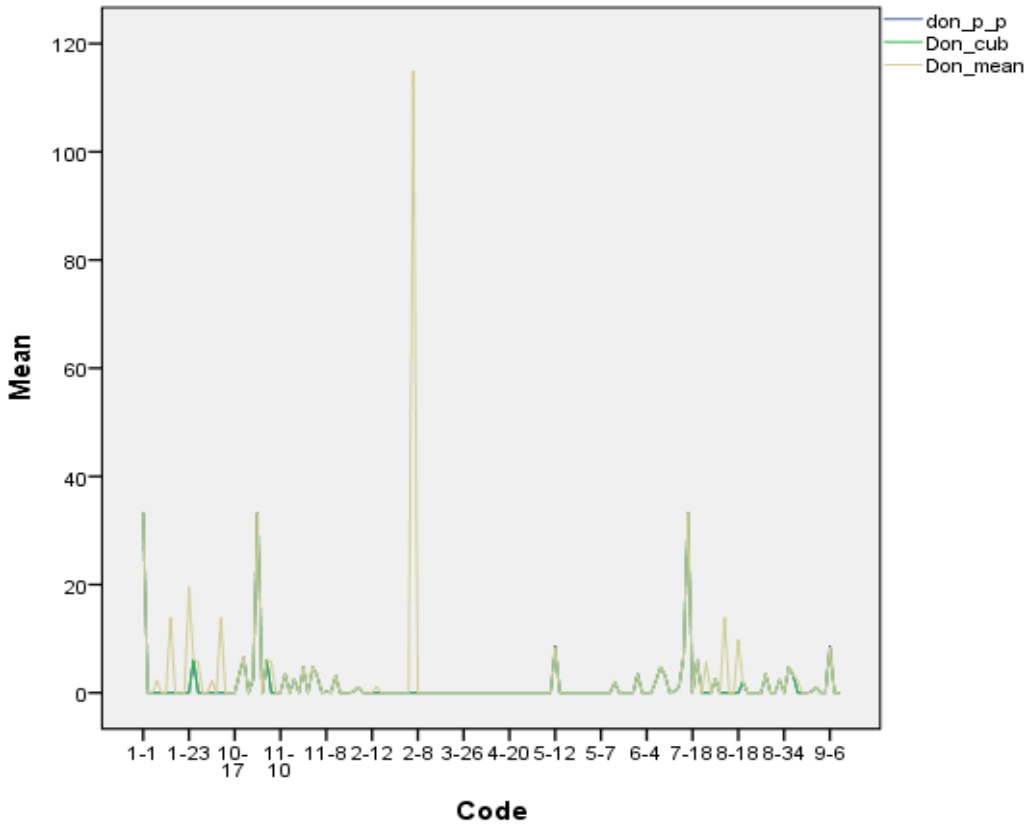
Results and Disscusion:

Investigation of the correlation among the measurement of Dioxinivalenone (DON) amounts and Pearson analysis

In the study of DON in all egg yolk samples, the least amount was 0.00 ppb and the utmost was 33.19 ppb in the p / p analysis also the least amountwas 0.00ppb and the utmost was 33.08 in the CUb analysis and the mean was 0.00 and utmost 114.84. The improved mean with 5% error (Trimmed mean 5%) of .5782 (P / P), .5789 (Cub), and 1.1312 demonstrated the average measured DON amounts (Figure 1-1)

The utmost DON values measured were 33.08-8.07 CUb in samples 90,122,60,118 and 1. Which include brands 7, 10, 5, 9, and 1. The lowest DON values measured were 0.00 in samples 153,150,147,145 and 154, which include brands 12,12,11,11 and 12.

Figure 1-1:Comparative Graphs of Mean Dioxy Niwalenone (DON) Values in Yolk systems obtained with the Study Brands according to Point, Point, Linear, and Cubic Function



The studies of the correlation among Pearson analysis and DON values by P / P and cub ways demonstrated a statistical correlation (PC: 1,000). This correlation amongst the average amount of total DON measured through P / P and Cub (PC: 0.415) was also statistically significant (Sig: 0.000). Hence, it can be concluded that with ignoring of the analysis and processing of amounts measured through the competitive indirect ELISA procedure, all information gained through various procedures of numerical functions in specifying the value of toxin will have the similar behavior in numerical analysis with statistical ways. This viewpoint was also observed in the analysis of WIL COXON analysis among DON values of total mean and P / P (Z: -1.907 / Sig: 0.056 and also DON mean of total Cub (Z: -3.660 / Sig: 0.000). Proves the above conclusion.

Statistical analysis of the correlation between all tested variables including the number of mycotoxins based on ppb and the amount of total antioxidant power based on nmol / g and ng / g, as well as the measured values of unsaturated fatty acids C24 - C14 per ppm (Table 1). Two-way Pearson correlation analysis showed that the amount of aflatoxin obtained based on p / p and ochratoxin analysis as well as DON was not statistically significant. And this feature between the amounts of aflatoxin, ochratoxin, and DON mycotoxins with cub analysis also lacks any statistical correlation. So in the statistical measurement of the mean of total aflatoxin, ochratoxin and DON has not always been observed as considerable correlation. Therefore, it can be derived that the occurrence and possibility of measuring the above-mentioned mycotoxins in the egg yolk samples of the study population are not dependent on each other and act independently of each other, and therefore should be used in the prevention, tracking, and selection protocols. Evaluation, laboratory, and analysis of preliminary data and findings of statistical analysis of these mycotoxin variables should be recognized independently and researched independently of each other.

Investigation of the correlation between the amounts of mycotoxins measured

Table 1: The mean value of total DON in comparison with the fatty acids measured has a statistically significant correlation.

a. **Wilcoxon signed ranks Test**
b. **Based on positive ranks**

	PL-C14-Don-mean	PL-C15-Don-mean	PL-C16-Don-mean	PL-C17-Don-mean	PL-C18-Don-mean	PL-C20-Don-mean	PL-C22-Don-mean	PL-C24- Don-mean
Z	-2.515[b]	-3.630[b]	-5.382[b]	-2.804[b]	-5.558[b]	-3.571[b]	-.018[b]	-3.959[b]
Asymp. Sig[a]. (2-tailed)	.012	.000	.000	.005	.000	.000	.985	.000

c. Based on negative ranks

C18>C16>C24>C20>C15>C17>C14>C22

To examine more closely any statistical correlation between the measured mycotoxins with changes in the amount of various fatty acids studied using Will Coxon analysis, it was found that the mean value of total aflatoxin has a disproportionate correlation with all fatty acids measured in the table below.

Table 2 shows the measured value of cub DON with C18, C16, and C22 fatty acids showing a statistically significant correlation**.**

Table 2 : The measured value of cub DON with C18, C16, and C22 fatty acids showing a statistically significant correlation

a. Wilcoxon signed ranks Test

b. Based on positive ranks

	PL-C14-Don-cub	PL-C15-Don-cub	PL-C16-Don-cub	PL-C17-Don-cub	PL-C18-Don-cub	PL-C20-Don-cub	PL-C22-Don-cub	PL-C24- Don-cub
Z	-.49[b]	-1.758[b]	-6.307[c]	-.447[b]	-6.889[c]	-1.119[b]	-2.202[c]	-1.868[b]
Asymp. Sig[a].(2-tailed)	.961	.079	.000	.655	.000	.263	.028	.062

c. Based on negative ranks

C18>C16C22

All studied fatty acids C14 to C24 found in HPLC measurements in non-parametric will Coxon test had a statistically significant correlation with each other that the degree of correlation between them varies depending on the number of carbons in the fatty acid chain and the number of unsaturated bonds (Table 3).

Table 3: All studied fatty acids C14 to C24 found in HPLC measurements in the non-parametric will Coxon test had a statistically considerable correlation with each other that the degree of correlation between them varies depending on the number of carbons in the fatty acid chain and the number of unsaturated bonds.

	Pl-c15-pl-c14	Pl-c16-pl-c14	Pl-c17-pl-c14	Pl-c18-pl-c14	Pl-c20-pl-c14	Pl-c22-pl-c14	Pl-c24-pl-c14	Pl-c16-pl-c15	Pl-c17-pl-c15	Pl-c18-pl-c15	Pl-c20-pl-c15	Pl-c22-pl-c15	Pl-c24-pl-c15	Pl-c17-pl-c16	Pl-c18-pl-c16	Pl-c20-pl-c16	Pl-c22-pl-c16	Pl-c24-pl-c16	Pl-c18-pl-c17	Pl-c20-pl-c17	Pl-c22-pl-c17	Pl-c24-pl-c17	Pl-c20-pl-c18	Pl-c22-pl-c18	Pl-c24-pl-c18	Pl-c22-pl-c20	Pl-c24-pl-c20

Z																											
Asymp. Sig.(2-tailed)	-5.278[b] .000	-7.965[c] .000	-2.063[b] .039	-7.505[c] .000	-3.119[b] .002	-7.425[c] .000	-3.179[b] .001	-7.428[c] .000	-4.950[c] .000	-7.456[c] .000	-3.994[c] .000	-6.134[c] .000	-3.244[c] .001	-7.965[b] .000	-.899[c] .368	-8.048[b] .000	-7.025[b] .000	-8.092[b] .000	-8.161[c] .000	-1.618[b] .106	-7.548[c] .000	-3.899[b] .000	-8.066[b] .000	-6.930[b] .000	-8.148[b] .000	-7.950[c] .000	-1.436[b] .151

a. Wilcoxon signed ranks Test

b. Based on positive ranks

c. Based on negative ranks

The correlations among C18 and C24 Z: 8.148, C16 and C24 Z: 8.092, C18 and C20 Z: 8.066, C16 and C20 Z: 8.048, followed by these fatty acids in the second category C16 and C17 Z: 7.965, C22 and C20 Z: 7.950, C16 and C22 Z: 7.025 were in the second category of correlation with each other. And in the third category, the correlations of C14 and C15 Z: 5.278, C14 and C24 Z: 3.179, C14 and C20 Z: 3.119, and C14 and C17 Z: 2.063 were statistically significant.

To reduce the damage caused by fungal toxins in humans, prevention of fungal contamination and consequently the production of mycotoxins in agricultural products is the best solution because the elimination of mycotoxins in high volume foods used in livestock farming is very difficult and costly. For this purpose, measures such as having a proper planning table for harvesting agricultural products, reducing the moisture content of grains after harvest and during storage, storing crops as low as possible, controlling insect infestation, removing contaminated grains and. .. recommended (5).The lowest DON values measured were 0.00 in samples 153,150,147,145 and 154, which include brands 12,12,11,11 and 12.

Examination of aflatoxin residues in chicken eggs found in supermarkets has shown that not all eggs contain aflatoxin residues and only a percentage of eggs may have aflatoxin residues (56). The improved mean with 5% error (Trimmed mean 5%) at 20.2965 (P / P), 24.1445 (Cub), and 14.8137 demonstrated the average measured aflatoxin amounts. The mean was 29.34 and the utmost was 239.95. The developed average with a 5% error (Trimmed mean 5%) at 114. 294 (P / P), 108.5811 (cub), and 111.6994 demonstrated the average measured amounts of ochratoxin. The mean was 0.00 and the utmost was 114.84. The developed average with 5% error (Trimmed mean 5%) of .5782 (P / P), .5789 (Cub), and 1.1312 demonstarted the average measured DON amounts.

Thus, in addition to being consistent with the findings that mycotoxins, especially deoxy novalenones, significantly increase TAC susceptibility and the profile of yolk fatty acids, our study also demonstrates that this separate combination of "systems "Alters lipid metabolism in such animals. This is the first report to show altered lipid metabolic patterns in eggs. These effects created patterns similar to the patterns of a toxic combination of mycotoxins that interfere with lipid metabolism." 99)

This is because DON, contaminated diets, like commercial poultry diets, are widely consumed by humans.

Conclusion.

Diets contaminated with Deoxynivalenone (DON), such as commercial poultry diets, are widely consumed by humans. They are affected by interfering metabolism and negatively affect the oxidative power of yolks. Further research on several doses of these compounds and research in other animal models may be necessary to substantiate these findings, especially in the animal model of mammals. DON is a member of the trichotomy family and is mainly produced by Fusarium. Consumption of food contaminated with DON can cause anorexia, nausea, and impaired immune function in various animals. The objective of this study is a comparative assay of egg yolk's total antioxidant capacity than to mycotoxins DON. Systems were performed by the the ELISA reader and test kit based on the kit guidances. Finally, the obtained information were analyzed with descriptive statistics and SPSS software (standard and mean deviation, contamination ratio), and a one-way analysis of variance. In the analysis of WIL COXON analysis, the mean DON values of total and P / P ((Z: -1.907 / Sig: 0.056), as well as the DON, mean of total Cub (Z: -3.660 / Sig: 0.000) were observed and the findings A similar statistical correlation can be seen between the statistical mean of total DON and the number of fatty acids measured.

ACKNOWLEDGEMENTS

With special thanks to The Research and Technology deputy of the Islamic Azad University, Mahajan branch.

Conflict of interest

The authors declare that there is no conflict of interest.

Ethical statement: None

Financial support: None

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