



MYCOTOXIN ISSUES IN TURKEY



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2nd MoniQA International Conference

Overview

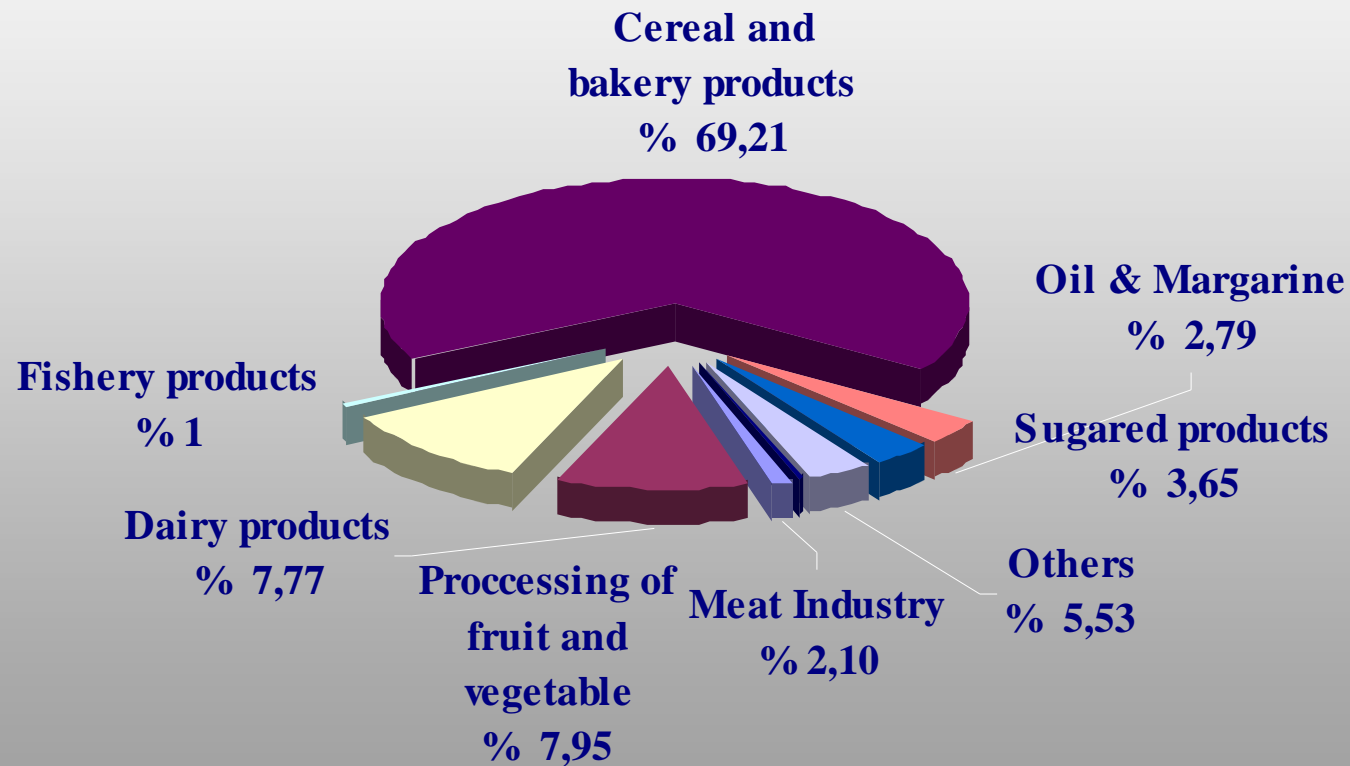
- General view of food industry
- Legislations
- Surveillance, monitoring & regulatory control programs
- Trainings
- Notifications in RASFF
- Projects
 - *Finalized, Ongoing, Further needs*

View of Food Industry in Turkey

- **Approx. 20 % of manufacturing industry**
- **Employment: 260.000 people**
- **Number of food companies: 27.703**
- **Use of Capacity: 65-75%**
- **Number of companies with high capacity: 2000**
- **Total production: 418 million tons**
- **Number of companies for food saling and collective consumption: 400.000**

View of Food Industry in Turkey

Total:27.703



- ***Ministry of Agriculture and Rural Affairs (MARA)***
- Ministry of Health
- *Ministry of Internal Affairs*

General Directorate of Protection and Control (GDPC)

Responsible for the inspection of foodstuffs

ASSURES

• Safe food

BY

- Efficient inspection
- Sufficient control
- Good quality input

General Directorate of Protection and Control (GDPC)

- **Central authority: GDPC**
- **Local authorities *:** 81 directorates of ministry of agriculture, 4373 food inspectors
- **Aflatoxins / Ochratoxin A analysis ***
 - **29** / 19 Laboratories of MARA
 - **21** / 7 Private Food Analysis Labs

* *Datas of MARA*

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Turkey's first date with mycotoxins

- In 1960s
 - 10 tons of Hazelnut kernels exported to Canada in 1967
 - 31 lots over 45 lots of pistachio exported to US in 1971
- were rejected due to aflatoxin contamination

LEGISLATIONS

- There are 95 legislations in Turkish Food Codex
 - 68 of them are prepared under the scope of Harmonization with EU legislations
- **1997**: First Legislation on contaminants (23172 Official Gazette “ Turkish Food Codex Legislation”
 - AFB1 : 5 ppb
 - AFTOT : 10 ppb
- **2002**: Regulation for max. levels for contaminants (24885 Official Gazette
- **2008**: Revision of the regulation (26879 Official Gazette)
- **Feb 2009**: Last revision (27143 Official Gazette)
 - *No limit for AFB1 as in CODEX*

- Turkish Food Codex Communiqué Concerning the Maximum Limits For Contaminants In Food Substances (Communique No:2008/26)
- Turkish Food Codex Communiqué On The Criteria For Sampling, Sample Preparation, and Method of Analysis for The Official Control of The Level of Mycotoxins in Foodstuffs (Communique No: 2007/21)
which has been prepared in accordance with Regulation 401/2006/EC
 - Aflatoxins (M_1 , B_1 , B_2 , G_1 , G_2)
 - Ochratoxin A
 - Patulin
 - Deoxynivalenol
 - Zearalenon
 - Fumonisin (B_1 , B_2)
 - T2 & HT2

REGULATIONS - Communiqué No:2008/26

AFLATOXINS (M₁,B₁,B₂,G₁,G₂)	OCHRATOXIN A	PATULIN
Max. Limits (µg/kg)	Max. Limits (µg/kg)	Max. Limits (µg/kg)
<ul style="list-style-type: none"> •Peanut (AFTOT 10) •Pistachio (AFTOT 10) •Hazelnut (AFTOT 10) •Cereal (AFB₁:2 AFTOT:4) •Maize (Further proccessing) (AFB₁:5 AFTOT:10) •Milk (AFM₁:0,05) •Paprika(AFB₁:5 AFTOT:10) •Infant Formula (AFM₁:0,025) 	<ul style="list-style-type: none"> •Cereal (5) •Coffee (5) •Wine (2) •Raisin (10) •Grape juice (2) 	<ul style="list-style-type: none"> •Juices (50) •Alcoholic drinks (50) •Apple products (25) •Baby food (10)

Turkish Food Codex Communiqué Concerning the Maximum Limits For Contaminants In Food Substances (Communiqué No:2008/26)

DEOXYNIVALENOL	ZEARALENON	FUMONISINS (B ₁ +B ₂)
Max. Limits (µg/kg)	Max. Limits (µg/kg)	Max. Limits (µg/kg)
<ul style="list-style-type: none"> •Cereal for further processing (1250) •Cereal ready-to-eat (750) •Durum wheat for further processing (1750) •Maize for further processing (1750) •Bread (500) 	<ul style="list-style-type: none"> •Cereal for further processing (100) •Maize for further Processing (350) •Cereal ready-to-eat (75) 	<ul style="list-style-type: none"> •Maize for further processing (4000) •Maize ready-to-eat (1000) •Baby foods (200)

Turkish Food Codex Communiqué Concerning the Maximum Limits For Contaminants In Food Substances (Communiqué No:2008/26)

REGULATIONS - Communiqué No:2007/21

Performance criteria for Aflatoxins

Criteria	Concentration (µg/kg)	Recomended value (%)	Maximum value allowed
Recovery-Aflatoxin M1	0,01-0,05	60-120	
	>0,05	70-110	
Recovery-Aflatoxin B1, B2, G1,G2	<1,0	50-120	
	1-10	70-110	
	>10	80-110	
Precision (Reproducibility) RSDR	All	Value from Horwitz equation	2 x Value from Horwitz equation

Performance criteria for Ochratoxin A

Level of Concentration (µg/kg)	Ochratoxin A		
	RSDr (%)	RSDR (%)	Recovery (%)
<1	≤40	≤60	50-120
1-10	≤20	≤30	70-110

Turkish Food Codex Communiqué On The Criteria For Sampling, Sample Preparation, and Method of Analysis for The Official Control of The Level of Mycotoxins in Foodstuffs (Communiqué No: 2007/21)

Performance criteria for Patulin

Level of Concentration ($\mu\text{g}/\text{kg}$)	Patulin		
	RSDr (%)	RSDR (%)	Recovery (%)
<20	≤ 30	≤ 40	50-120
20-50	≤ 20	≤ 30	70-105
>50	≤ 15	≤ 25	75-105

Performance criteria for Deoxynivalenol

Level of Concentration ($\mu\text{g}/\text{kg}$)	Deoxynivalenol		
	RSDr (%)	RSDR (%)	Recovery (%)
>100- ≤ 500	≤ 20	≤ 40	60-110
>500	≤ 20	≤ 40	70-120

Performance criteria for Zearalenon

Level of Concentration ($\mu\text{g}/\text{kg}$)	Zearalenone		
	RSDr (%)	RSDR (%)	Recovery (%)
≤ 50	≤ 40	≤ 50	60-120
>50	≤ 25	≤ 40	70-120

Performance criteria for Fumonisin

Level of Concentration (µg/kg)	Fumonisin B1, B2		
	RSDr (%)	RSDR (%)	Recovery (%)
≤500	≤30	≤60	60-120
>500	≤20	≤30	

Performance criteria for T-2

Level of Concentration (µg/kg)	T-2		
	RSDr (%)	RSDR (%)	Recovery (%)
50-250	≤40	≤60	60-130
>250	≤30	≤50	60-130

Performance criteria for HT-2

Level of Concentration (µg/kg)	HT-2		
	RSDr (%)	RSDR (%)	Recovery (%)
100-200	≤40	≤60	60-130
>200	≤30	≤50	60-130

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AFLATOXIN MONITORING PROGRAM (AMP)

MARA is responsible to carry out official controls of foodstuffs according to the food legislation

Aflatoxin Monitoring Program 2003-2007				
	Years	Number of Samples	<ML	>ML
Hazelnut *	2003	271	270	1
	2004	211	211	0
	2005	179	179	0
	2006	373	371	2
	2007	316	310	6
Peanut *	2003	7	7	0
	2004	14	14	0
	2005	8	8	0
	2006	332	319	13
	2007	216	202	14
Pistachio *	2003	450	447	3
	2004	0	0	0
	2005	13	13	0
	2006	307	287	20
	2007	222	211	11
Walnut *	2006	173	172	1
	2007	168	168	0
Dried fig *	2003	13	13	0
	2004	8	8	0
	2005	18	18	0
	2006	203	195	8
	2007	165	159	6
Total		3667	3582	85

* Datas of MARA

2008 AFLATOXIN MONITORING PROGRAM (AMP)

Samples	Number of samples	>ML
HAZELNUT	433	2
HAZELNUT PASTE	155	1
DRIED FIG	275	27
FIG PASTE	20	2
PISTACHIO	332	11
PISTACHIO PASTE	92	4
PEANUT	337	14
PEANUT PASTE	53	6
ALMOND	113	0
APRICOT KERNEL	21	3
CASHEW	111	0
SESAME	78	0
TURKISH DELIGHT	165	2
HALVA	183	2
WALNUT	147	0
BAKLAVA	106	0
HONEY WITH NUTS	44	22
FLAKED RED PEPPER	370	45
POWDERED RED PEPPER	327	5
OLIVE	41	0
TOPLAM	3403	146

* *Datas of MARA*

2009 AFLATOXIN MONITORING PROGRAM (AMP)

Samples *	Number of samples	>ML
RAISIN (Ochratoxin A)	165	0
HAZELNUT	583	6
HAZELNUT PASTE	168	0
DRIED FIG	485	15
FIG PASTE	23	4
PISTACHIO	516	27
PISTACHIO PASTE	104	1
PEANUT	525	33
PEANUT PASTE	59	2
TURKISH DELIGHT	207	4
HALVA	210	4
HONEY WITH NUTS	148	32
RED PEPPER	413	61
TOPLAM	3606	189

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TRAININGS RELATED WITH MYCOTOXINS

- MARA organizes trainings for farmers

Trainings	2005		2006	
	Practice	Participants	Practice	Participants
Drying and harvesting of hazelnut *	436	10341	268	6008
Aflatoxins *	308	6911	198	5226
Total	744	17252	466	11234

* *Datas of MARA*

- Leaflets, posters, letters
- Workshops on Field
- Local gazettes, TV, radio



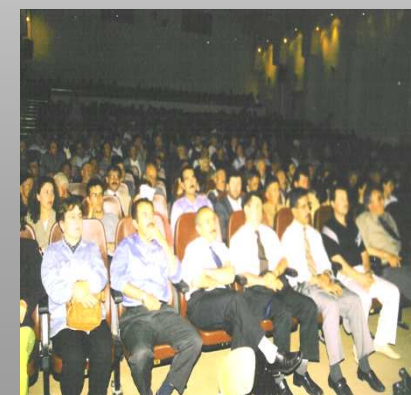
TRAININGS RELATED WITH MYCOTOXINS

Year	Demonstration		Field Day		Farmers Meeting		Circular Letter
	Practice	Participants	Practice	Participants	Practice	Participants	
2007 *	794	4663	71	1579	2110	40085	36686
2008 * (First 6 months)	485	2902	49	1284	1665	31802	15185

Totally **5.174** trainings with **82.315** participants

Year	Brochure	Leaflet	Radio	CD	Poster
2007 *	8300	64688	6	9	504
2008 * (First 6 months)	1180	15864	2	2	879

* *Datas of MARA*



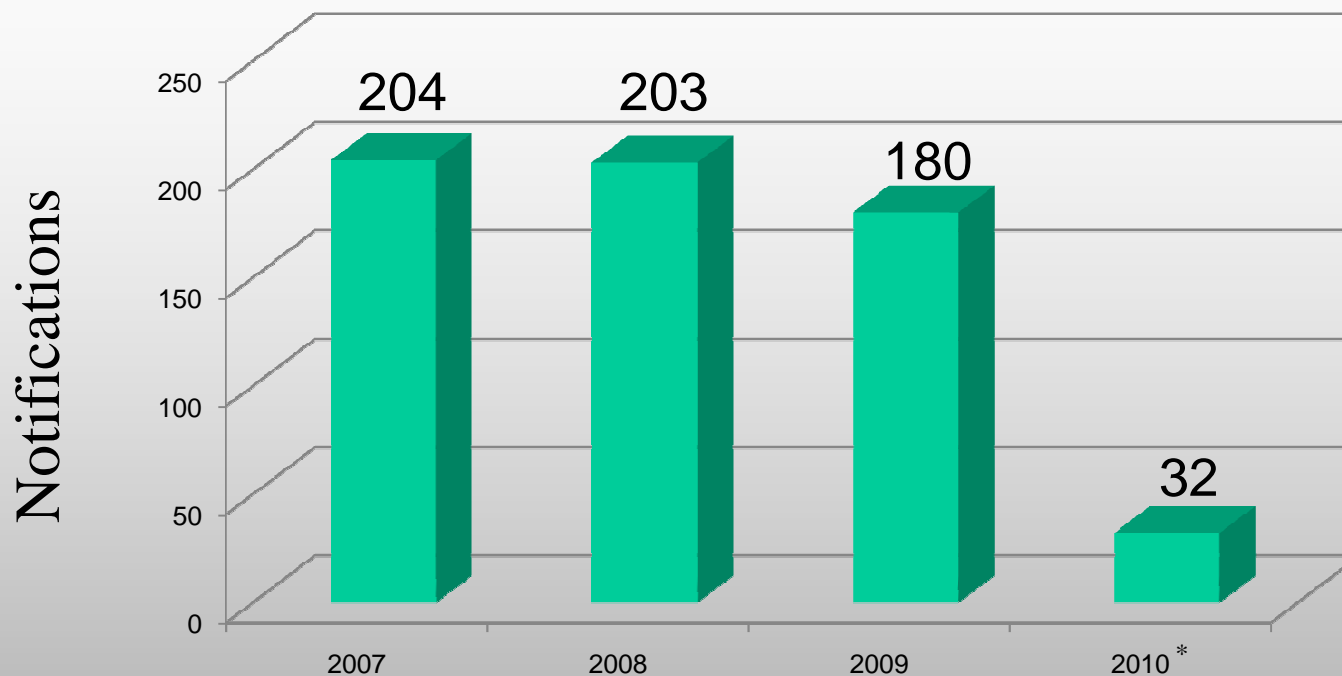
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The Rapid Alert System for Food and Feed (RASFF)

- The purpose of the *RASFF* is to provide the control authorities with an effective tool for exchange of information on measures taken to ensure food safety.
- The Annual Reports on RASFF provides useful data on
 - the number of notifications,
 - origin of the notifications,
 - the products,
 - countries involved,
 - the identified risks.
- Follow-up actions carried out in response to various food safety problems.

http://ec.europa.eu/food/food/rapidalert/archive_en.htm

RASFF-NOTIFICATIONS of TURKEY for MYCOTOXINS



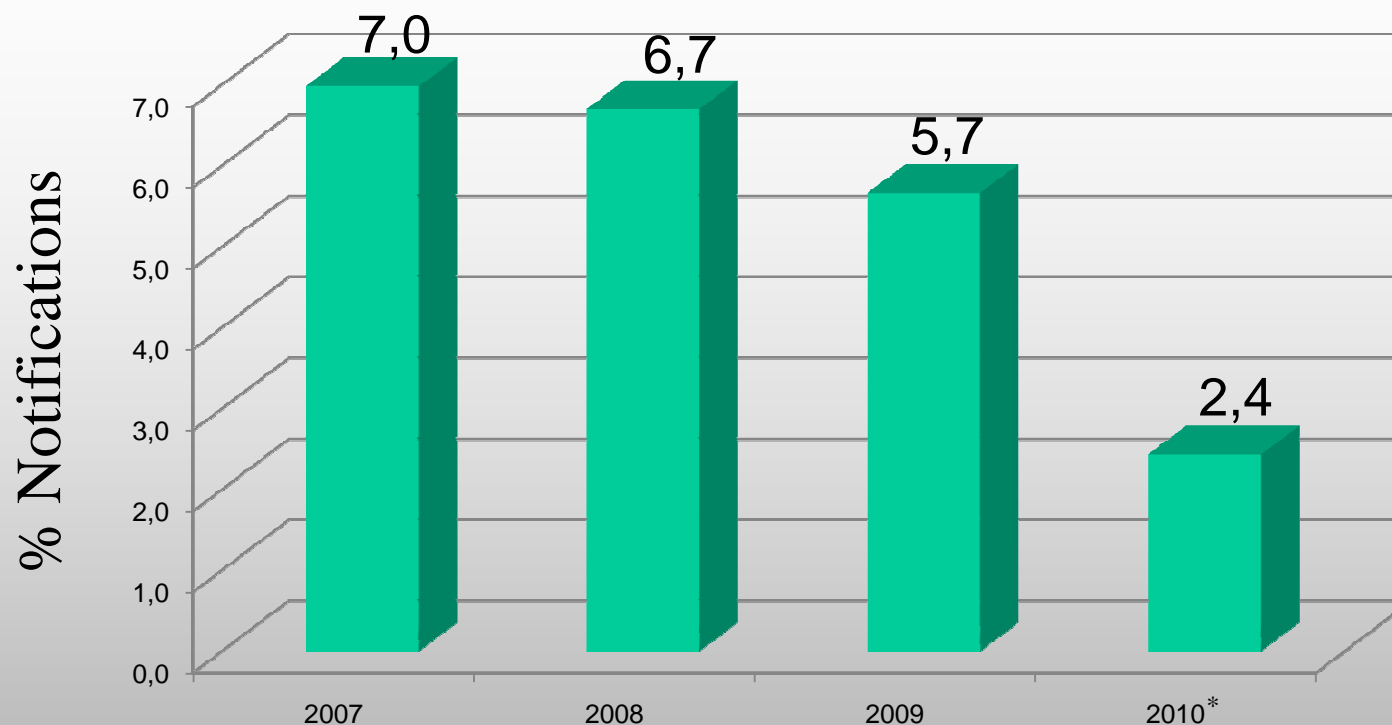
Years	Mycotoxin Notifications	Aflatoxins	Ochratoxin A
2007	204	200	4
2008 **	203	202	2
2009	180	174	6
2010 *	32	31	1

* 2010: first 5 months (31.05.2010)

** 1 product (dried fig) was contaminated with both Aflatoxins and Ochratoxin A

RASFF portal database (http://ec.europa.eu/food/food/rapidalert/index_en.htm)

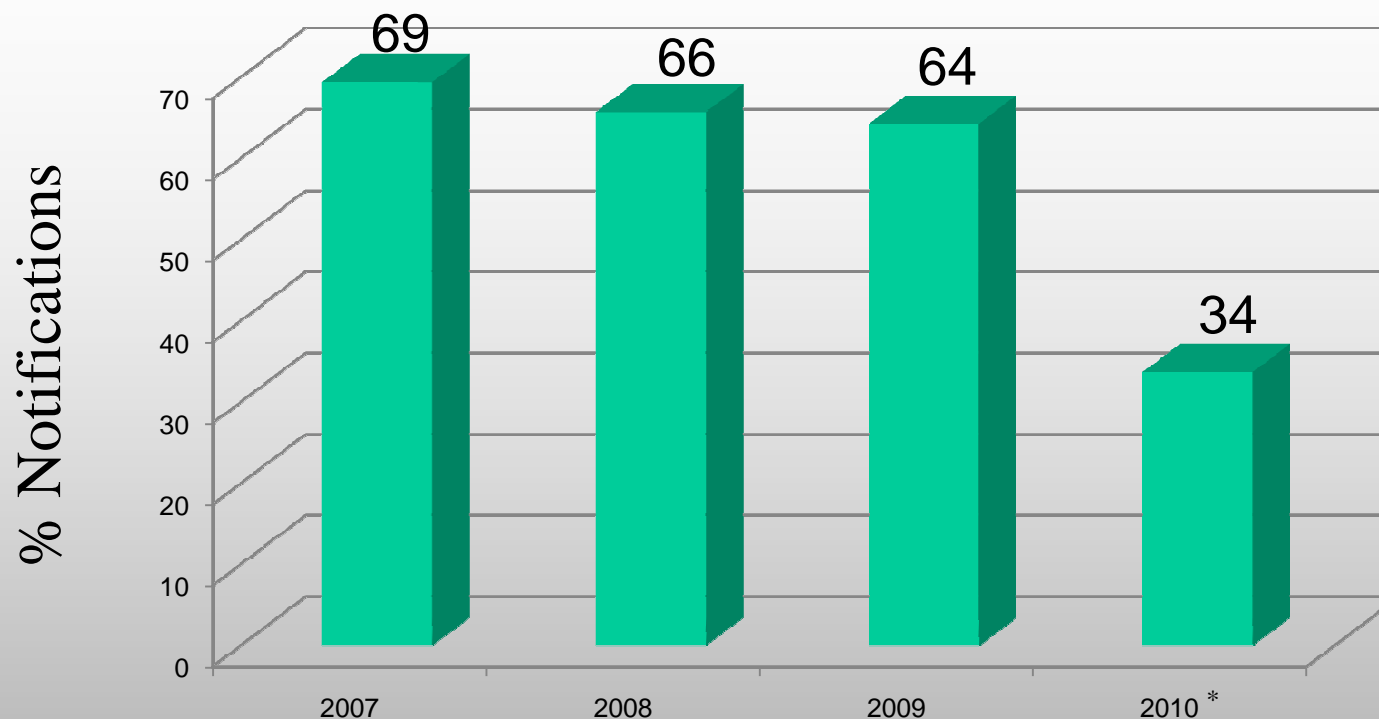
Percentage of Turkey in Total Notifications for Mycotoxins



Years	Total Notifications	Notifications for Turkey	% Notifications	Mycotoxin Notifications for Turkey	% Myco-Notifications
2007	2923	294	10,1	204	7,0
2008	3031	309	10,2	203	6,7
2009	3181	280	8,8	180	5,7
2010*	1317	95	7,2	32	2,4

* 2010: first 5 months (31.05.2010)

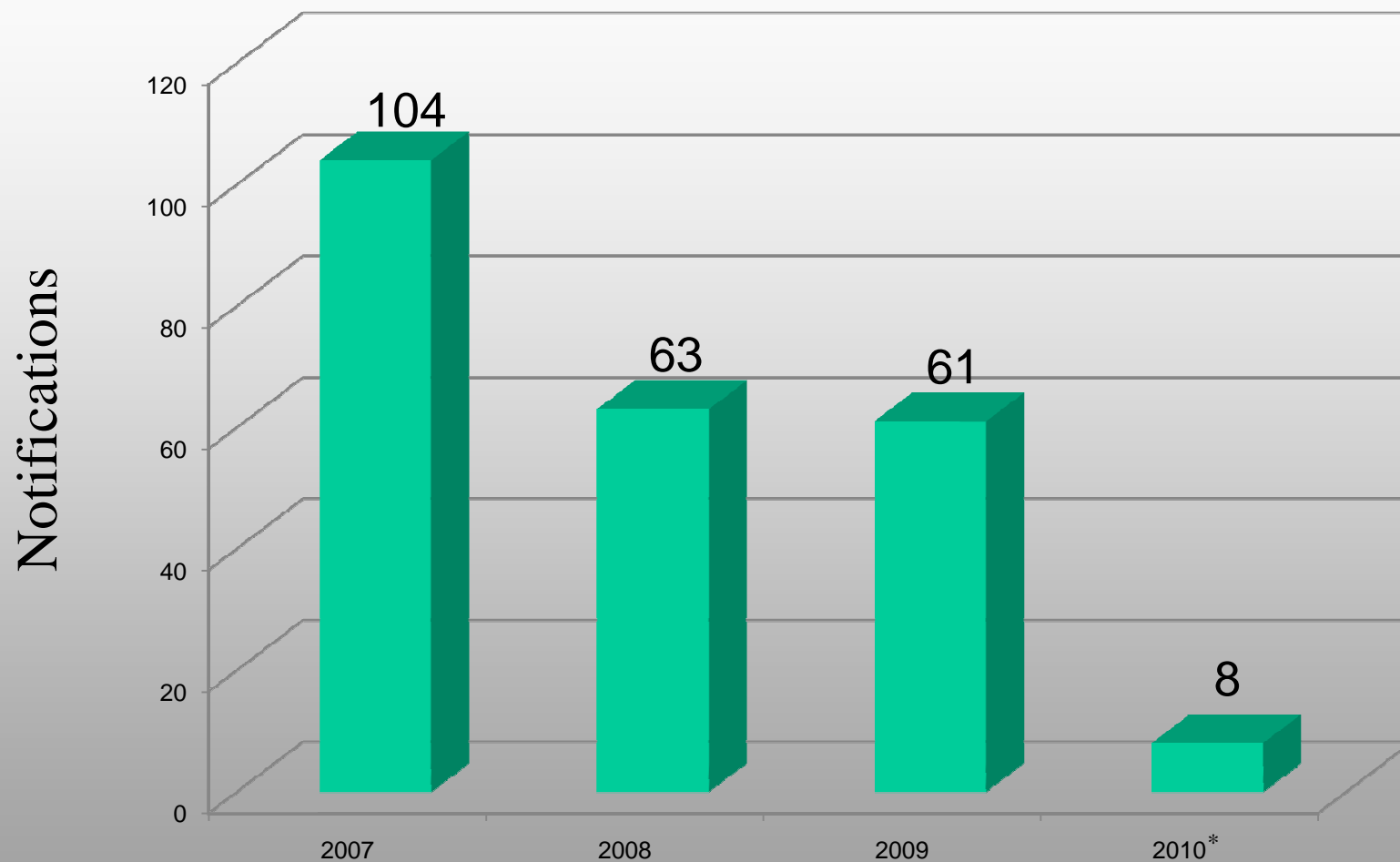
% Mycotoxin Notifications in Total Notifications for Turkey



Years	Notifications	Mycotoxin Notifications	%
2007	294	204	69
2008	309	203	66*
2009	280	180	64
2010*	95	32	34

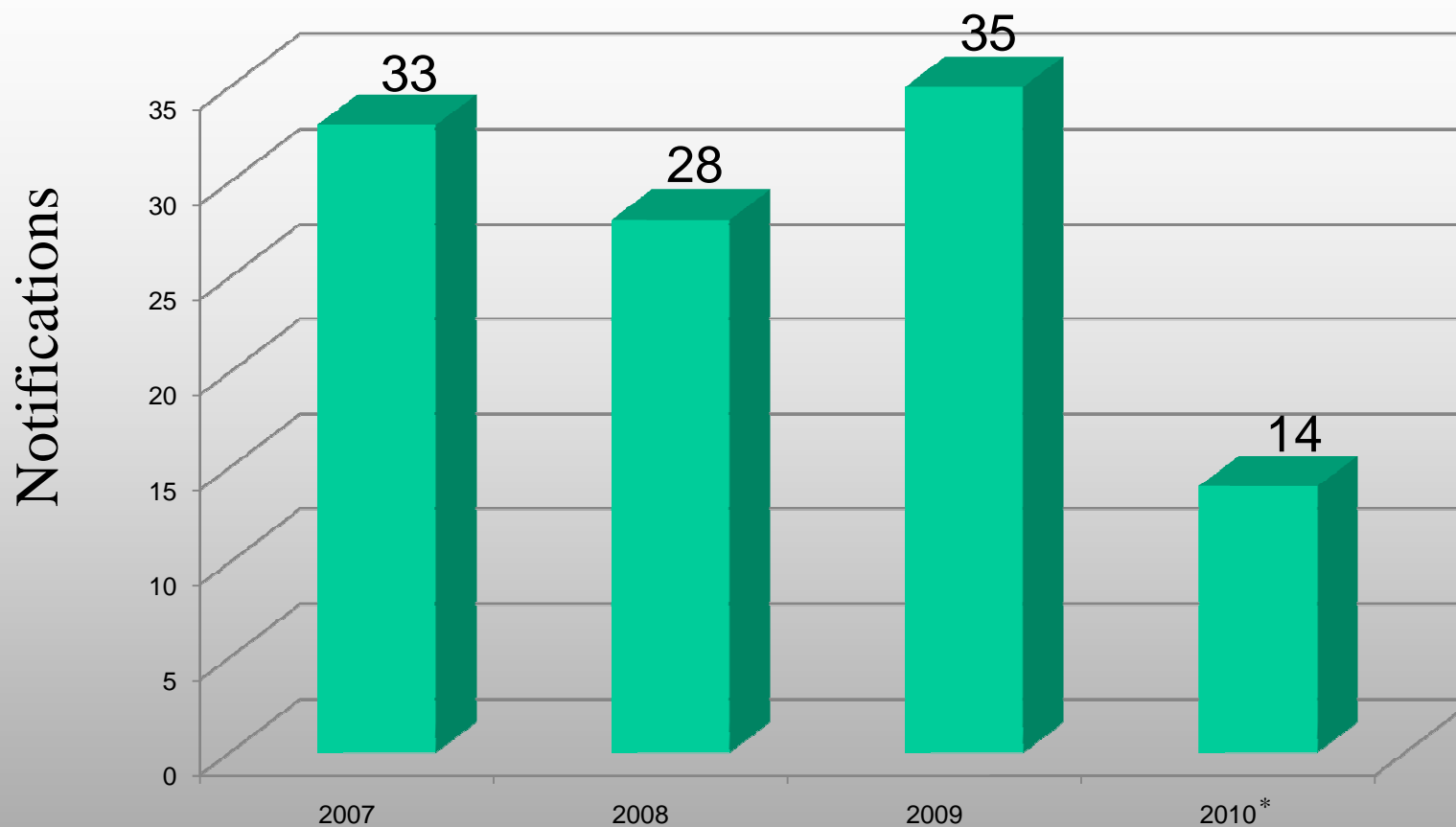
* 2010: first 5 months (31.05.2010)

NOTIFICATIONS for MYCOTOXINS in HAZELNUT



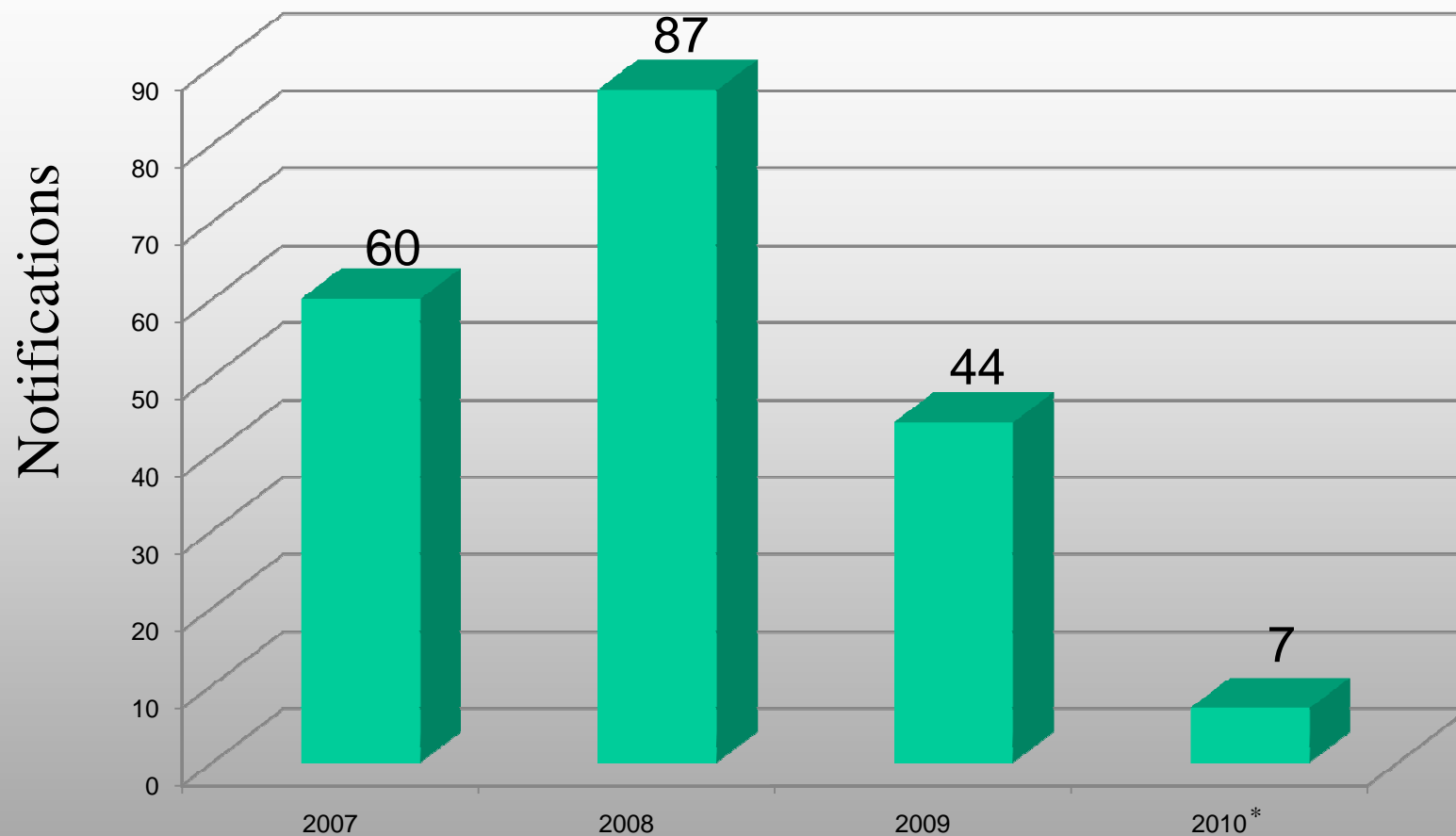
* 2010: first 5 months (31.05.2010)

NOTIFICATIONS for MYCOTOXINS in PISTACHIO



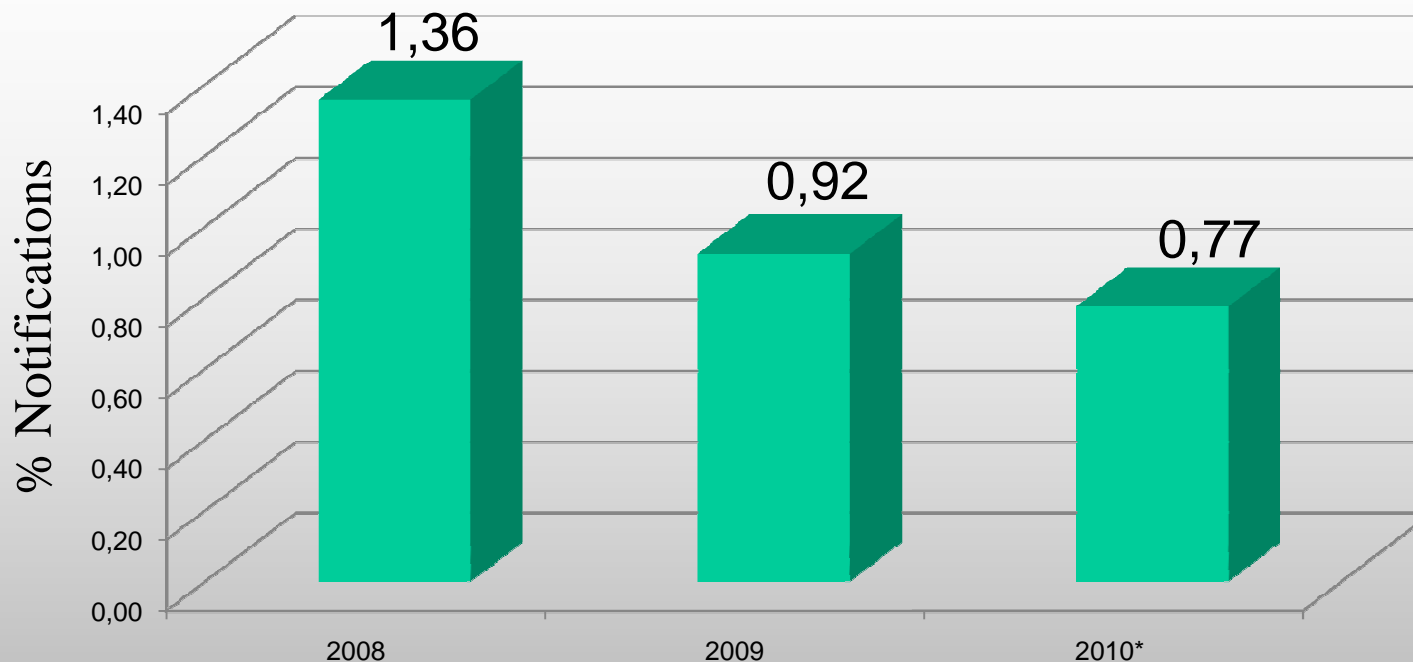
* 2010: first 5 months (31.05.2010)

NOTIFICATIONS for MYCOTOXINS in DRIED FIG



* 2010: first 5 months (31.05.2010)

MYCOTOXIN NOTIFICATIONS in PRODUCTS EXPORTED TO EU



Years	Products Exported to EU**	Mycotoxin Notifications	%
2008	14.968	203	1,36
2009	19.510	180	0,92
2010*	3.100	24	0,77

* 2010: first 4 months (16.04.2010)

** Hazelnut + Pistachio + Dried Fig (MARA)

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National Projects

- Effects of Further Processing of **Hazelnut** on Aflatoxin Contamination (2008, Hazelnut Promotion Group)
- Improvement of scientific infrastructure of the **Culture Collection of the moulds** specific to Turkey. 2007-2008. (State Planning Organisation).
- The Classification of Fungi According to the Morphological and Physiological Properties by means of Image Analysis Technique, 2000-2004. (TUBITAK)
- Determination of the factors affecting aflatoxin formation in **hazelnut** and preventive measures. 2002-2005. (Hazelnut Promotion Group)
- Improvement of drying, processing and storage conditions of Turkish **pistachio** nuts. 1998-2000. (TUBITAK).
- Determination of Black points in **wheat** in 7 regions in Turkey: Product quality and public health aspect. 1997-1998. (Istanbul Chamber of Trade Organisation)
- Moulds and mycotoxins in stored **corn** in Turkey. 1986. (State Soil Products Office)

International Project

- **FP6- MoniQA** - Towards the Harmonisation of Analytical Methods Regarding Monitoring the Hazards for monitoring Food Quality and Safety in the Food Supply Chain, FP6 (2007-2012)
- **FP7- MycoRed** - "Design and development of novel integrated strategies for worldwide mycotoxin reduction in food and feed chains", FP7 (2009-2013)
- **FP6- SAFOODNET** Food Safety and Hygiene Networking with new EU Member States and Associated Candidate Countries FP6 SSA (2006-2008)
- **FP6- MYCOGLOBE** Integration of Mycotoxin And Toxigenic Fungi Research For Food Safety In Global System, FP6, SSA, 2004-2007. (member of Scientific Board)
- **Green Corridor 2005**, Iranian Pistachio Project. 2005. (Expert support to the Project studies)
- Sampling of hazelnuts for aflatoxin analyses. 2005 . International Tree Nut and Dried Fruit Council – INC & Hazelnut Promotion Group-HPG

Further Needs

- More accredited laboratories for more mycotoxins in Turkey
- Harmonisation for method validation & uncertainty estimation between the countries
- Projects related with mycotoxins on proprocessing and harvesting of pistachio and maize
- Validated methods for mycotoxins in traditional products
- Certified reference materials useful for traditional products

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THANK YOU



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