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Oğuzeli Bölgesinde (Barak Ovasi) Dolmalik Biber ve Patlican Kurusu Üretiminde Aflatoksin Oluşumunun Belirlenmesi

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Araştırma Makalesi

Determination of Aflatoxin Formation in the Production of Dried Pepper and Aubergine in Oğuzeli Region (Barak Plain)

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Anahtar Kelimeler

Kurutulmuş dolmalık biber
Kurutulmuş patlıcan
Kurutma
Aflatoksin
HPLC

Abstract

In this research, aflatoxin (Aflatoxin B1 and total) content produced by *Aspergillus flavus* was determined in samples of dried bell peppers and aubergines cultivated in Oğuzeli District (Barak Plain) of Gaziantep Province and traditionally produced by drying in open air drying hangers. For this purpose, 10 farmers have been selected in the Oğuzeli District (Barak Plain), samples were taken in the washing, stem and seed sorting, stringing to drying ropes, drying and final product stages of the production processes of dried bell pepper and aubergine; and these samples were analyzed to determine the presence and occurrence of aflatoxin (Aflatoxin B1 and total). Aflatoxin was not detected in any of the analyzes made with the HPLC system on the samples taken from the drying production steps for analysis. In addition to the aflatoxin analyzes, water activity (Aubergine 0.32, Pepper 0.33), water content (Aubergine %9, Pepper %11) and color analysis were made in all samples for determining the effect of drying on the products.

Oğuzeli Bölgesinde (Barak Ovasi) Dolmalik Biber ve Patlican Kurusu Üretiminde Aflatoksin Oluşumunun Belirlenmesi

Öz

Bu araştırma kapsamında Gaziantep ili Oğuzeli ilçesi (Barak Ovası)'nde yetiştirilen ve geleneksel olarak açık havada kurutma askılarında kurutularak üretilen dolmalık biber ve patlıcan kurusu üretiminde hammaddeden son ürüne kadar kurutma aşamalarından alınan örneklerin Aspergillus flavus tarafından üretilen aflatoksin (Aflatoksin B1 ve toplam) içeriğini tespit etmeye yönelik çalışma yapılmıştır. Bu amaçla Oğuzeli ilçesi (Barak Ovası)'nde üretim yapan çiftçiler arasından seçilen 10 çiftçiden dolmalık biber ve patlıcan kurusu üretim işleminin; yıkama, sap ve tohum ayıklama, ipe dizme, kurutmaya serme ve son ürün aşamalarında örnekler alınarak aflatoksin (Aflatoksin B1 ve toplam) varlığı ve hangi aşamada oluştuğunun belirlenmesi için analizler yapılmıştır. HPLC ile analizi yapılan örneklerin hiçbirinde aflatoksin varlığı tespit edilememiştir. Alınan örneklerde aflatoksin analizlerinin yanı sıra kurutmanın ürün üzerindeki değişiminin belirlenmesi amacı ile su aktivitesi (Patlıcan 0.32, Biber ise 0.33), nem miktarı (Patlıcan %9, Biber %11) ve renk analizleri de yapılmıştır.

1. INTRODUCTION (GİRİŞ)

Pepper plant; is the most consumed species of vegetable both in the world and in our country. Pepper with hot climatic vegetables is perennial in one-year plant tropical regions [1]. Aubergines is thought to be carried to our country during the commercial activities carried out through the Silk Road. Aubergines is perennial in tropical regions as well as pepper, while other climate changes are a one-year plant [2].

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One of the oldest methods used in the preservation of food is drying. It is based on the principle of removing free water from food and terminating the microbial growth. This method, which is used under the sun, is most commonly used because of the short shelf life of fruits and vegetables both due to the prevention of economic losses during the harvest period and its use in later periods.

The drying method applied to fruits and vegetables has many advantages. Since a volumetric and mass decrease occurs, convenience and economic gain can be achieved in transport and storage processes. Drying plant installation cost is lower than other conservation techniques [3]. Disadvantages can not be applied climate effectively in high moisture areas. The most important problem is contamination by many factors such as dust, micelle, gas emissions, insects, and birds due to the operation of the process. Under these circumstances, the products dried sufficiently dry or mold and yeast developed under unfavorable storage conditions [4].

In case of drying and storage deterioration, mycotoxin formation is observed. The most important and common of these mycotoxins are aflatoxins. In addition to the toxic effect of aflatoxins on living things, it has also been determined that there are also strong carcinogenic substances [5, 6].

Aflatoxin is generally called the secondary metabolite (mycotoxin), which is created by fungi and has a toxic effect on living things [7]. Aflatoxins are produced in or on food by certain molds like *Aspergillus flavus* and *Aspergillus parasiticus*. 18 different aflatoxins were detected in foods. The most important are aflatoxin (Figure 1) B1, B2, G1, G2 [8].

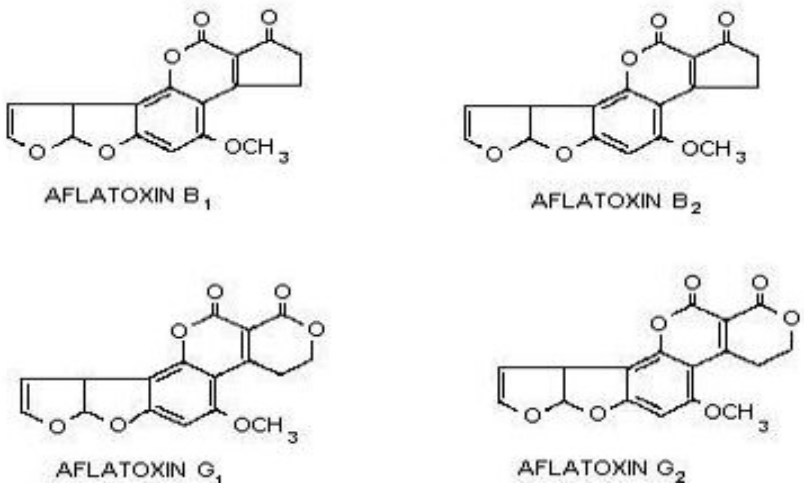


Figure 1. *Chemical Structure of Aflatoxins* [7]

It is seen that the production of dried vegetables in our country is concentrated in the Aegean Region. The dried vegetables are mainly tomatoes, mushrooms, okra, aubergines, peppers, beans, zucchini, onions, leeks, and garlic [9].

In the Southeastern Anatolia Region, especially in the Oğuzeli district (Barak Plain), each household commonly produces stuffed aubergines and dried peppers by hanging them on the balconies and roofs of the houses in amounts to meet their own consumption needs during the harvest period. However, commercially, a very large amount of stuffed aubergines and dried peppers are produced by hanging them on pedestal hangers in the fields, in production areas.

Production of bell pepper and dried aubergines show similar characteristics as process steps. In general, vegetables are collected in the form of picking, selection, washing, seed extraction, stringing, and hanging on drying hangers [10]. During these processes, the dried vegetables should be prevented from contacting the soil as much as possible, and the preliminary processes should be completed as soon as possible and hung on the drying hangers.

This study aims to examine certain variables in the production of bell pepper and dried aubergines, which is widely applied in Oğuzeli region, to determine the stage of formation and to make evaluations about the reasons case the presence of aflatoxin is observed in the products obtained.

2. MATERIALS AND METHODS (MATERYAL VE YÖNTEM)

Material

The stuffed aubergines and peppers used as materials in this study were taken from 10 different farmers producing in Oğuzeli District. Water activity, moisture content and color analyses were made separately for each day of the drying phase, starting from the day the products were first collected. In order to determine the amount of aflatoxin, samples were stored daily at -18ºC and HPLC analyses were applied with the final product taken.

Method

*Production processes***:** Peppers and aubergines, whose seed part is removed, are strung on cotton threads with the help of needles, adjusted so that there are approximately 30 peppers or aubergines on each thread, then tied on drying hangers made of wood at both ends and waited for drying. While the drying time is 2-3 days for aubergines, this period is 7-9 days for peppers.

Analyzes

Determination of dry matter: aubergines and pepper samples, which were brought to the desired size for the amount of dry matter, were weighed before drying and dried in glass containers in a vacuum oven at 70 °C under 100 mmHg pressure until they reached a constant weight (24 hours) [11].

*Water activity***:** After the samples were cut to the desired size for the determination of water activity, they were placed in the plastic reservoir of the Novasina brand (Switzerland) table-type water activity device and direct measurement was made.

*Color determination***:** Colors of all samples were analyzed according to Hunter color scale by using Lovibond (USA) brand color analyzer and Hunter L*, a* and b* color values were determined.

Aflatoxin determination: SHIMADZU brand HPLC device was used according to AOAC.997.07 [12] method in aflatoxin analysis.

Tools and equipment used

- High performance liquid chromatography (HPLC)
- SHIMADZU LC-20AD HPLC Pump
- SHIMADZU SIL-20ADHT Auto Sample
- SHIMADZU RF-10AXL Fluorescence detector(FLD)
- SHIMADZU CTO-20AC COLUMN Oven
- Computer and software (HP, LCsolution)
- HPLC column (ODS3 -250 mm-5µm- 4.6 mm)
- Differentiation Device (Kobra Cell)
- Microfiber Glass Filter Mobile Phase Filtering Apparatus
- Automatic Pipette (0-1 mL, 10-100 µl and 5 mL)

Immunoaffinity column derivatization device (cobra cell): Derivatization process was performed to detect very low amounts of aflatoxins found in ppb level in foods.

Aflatoxin B1, B2, G1, G2 standard: Supelco Aflatoxin Mix Kit-M Cat. no. 46300U is a certified mix standard with a concentration of 2694ng/mL, consisting of 5 ampoules of 1 mL each. Each ampoule contains 1007 ng/mL B1, 286 ng/mL B2, 1071 ng/mL G1, 330 ng/mL G2.

PBS preparation: PBS tablets were used as ready (1 tablet dissolved in 100 mL distilled water). It was stored below 25°C.

Preparation of hplc mobile phase: Pure water/ACN/MeOH (600:200:300 / v:v:v) mixture was prepared. 120 mg KBr and 350 ML 4N Nitric Acid per liter of the solution were added and filtered using 0.45 micron porous filter paper before use.

Preparation of aflatoxin B1, B2, G1, G2 standards: A certified ready-mix standard with a certain concentration was used. Stored at 2-8°C, out of sunlight. II. Preparation of Stage Standard Solution: One of the ampoules was broken and 1 mL of aflatoxin standard was transferred to a 10 mL Bolon jug and 9 mL of methanol was added on it.

Preparation of calibration standards: To prepare this, II. 90 µl of the step standard was transferred to a 2.5 ml flask, 910 µl of methanol and 1.5 ml of ultrapure water were added and mixed well. Afterwards, the mixture in the flask was transferred to the vial and read as the calibration standard of the device in 20, 40, 60, 80 and 100 µl injections. A 5-point calibration curve was drawn with the created calibration table, and the correlation coefficient was ensured to be at least 0.999.

Analysis process: The analysis process consists of extraction, immunoaffinity and injection stages. In the extraction process; 50 g sample was weighed on a balance with 0.01 g precision in a 1000 mL blender container, 5 g NaCl was added, and 300 ml of 80% MeOH was added. It was mixed at high speed for 5 minutes and filtered through Whatman No: 4 filter paper. 10 mL of the filtrate was taken and 60 mL of PBS solution was added on it to mix.

In the injection phase: Before the samples were injected into the device, the calibration curve was checked using the standard solution we prepared. 100 mL injections were made from each sample 2 times.

Calculation: First, the dilution factor is calculated. 50 g of sample was diluted to 300 mL and 10 mL of this mixture was taken and 60 mL of PBS was added. 70 mL was passed through the immunoaffinity column, and a 2.5 mL balloon was taken into a jug. After the volume was completed, it was taken into a vial and injected into the device, and 100 µl was injected. The aflatoxin values obtained during the drying stages were calculated on the dry matter. In addition, recovery rates were added to the aflatoxin values (B1 and Total Aflatoxin) of the samples. Recovery rate; 93.59 for aflatoxin B1; It is 92.93% for total Aflatoxin.

Statistical analysis: Analysis were applied in three independent samples and all determinations were performed in triplicate in each taken sample. Statistical analyses were done with the SPSS program (Version 20, Chicago, IL, USA) and the difference between dried samples was determined using Duncan's multiple range test. Results were expressed as the average ± standard deviation.

3. RESULTS AND DISCUSSION (BULGULAR VE TARTIŞMA)

In this research, which was carried out on the production of bell pepper and dried aubergine, the presence of aflatoxin and the stage at which it was formed were tried to be determined by taking samples from each stage in the process of collecting these products, which are traditionally produced in Gaziantep province Oğuzeli district, from the field to the processing of the final product. In this context, aflatoxin analyzes of the samples were made in Şanlıurfa Food Control Laboratory.

One of the most important factors on the formation of aflatoxin is the amount of moisture. As long as the humidity is not reduced to appropriate levels by effective drying, the risk of mold and aflatoxin formation in the products will increase. However, one of the possible risks in the formation of aflatoxin is high water activity values. For this reason, dry matter determination, water activity and color analyzes were made in the samples taken within the scope of our study, as well as aflatoxin analyses.

Dry matter determination

Dry matter changes of the samples in the drying of stuffed aubergines and pepper are given in Table 1 and Table 2. As can be seen in Figure 2, while the aubergines samples were dried in 3 days due to the structural features and the processes applied before drying, the pepper samples reached the desired dry matter ratio (90%) in 8 days.

Table 1. *Dry Matter Values of Dried Aubergine Samples (%)*

Sample No	Drying days		
	1.	2.	3.
1	11.15±0.03a*	24.21±0.05a	89.08±0.03a
2	12.60±0.03b	38.52±0.03b	90.92±0.03a
3	12.13±0.05a	49.28±0.05c	91.29±0.04a
4	14.09±0.07b	42.86±0.04b	89.88±0.02a
5	14.51±0.05c	37.76±0.06b	91.86±0.03a
6	10.15±0.04a	28.85±0.06a	90.39±0.04a
7	15.65±0.02c	47.60±0.05c	92.07±0.05a
8	10.45±0.06a	42.06±0.04b	90.68±0.01a
9	15.97±0.08c	52.13±0.03c	91.13±0.03a
10	11.75±0.05a	40.20±0.06b	91.27±0.04a
Avg.	12.84±0.05	40.35±0.05	90.86±0.03

*Values are mean± SD, (n=3).

Results followed by the same letter (a–c) in the same column are not statistically different at P<0.05.

Table 2*. Dry Matter Values of Dried Pepper Samples (%)*

sample No	Drying days							
	1.	2.	3.	4.	5.	6.	7.	8.
1	8.41±0.09c*	9.36±0.07b	11.82±0.09a	13.72±0.06a	26.44±0.06b	51.46±0.05b	69.56±0.04a	88.30±0.04a
2	7.85±0.09c	9.66±0.08b	16.11±0.07b	15.81±0.05b	23.34±0.05a	49.86±0.04a	67.43±0.06a	93.32±0.03b
3	6.70±0.07a	7.59±0.07a	18.76±0.07b	21.01±0.06d	22.72±0.04a	49.25±0.05a	67.46±0.05a	86.09±0.04a
4	5.73±0.08a	11.70±0.08c	13.92±0.06a	15.27±0.06b	35.58±0.06c	53.43±0.05b	69.75±0.04b	85.88±0.02a
5	7.19±0.07b	6.84±0.07a	15.98±0.08b	20.83±0.05d	24.49±0.07b	49.12±0.03a	68.42±0.04a	86.66±0.04a
6	6.04±0.06a	11.17±0.06c	17.49±0.08b	29.00±0.07d	27.87±0.04b	50.76±0.04b	69.94±0.03b	89.65±0.05a
7	6.95±0.08b	10.71±0.05c	16.17±0.07b	16.13±0.06b	35.64±0.06c	54.42±0.05b	70.01±0.06b	89.83±0.03a
8	6.07±0.06a	9.94±0.09b	20.70±0.09c	15.96±0.07b	18.71±0.05a	47.63±0.04a	68.94±0.04a	88.59±0.02a
9	7.23±0.07b	12.15±0.08d	12.56±0.05a	18.29±0.05c	26.88±0.06b	49.16±0.06a	68.73±0.04a	87.97±0.04a
10	7.63±0.09b	11.45±0.07c	24.43±0.04c	15.45±0.06b	33.62±0.07c	49.79±0.05a	69.43±0.05a	89.97±0.03a
Avg.	6.98±0.08	10.06±0.07	16.80±0.07	18.15±0.06	27.53±0.06	50.49±0.05	86.97±0.04	88.60±0.03

*Values are mean± SD, (n=3).

Results followed by the same letter (a–d) in the same column are not statistically different at P<0.05.

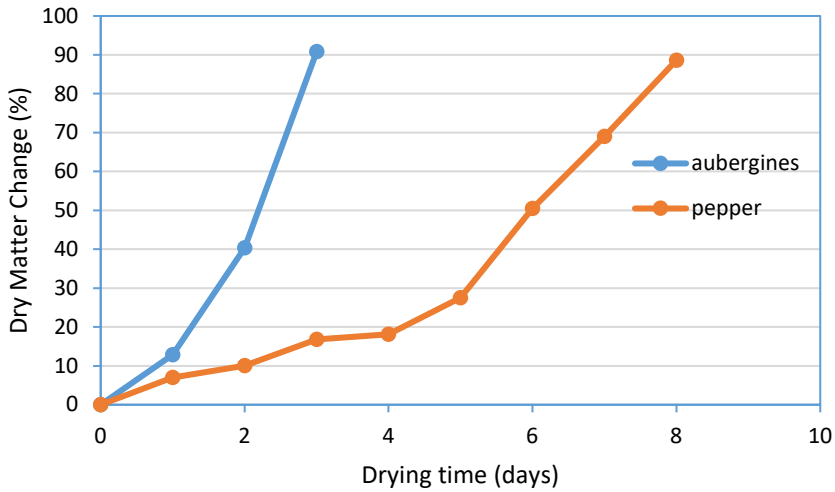


Figure. 2. *Average Dry Matter Exchange Rates of Dried Aubergines and Peppers.*

Water activity

The changes in water activity of the samples during the drying of stuffed aubergines and pepper are given in Table 3 and Table 4. As seen in Figure 3, the average water activity (aw) in aubergines samples was 0.32 after 3 days, while this value was 0.34 when pepper samples completed 8 days.

Table 3. Changes in water activity values of Dried aubergines Samples (aw)

sample No	Drying days		
	1.	2.	3.
1	0.97±0.01a*	0.97±0.03b	0.36±0.02c
2	0.97±0.01a	0.95±0.02b	0.33±0.01b
3	0.95±0.03a	0.97±0.03b	0.37±0.03c
4	0.98±0.02a	0.94±0.05b	0.31±0.04b
5	0.96±0.03a	0.91±0.01a	0.30±0.03a
6	0.97±0.06a	0.94±0.07b	0.28±0.02a
7	0.96±0.02a	0.95±0.01b	0.33±0.05b
8	0.98±0.01a	0.99±0.06c	0.33±0.03b
9	0.97±0.08a	0.96±0.06b	0.32±0.02b
10	0.96±0.08a	0.95±0.03b	0.30±0.01a
Avg.	0,96±0,03	0,95±0,04	0,32±0,03

*Values are mean± SD, (n=3).

Results followed by the same letter (a–c) in the same column are not statistically different at P<0.05

Table 4. *Changes in Water Activity Values of Dried Pepper Samples (aw)*

sample No	Drying days							
	1.	2.	3.	4.	5.	6.	7.	8.
1	0.97±0.01a*	0.96±0.02a	0.97±0.02b	0.97±0.01a	0.86±0.02a	0.70±0.01a	0.37±0.01a	0.34±0.01a
2	0.97±0.06a	0.97±0.06a	0.95±0.05b	0.97±0.04a	0.86±0.06a	0.71±0.06a	0.37±0.05a	0.33±0.06a
3	0.97±0.02a	0.97±0.01a	0.95±0.02b	0.97±0.02a	0.84±0.02a	0.72±0.02a	0.38±0.03a	0.34±0.02a
4	0.98±0.01a	0.98±0.01a	0.96±0.05b	0.97±0.02a	0.84±0.02a	0.74±0.03b	0.37±0.01a	0.34±0.02a
5	0.97±0.08a	0.96±0.05a	0.94±0.07a	0.98±0.06a	0.86±0.05a	0.74±0.03b	0.37±0.05a	0.33±0.06a
6	0.97±0.04a	0.97±0.04a	0.95±0.02b	0.97±0.03a	0.85±0.04a	0.75±0.03b	0.36±0.01a	0.34±0.03a
7	0.98±0.02a	0.96±0.05a	0.94±0.04a	0.97±0.04a	0.84±0.04a	0.72±0.02a	0.37±0.01a	0.34±0.03a
8	0.97±0.02a	0.97±0.02a	0.96±0.05b	0.97±0.02a	0.86±0.03a	0.76±0.06b	0.37±0.02a	0.34±0.03a
9	0.98±0.06a	0.97±0.08a	0.96±0.06b	0.97±0.05a	0.85±0.03a	0.71±0.03a	0.37±0.01a	0.33±0.02a
10	0.97±0.05a	0.95±0.06a	0.95±0.05b	0.97±0.05a	0.85±0.06a	0.75±0.02b	0.37±0.04a	0.34±0.01a
Avg.	0,97±0,03	0,96±0,04	0,95±0,04	0,97±0,03	0,85±0,03	0,73±0,03	0,37±0,03	0,33±0,03

*Values are mean± SD, (n=3).

Results followed by the same letter (a,b) in the same column are not statistically different at P<0.05

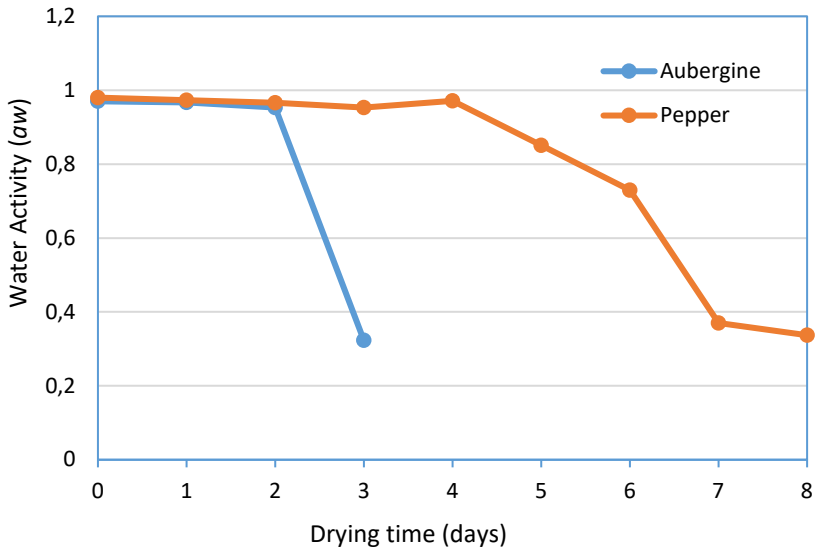


Figure 3. *Average Water Activity Values of Dried aubergines and Peppers*

Color determination

As can be seen from the data in Table 5, in the color analyzes of the Round aubergines samples made with the Hunterlab device, a small decrease in L* values from the first day to the last drying day indicates the dulling in the product color. The change in a* values shows that there is a decrease in the redness values of aubergines while drying.

Table 5. *Color (L*, a*, b*) Values of aubergines Samples on the First and Last Days of Drying*

NO	L		a		b	
	First day	Last Day	First day	Last Day	First day	Last Day
1	42.63±0.28c*	38.83±0.31b	8.46±0.17a	1.85±0.19b	1.99±0.19c	-0.04±0.12b
2	42.72±0.19c	34.93±0.41a	9.72±0.13b	1.44±0.31b	3.19±0.11c	-1.80±0.22b
3	36.05±0.21b	34.75±0.35a	7.89±0.19a	1.45±0.23b	-0.41±0.09b	-0.80±0.27b
4	30.41±0.23a	34.28±0.31a	9.89±0.23b	1.81±0.26b	0.24±0.19b	-1.10±0.19b
5	35.98±0.19b	32.40±0.29a	8.64±0.25a	1.54±0.31b	-1.04±0.24b	-1.02±0.18b
6	39.43±0.28c	36.75±0.43b	8.98±0.28a	1.66±0.34b	2.79±0.23c	-1.45±0.26b
7	41.93±0.21c	36.10±0.34b	11.15±0.19c	1.81±0.27b	-0.47±0.12b	-1.70±0.24b
8	40.72±0.13c	38.67±0.45b	12.30±0.11c	1.20±0.37a	0.22±0.16b	-4.20±0.24a
9	39.61±0.18c	33.50±0.24a	8.49±0.11a	1.79±0.19b	2.04±0.14c	-1.21±0.17b
10	44.10±0.21c	37.74±0.29b	8.94±0.15a	1.52±0.27b	-3.24±0.13a	-1.21±0.17b

*Values are mean± SD, (n=3).

Results followed by the same letter (a–c) in the same column are not statistically different at P<0.05

Color analysis results in drying of bell pepper samples are given in Table 6. The fact that the color of the bell peppers darkens and becomes dull at a certain rate during drying can be explained by the decrease in L* values. The a* values, which were negative on the first drying day, turned to positive values on the last drying day. This change in the a* color value of the dried pepper samples indicates that there is a significant change from green to red in the pepper during the drying process.

Table 6. *Color (L*, a*, b*) Values of Pepper Samples on the First and Last Days of Drying*

NO	L		a		b	
	First day	Last day	First day	Last day	First day	Last day
1	44.14±0.19a*	43.51±0.23c	-6.17±0.13a	17.48±0.35c	22.33±0.11b	15.56±0.24d
2	46.67±0.20a	39.34±0.46b	-5.23±0.18a	7.18±0.32a	22.57±0.09b	15.79±0.26d
3	45.59±0.18a	35.88±0.37a	-6.57±0.17a	16.07±0.42c	21.53±0.14b	10.20±0.18b
4	45.80±0.12a	41.25±0.72c	-6.20±0.28a	9.10±0.51a	23.74±0.16b	9.65 ±0.32b
5	43.96±0.09a	37.18±0.31b	-6.85±0.23b	15.60±0.24c	17.94±0.17a	7.55 ±0.29a
6	45.53±0.13a	35.76±0.53a	-7.10±0.27b	12.75±0.41b	27.93±0.10c	6.65 ±0.21a
7	50.31±0.19b	36.85±0.24b	-4.81±0.11a	17.48±0.23c	29.19±0.18c	7.40 ±0.20a
8	45.75±0.31a	40.48±0.36b	-5.43±0.18a	17.35±0.29c	18.00±0.18a	6.08 ±0.22a
9	42.52±0.08a	37.99±0.41b	-5.03±0.16a	21.70±0.32d	20.50±0.13b	11.80±0.23c
10	44.28±0.16a	34.28±0.28a	-6.49±0.18a	15.70±0.27c	18.49±0.18a	8.45 ±0.31b

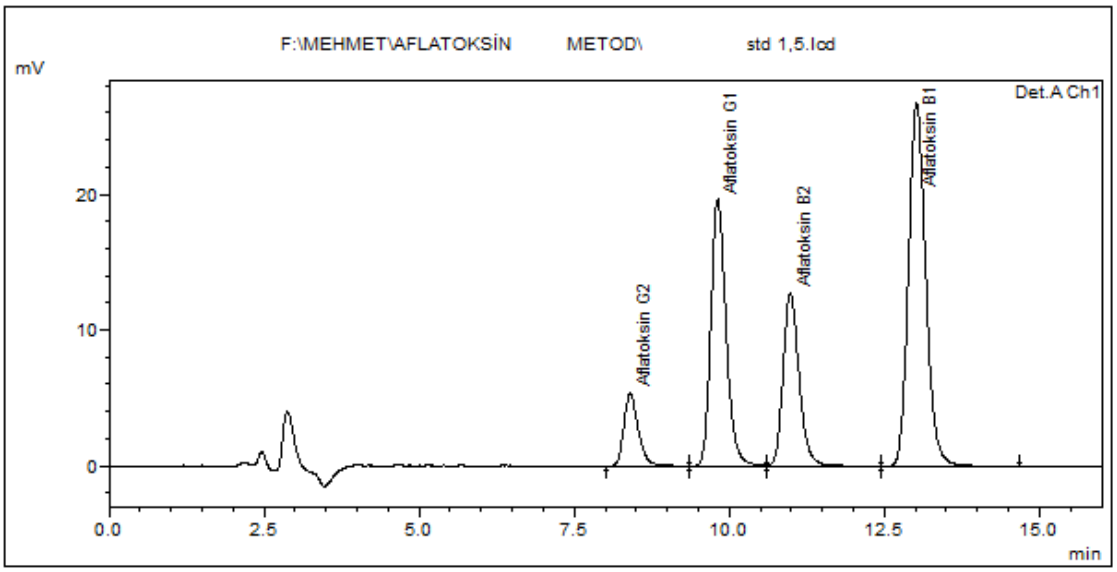
*Values are mean± SD, (n=3).

Results followed by the same letter (a–d) in the same column are not statistically different at P<0.05

Aflatoxin Determination

In this study, aflatoxin analyzes were made for dried aubergines and pepper samples at every stage of drying, starting from the fresh product on the first day.

Before the aflatoxin (B1, B2 and total) analyzes by HPLC, aflatoxin standards were prepared and standard chromatograms were obtained and measured. The chromatogram of the aflatoxin standard given to the device for the preparation of the standard calibration chart
is given in Figure 4.



PeakTable

Detector A Ch1 360nm - 430nm

Peak#	Ret. Time	Area	Height	Name	Conc.	Units
1	8.400	89084	5377	Aflatoksin G2	0.375	ug/kg
2	9.810	338132	19651	Aflatoksin G1	1.496	ug/kg
3	10.982	232170	12810	Aflatoksin B2	0.372	ug/kg
4	13.015	519854	26786	Aflatoksin B1	1.493	ug/kg
Total		1179240	64625			

Figure 4. *Chromatogram of aflatoxin standards*

Aflatoxin (B1, B2 and total) could not be detected in any of the analyzes performed on the samples during the drying of the stuffed aubergines and peppers. Selected 2 chromatographs of pepper and aubergines samples analyzed below are added. Figure 5 shows the aflatoxin chromatogram obtained on the 8th day for

the dried pepper sample, and the aflatoxin chromatogram obtained on the 3rd day for the dried aubergines sample in Figure 6. These results indicate that aflatoxins did not occur in bell peppers and aubergines in the drying processes carried out above the ground and hanging with a string in Gaziantep/Oguzeli region.

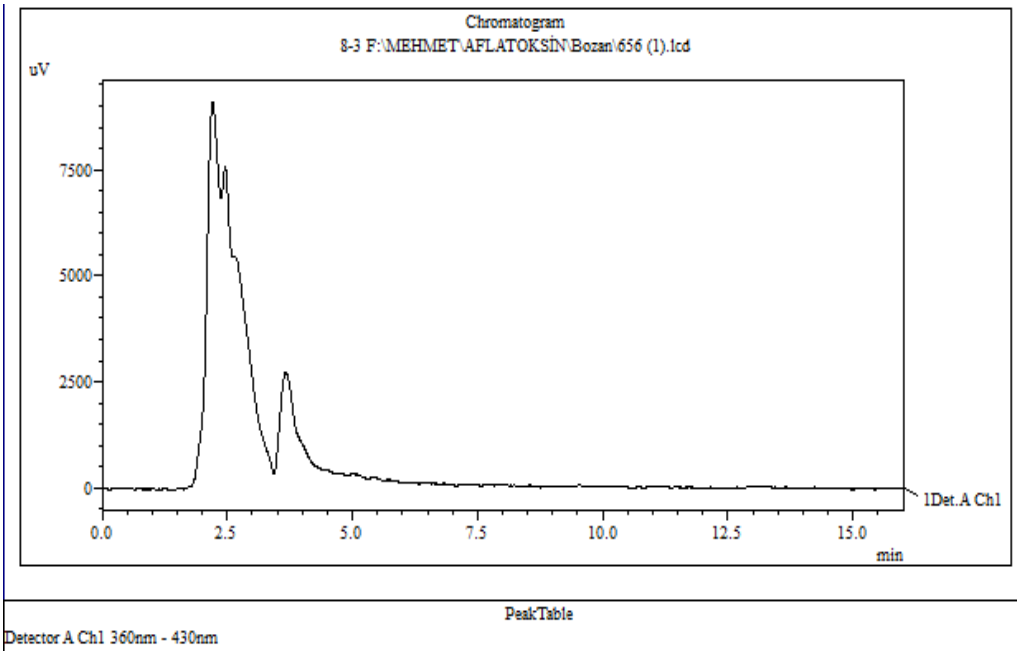


Figure 5. *Aflatoxin analysis chromatogram for pepper sample 3 on the 8th day of drying*

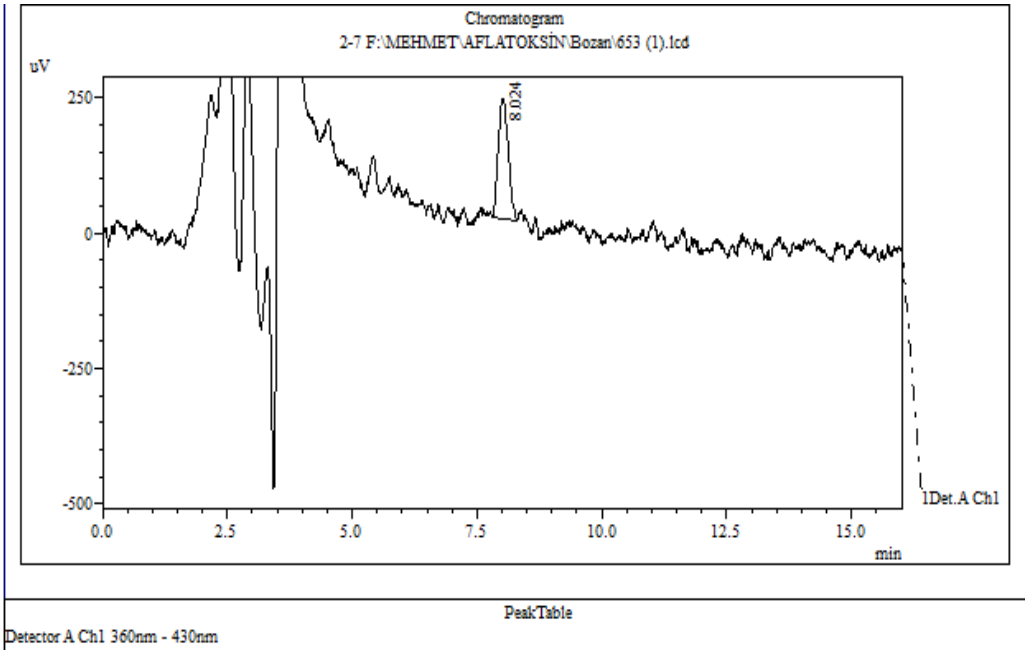


Figure 6. *Aflatoxin analysis chromatogram for aubergines sample no. 7 on the 3rd day of drying.*

Aflatoxin problem, which can occur at certain rates, can be encountered in many dried products. In the production of dried bell peppers and aubergines in Gaziantep/Oğuzeli region are not allowing the products to come into contact with the soil in the washing processes and subsequent drying processes in the pre-drying process and the drying process carried out on wooden drying hangers high above the ground suggest that these results are largely effective. At the same time, it is stated that it is important to prevent the

formation of aflatoxin in the favorable conditions for drying caused by the seasonal characteristics of the region (high temperature, low humidity). Due to these features, it has ensured the production of quality dried products by preventing the formation of aflatoxin in the production of dried stuffed aubergines and pepper.

4. CONCLUSION (SONUÇ)

The drying process, which is the most important process step in terms of aflatoxin formation in the production of dried bell peppers and aubergines, is carried out on drying hangers specially designed for this work in the Oğuzeli region, so that the contact of the product with the soil or any ground is prevented and the risk of contamination is tried to be reduced.

Within the scope of this study, samples were taken every day during the drying of bell peppers and aubergines traditionally dried in open air, on hangers in Gaziantep province Oğuzeli district (Barak plain), and AFB1, AFB2, AFG1, AFG2 and total aflatoxin analyzes were made.

As a result of the analysis, aflatoxin could not be detected in any of the samples. This shows us that since the drying process is done on hangers without contacting the ground, it largely protects the food from being contaminated with molds and directly affects the formation of aflatoxin. As a result, the stuffed aubergines and pepper products traditionally produced in the study area are considered as a qualified end product by providing appropriate storage and sales conditions, and they are away from the risks that threaten public health.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest regarding the publication of the paper.

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