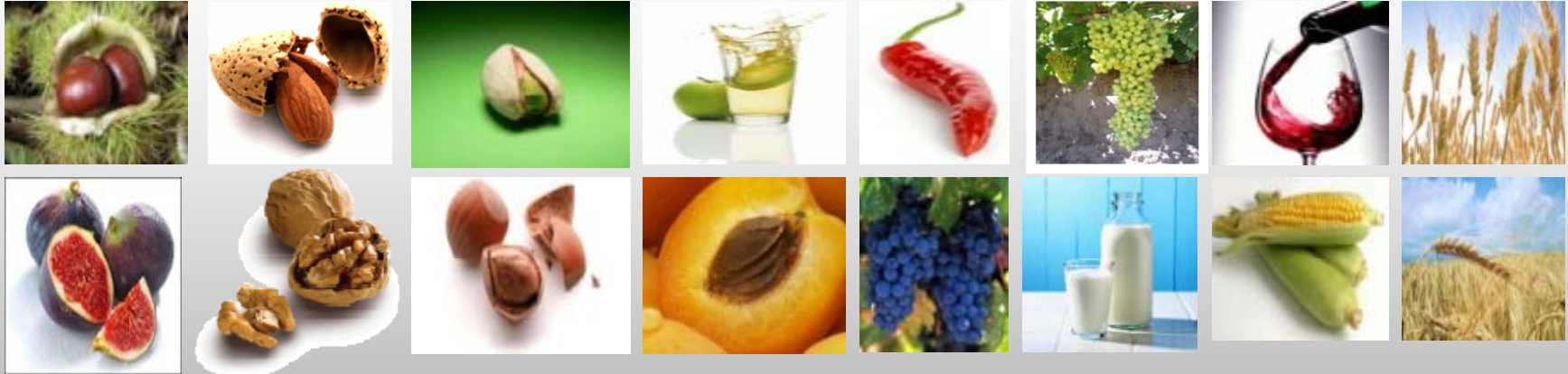




**MAM**

## Current Researches on Mycotoxins in Turkey



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14 October 2011

**2nd Mediterranean MycoRed Workshop**

**Istanbul/TURKEY**

# Overview

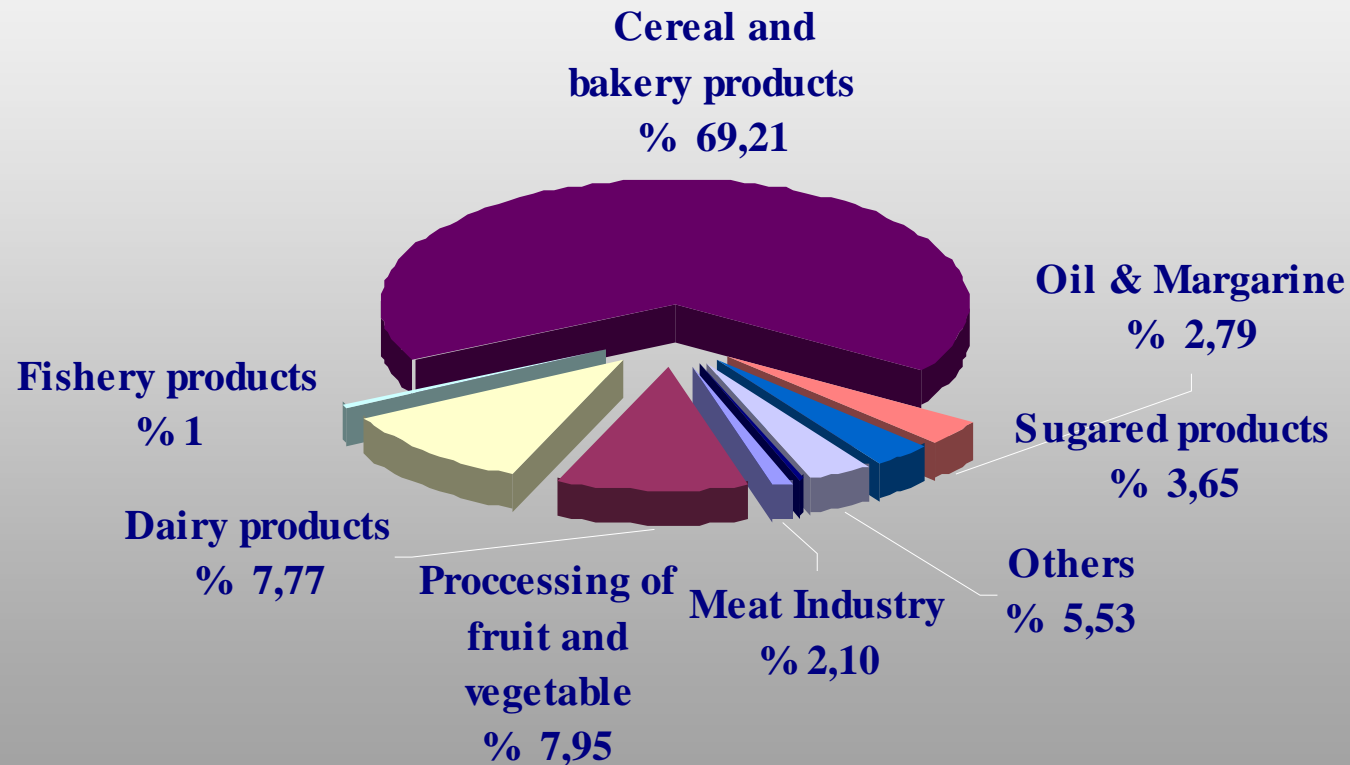
- General view of food industry
- Legislations
- Research Profile
- Surveillance, monitoring & regulatory control programs
- Effect of studies
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  - *Finalized, Ongoing*
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# View of Food Industry in 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:~28.000



# Products related with mycotoxins



•Cereals  
Maize  
Wheat  
Barley

•Dairy  
Milk  
Yogurt

•Nuts  
Hazelnut  
Pistachio  
Apricot Kernel  
Peanut  
Walnut  
Pine nut  
Chest nut

•Fruits  
Fig  
Grape  
Winefruit

•Spices  
Paprika  
Red pepper

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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*

## LEGISLATIONS - TODAY

- Turkish Food Codex Communiqué Concerning the Maximum Limits For Contaminants In Food Substances (Communiqué 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 (Communiqué 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 (M <sub>1</sub> ,B <sub>1</sub> ,B <sub>2</sub> ,G <sub>1</sub> ,G <sub>2</sub> )	OCHRATOXIN A	PATULIN
Max. Limits (µg/kg)	Max. Limits (µg/kg)	Max. Limits (µg/kg)
<ul style="list-style-type: none"> <li>•<b>Peanut</b> (AFTOT 10)</li> <li>•<b>Pistachio</b> (AFTOT 10)</li> <li>•<b>Hazelnut</b> (AFTOT 10)</li> <li>•Cereal (AFB<sub>1</sub>:2 AFTOT:4)</li> <li>•Maize (Further proccessing) (AFB<sub>1</sub>:5 AFTOT:10)</li> <li>•Milk (AFM<sub>1</sub>:0,05)</li> <li>•Paprika(AFB<sub>1</sub>:5 AFTOT:10)</li> <li>•Infant Formula (AFM<sub>1</sub>:0,025)</li> </ul>	<ul style="list-style-type: none"> <li>•Cereal (5)</li> <li>•Coffee (5)</li> <li>•Wine (2)</li> <li>•<b>Raisin</b> (10)</li> <li>•<b>Grape juice</b> (2)</li> </ul>	<ul style="list-style-type: none"> <li>•<b>Juices</b> (50)</li> <li>•Alcoholic drinks (50)</li> <li>•<b>Apple products</b> (25)</li> <li>•Baby food (10)</li> </ul>

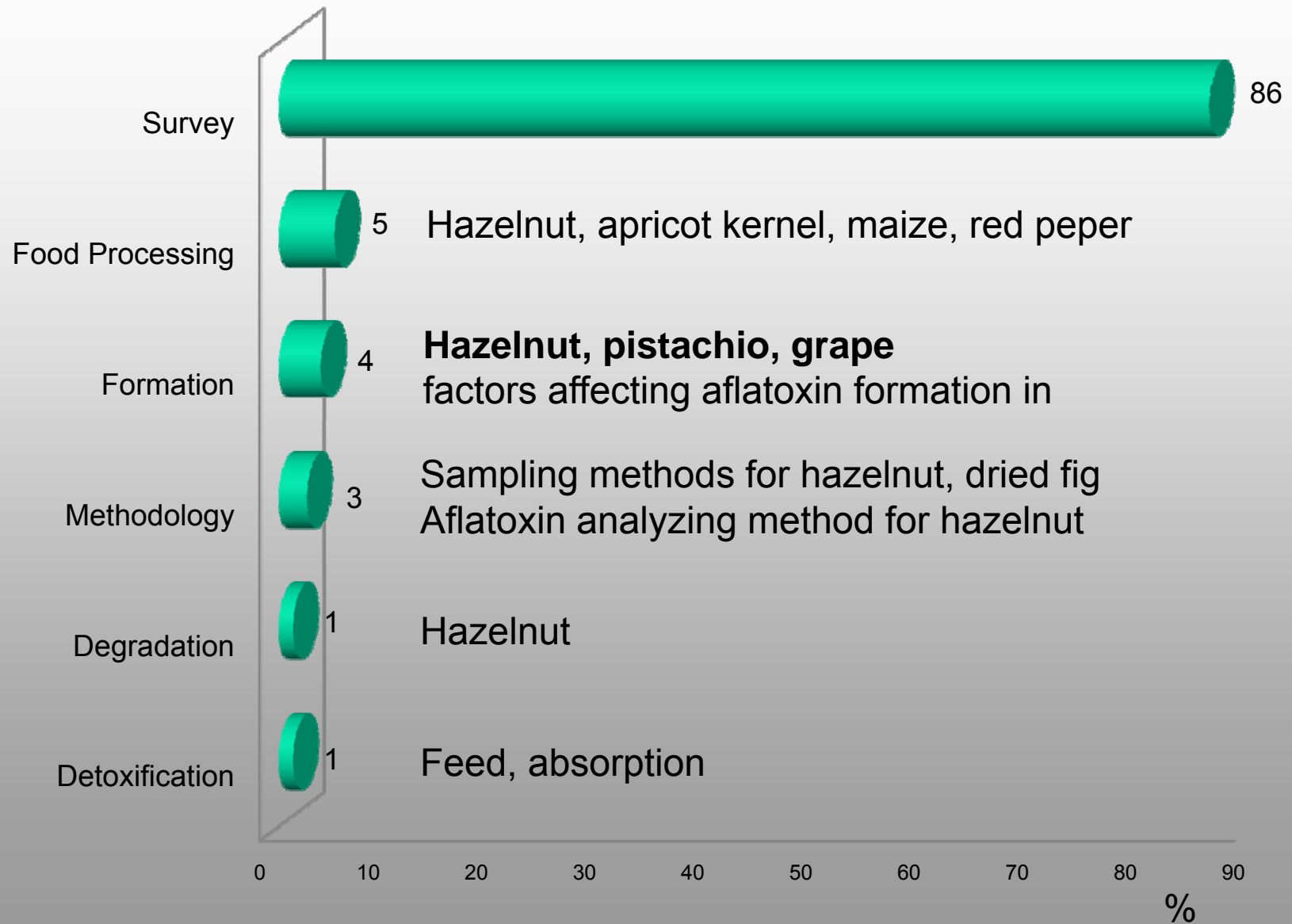
*Turkish Food Codex Communiqué Concerning the Maximum Limits For Contaminants In Food Substances  
(Communiqué No:2008/26)*

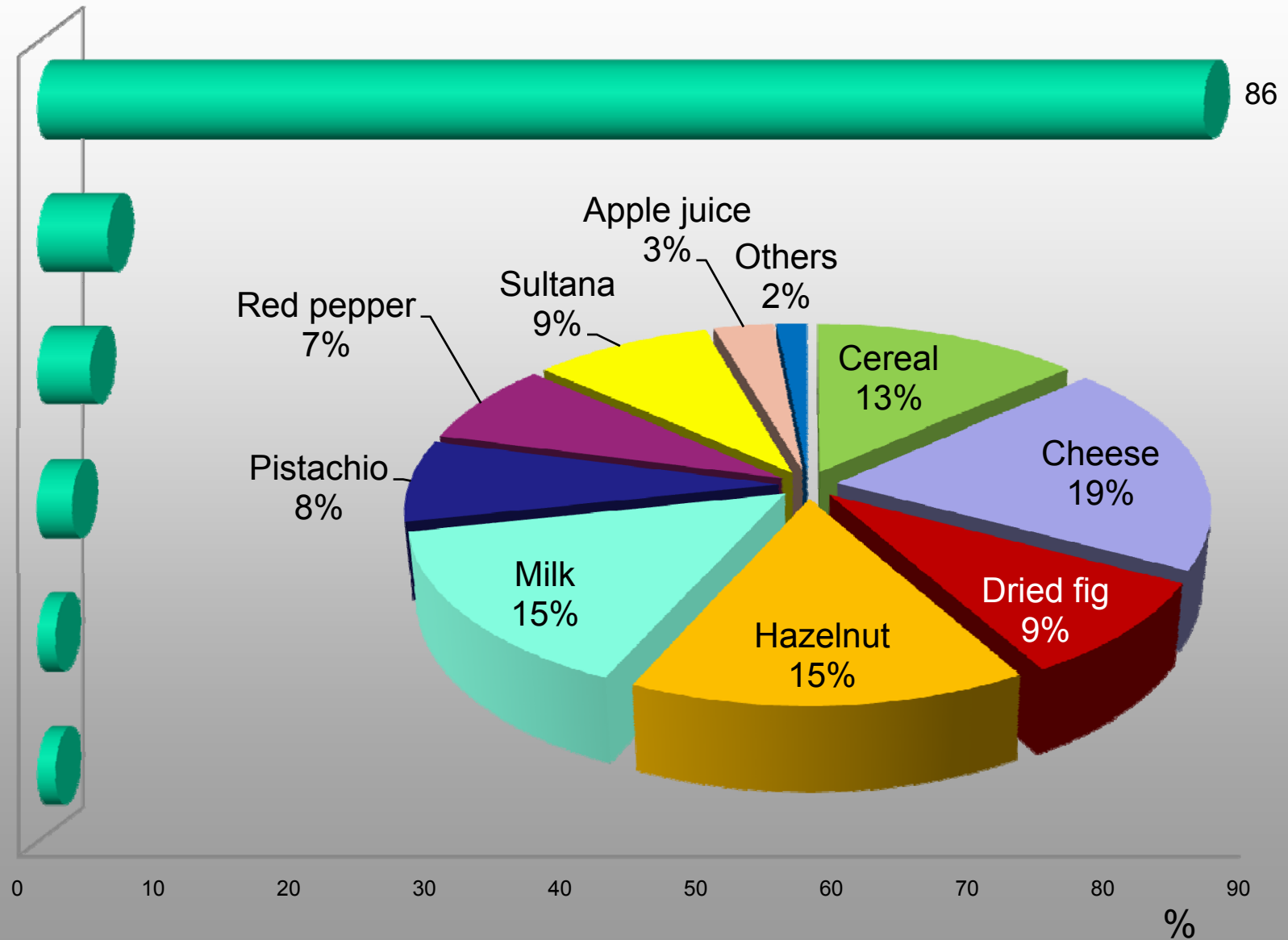
DEOXYNIVALENOL	ZEARALENON	FUMONISINS (B <sub>1</sub> +B <sub>2</sub> )
Max. Limits (µg/kg)	Max. Limits (µg/kg)	Max. Limits (µg/kg)
<ul style="list-style-type: none"> <li>•Cereal for further processing (1250)</li> <li>•Cereal ready-to-eat (750)</li> <li>•Durum wheat for further processing (1750)</li>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

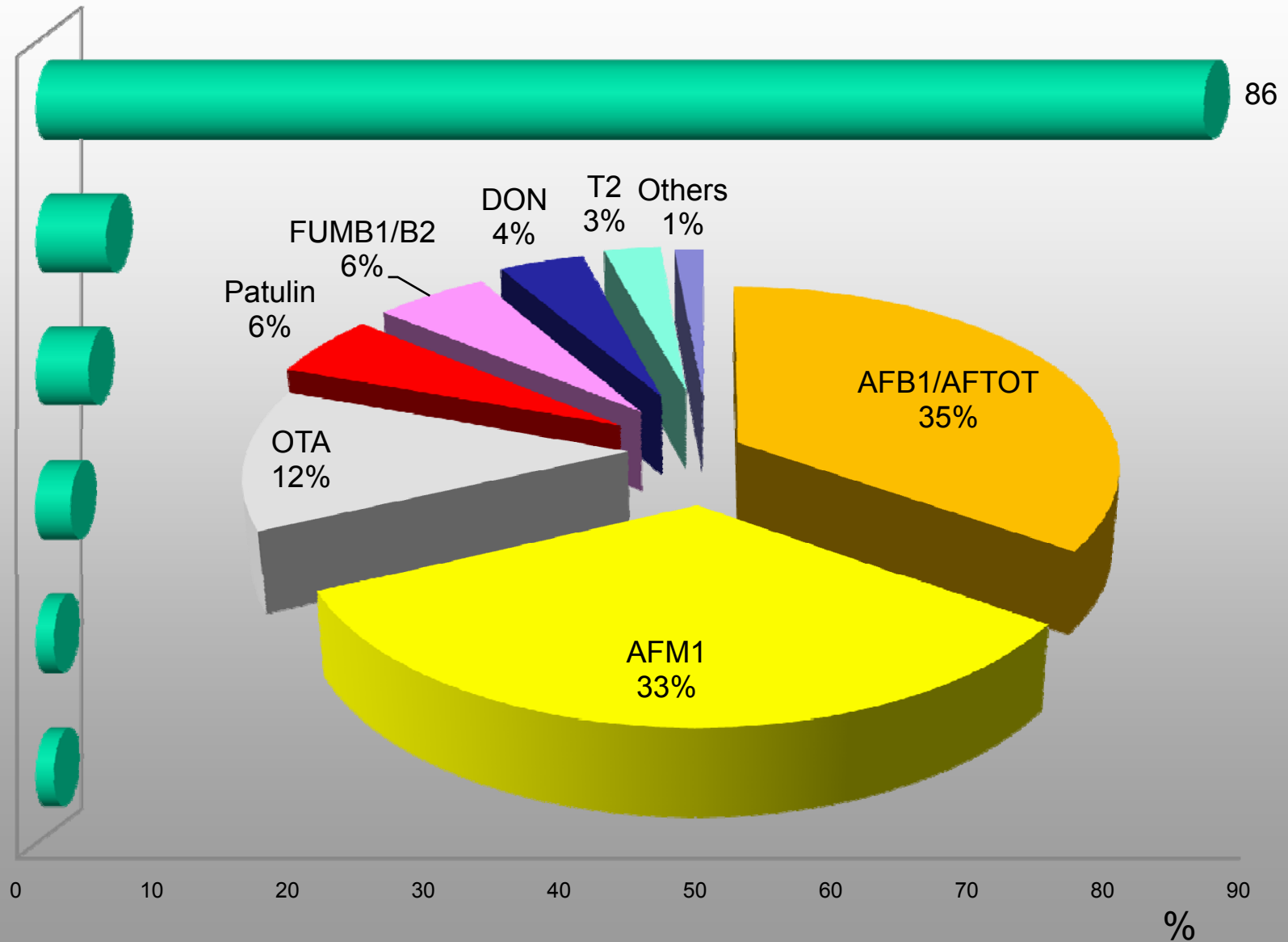
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# RESARCHES on MYCOTOXINs in TURKEY







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# AFLATOXIN MONITORING PROGRAM (AMP)

Republic of Turkey Ministry of Food, Agriculture and Livestock (MFAL) 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
<b>Hazelnut *</b>	2003	271	270	1
	2004	211	211	0
	2005	179	179	0
	2006	373	371	2
	2007	316	310	6
<b>Peanut *</b>	2003	7	7	0
	2004	14	14	0
	2005	8	8	0
	2006	332	319	13
	2007	216	202	14
<b>Pistachio *</b>	2003	450	447	3
	2004	0	0	0
	2005	13	13	0
	2006	307	287	20
	2007	222	211	11
<b>Walnut *</b>	2006	173	172	1
	2007	168	168	0
<b>Dried fig *</b>	2003	13	13	0
	2004	8	8	0
	2005	18	18	0
	2006	203	195	8
	2007	165	159	6
<b>Total</b>		<b>3667</b>	<b>3582</b>	<b>85</b>

\* Data of MFAL

## 2008 AFLATOXIN MONITORING PROGRAM (AMP)

Samples	Number of samples	>ML
<b>HAZELNUT</b>	<b>433</b>	<b>2</b>
HAZELNUT PASTE	155	1
<b>DRIED FIG</b>	<b>275</b>	<b>27</b>
FIG PASTE	20	2
<b>PISTACHIO</b>	<b>332</b>	<b>11</b>
PISTACHIO PASTE	92	4
<b>PEANUT</b>	<b>337</b>	<b>14</b>
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
<b>FLAKED RED PEPPER</b>	<b>370</b>	<b>45</b>
POWDERED RED PEPPER	327	5
OLIVE	41	0
<b>TOPLAM</b>	<b>3403</b>	<b>146</b>

\* Data of MFAL

## 2009 AFLATOXIN MONITORING PROGRAM (AMP)

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

\* Data of MFAL

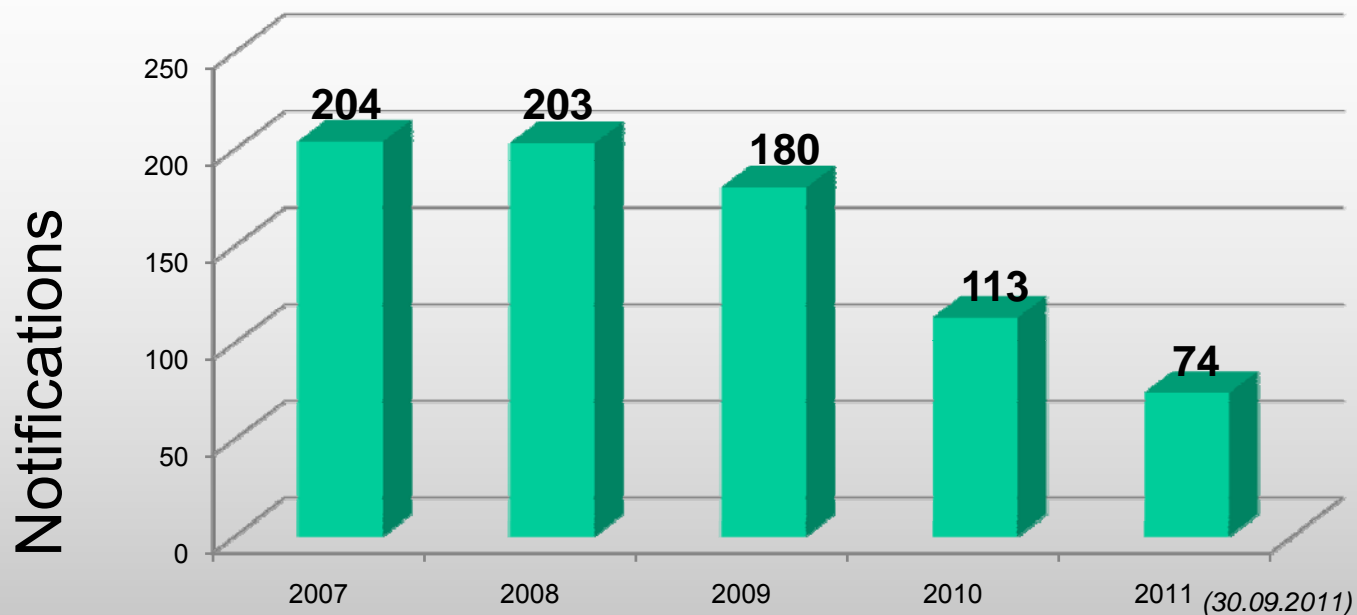
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## The Rapid Alert System for Food and Feed (RASFF)

- 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](http://ec.europa.eu/food/food/rapidalert/archive_en.htm)

# RASFF-NOTIFICATIONS of TURKEY for MYCOTOXINS

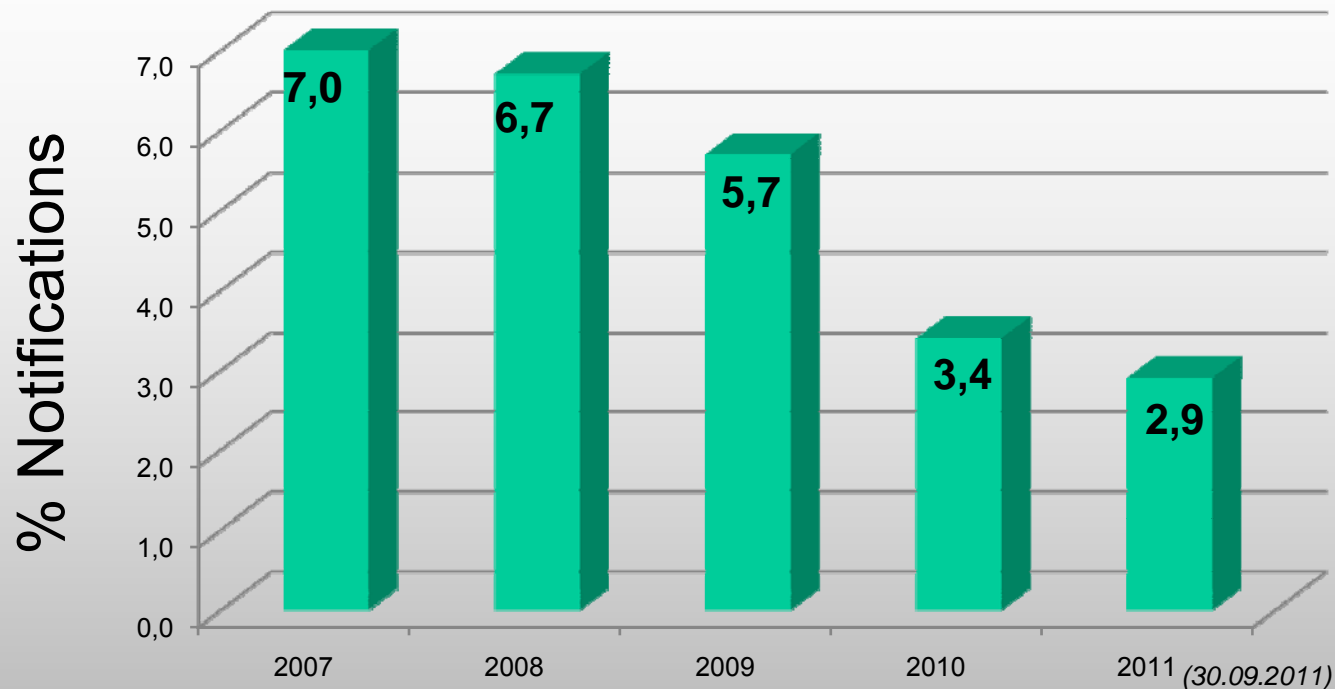


Years	Mycotoxin Notifications	Aflatoxins	Ochratoxin A	Fumonisin
2007	204	200	4	-
2008 *	203	202	2	-
2009	180	174	6	-
2010 **	113	109	5	1
2011 (30.09.2011)	74	73	1	-

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

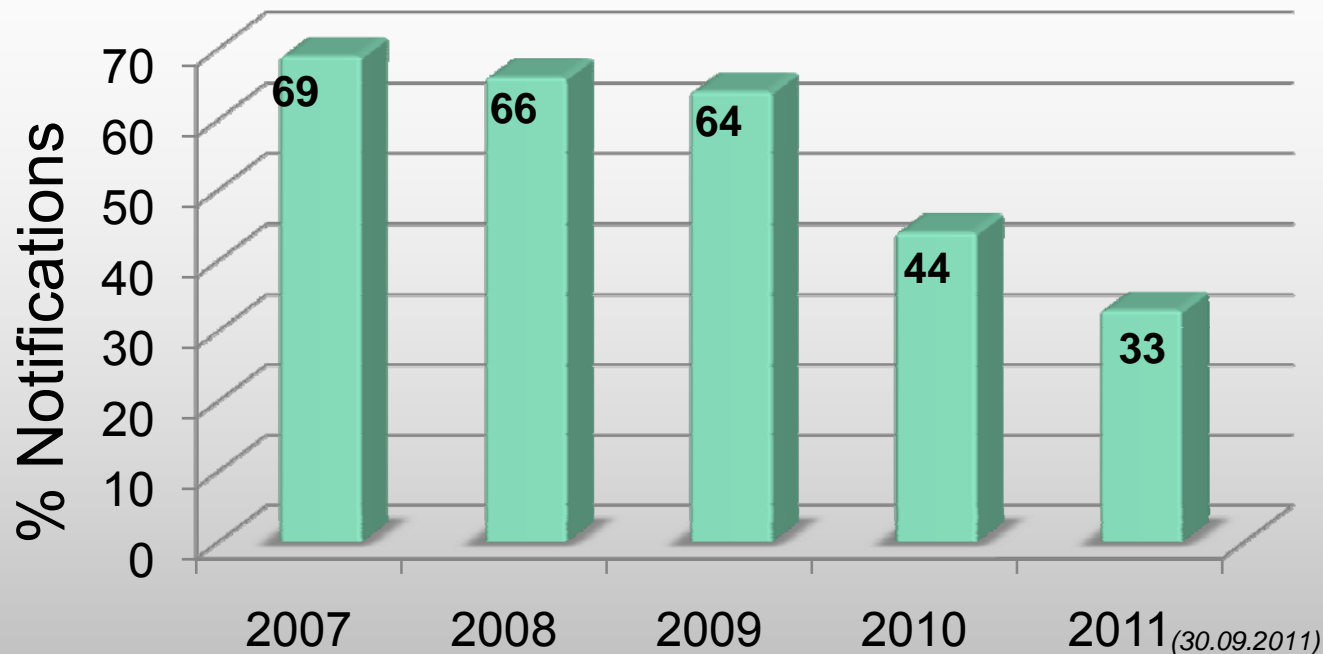
\*\*2 products (dried fig) was contaminated with both Aflatoxins and Ochratoxin A  
RASFF portal database ([http://ec.europa.eu/food/food/rapidalert/index\\_en.htm](http://ec.europa.eu/food/food/rapidalert/index_en.htm))

## Percentage of Turkey in Total Notifications for Mycotoxins



Years	Total Notifications	Notifications for Turkey	% Notifications	Mycotoxin Notifications for Turkey	% Myco-Notifications
2007	<b>2923</b>	294	10,1	<b>204</b>	<b>7,0</b>
2008	<b>3032</b>	309	10,2	<b>203</b>	<b>6,7</b>
2009	<b>3177</b>	280	8,8	<b>180</b>	<b>5,7</b>
2010	<b>3296</b>	256	7,8	<b>48</b>	<b>3,4</b>
30.09.2011	<b>2573</b>	221	8,6	<b>74</b>	<b>2,9</b>

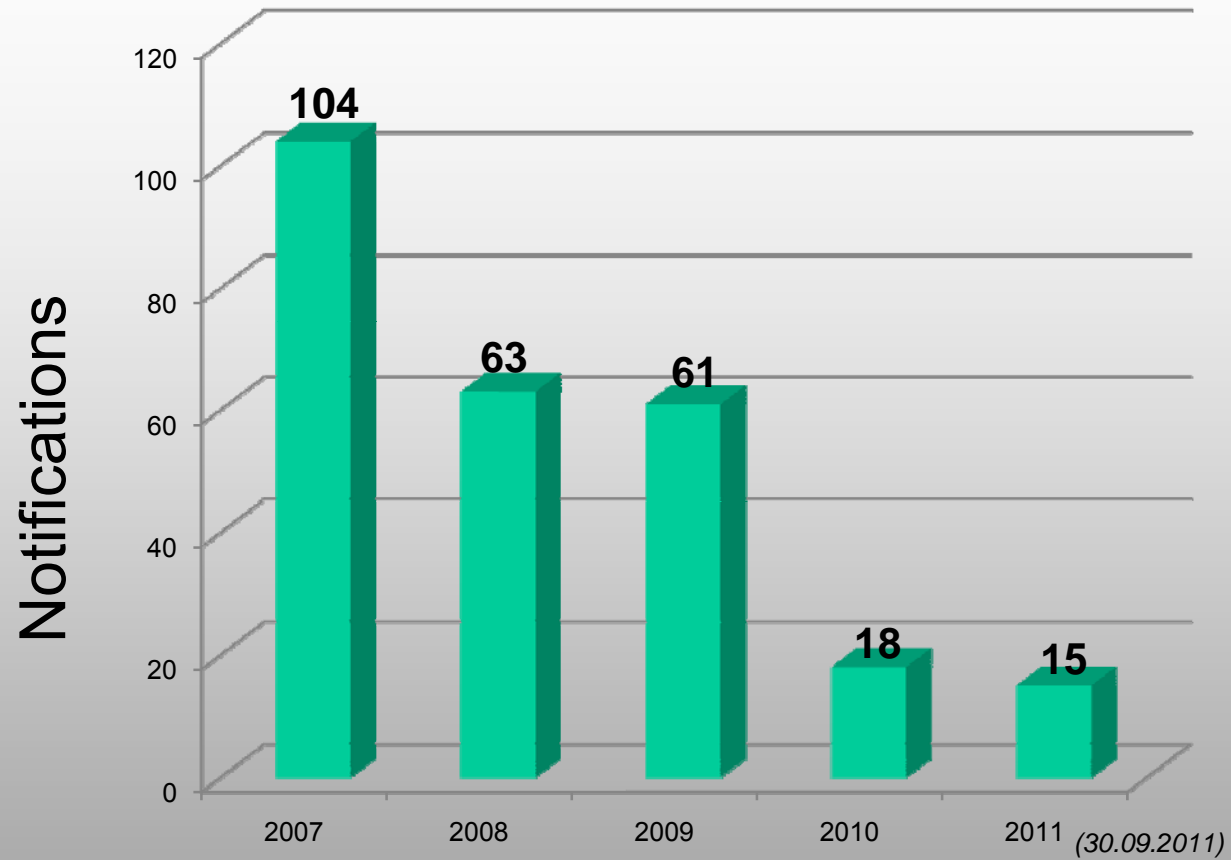
## % Mycotoxin Notifications in Total Notifications for Turkey



Years	Notifications	Mycotoxin Notifications	%
2007	294	204	69
2008	309	203	66
2009	280	180	64
2010	256	113	44
30.09.2011	221	74	33

RASFF portal database ([http://ec.europa.eu/food/food/rapidalert/index\\_en.htm](http://ec.europa.eu/food/food/rapidalert/index_en.htm))

# NOTIFICATIONS for MYCOTOXINS in HAZELNUT

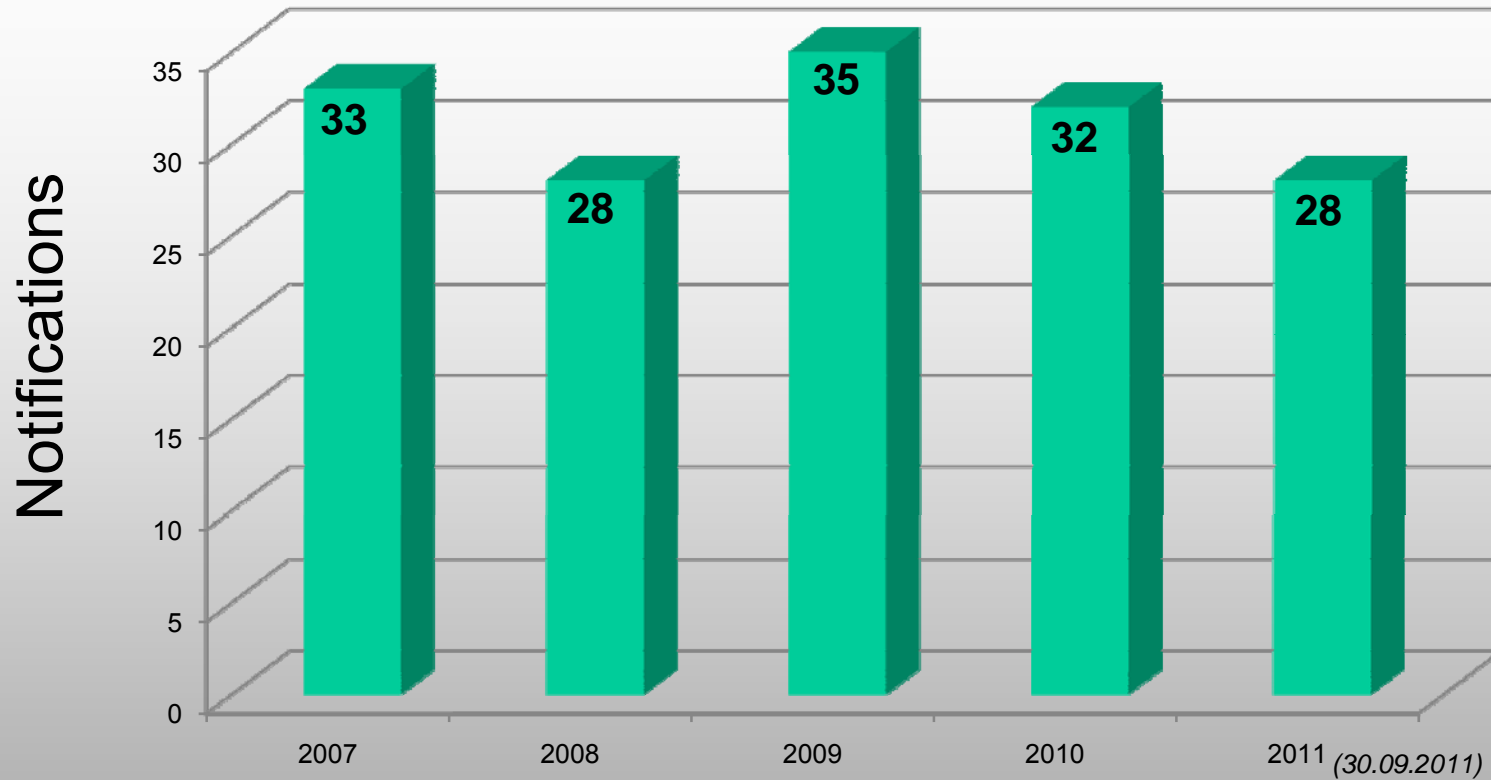


RASFF portal database ([http://ec.europa.eu/food/food/rapidalert/index\\_en.htm](http://ec.europa.eu/food/food/rapidalert/index_en.htm))

## Official Control Frequency (MFAL)

Year	2007	2008	2009	2010	2011
Frequency	5%	5%	10%	10%	10%

# NOTIFICATIONS for MYCOTOXINS in PISTACHIO

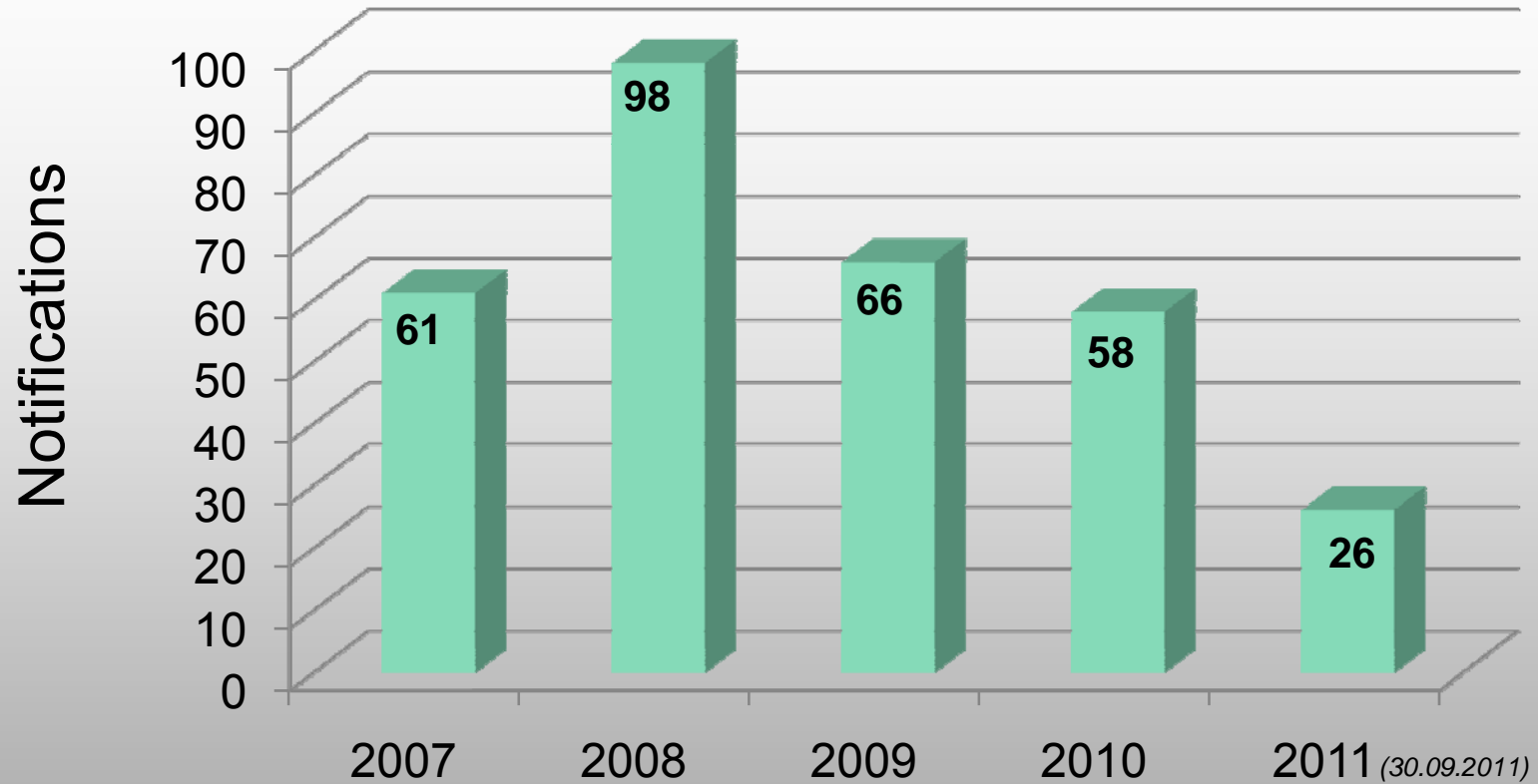


RASFF portal database ([http://ec.europa.eu/food/food/rapidalert/index\\_en.htm](http://ec.europa.eu/food/food/rapidalert/index_en.htm))

## Official Control Frequency (MFAL)

2007	2008	2009	2010	2011
10%	10%	10%	50%	50%

# NOTIFICATIONS for MYCOTOXINS in DRIED FIG/ FIG PASTE



RASFF portal database ([http://ec.europa.eu/food/food/rapidalert/index\\_en.htm](http://ec.europa.eu/food/food/rapidalert/index_en.htm))

## Official Control Frequency (MFAL)

2007	2008	2009	2010	2011
20%	10%	10%	20%	20%

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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

- **Development of a Sampling Plan** for Aflatoxin Analysis in Dried Figs, MFAL-INC-ADFEA (2011)
- **FP7- MycoRed** - "Design and development of novel integrated strategies for worldwide mycotoxin reduction in food and feed chains", FP7 (2009-2013)
- **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)
- **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

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# Further Needs

- Harmonisation for method validation & uncertainty estimation between the countries
- Validated methods for mycotoxins in traditional products
- Certified reference materials for traditional products
- Scientific studies on preventive measures
- Studies on exposure, daily intake, risk assesment to produce scientific data for regulatory bodies
- Studies on degradation compound of Mycotoxins during Processing

# Acknowledgements

MycoRed Project (FP7-KBBE-2007-2A)

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THANK YOU

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