# FOOD SAFETY ISSUES IN THE INTERNATIONAL TRADE OF NUTS & DRIED FRUIT

*Agri-Food Supply Chains inCross-Border Trade of Nuts &Dried Fruit*
*1 – 3 July 2015, Izmir, TURKEY*


***Dr. Betül VAZGEÇER***

*Ministry of Food Agriculture & Livestock*
*General Directorate of Food and Control*
*Food Establishments and Codex Department*


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REPUBLIC OF TURKEY

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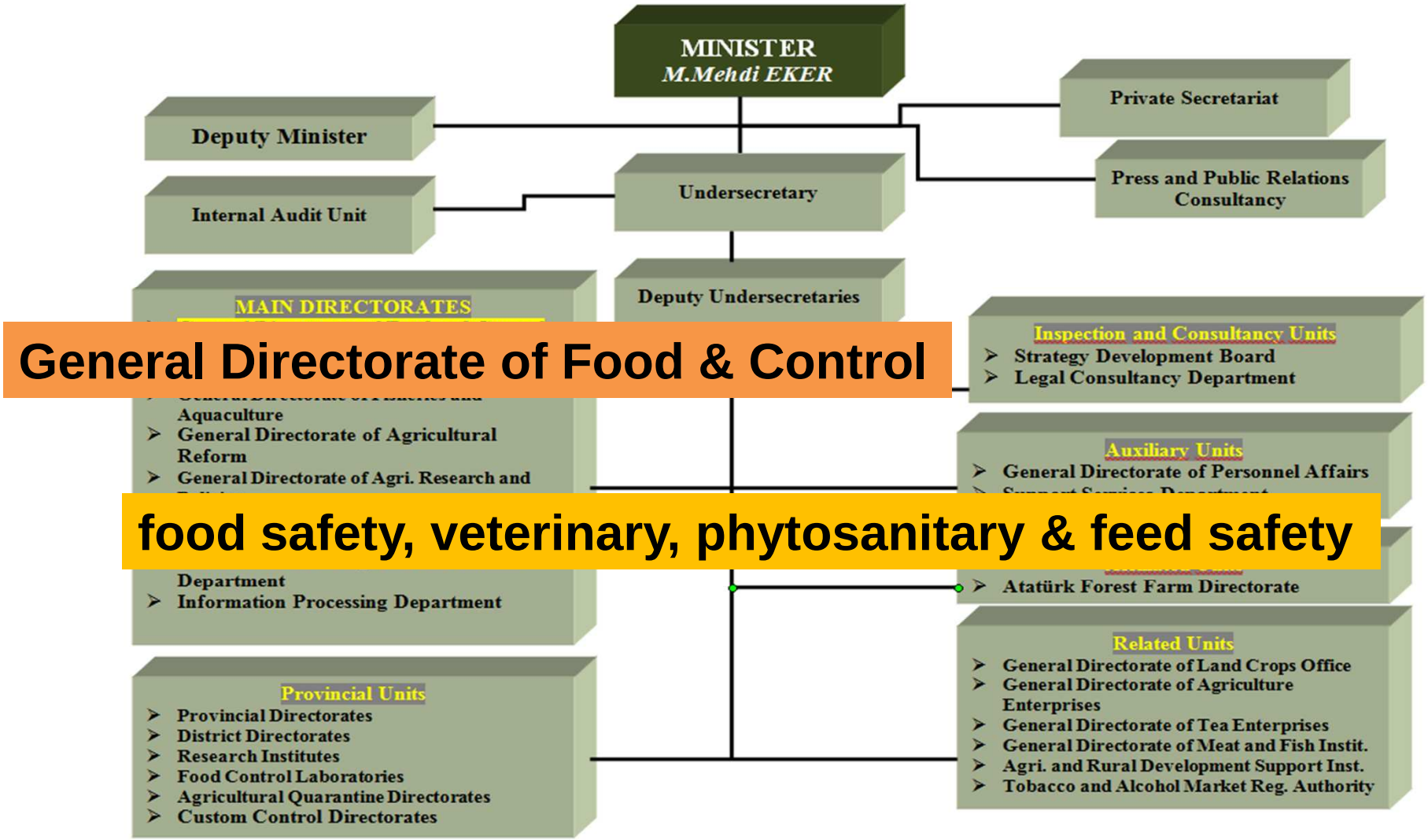
# *WHO WE ARE*

# Competent Authority in TURKEY

## MINISTRY OF FOOD AGRICULTURE & LIVESTOCK (MoFAL)

**Main policy:** assurance of high level protection of human health and consumers' interest

# Organization / MoFAL




**General Directorate of Food & Control**

**food safety, veterinary, phytosanitary & feed safety**

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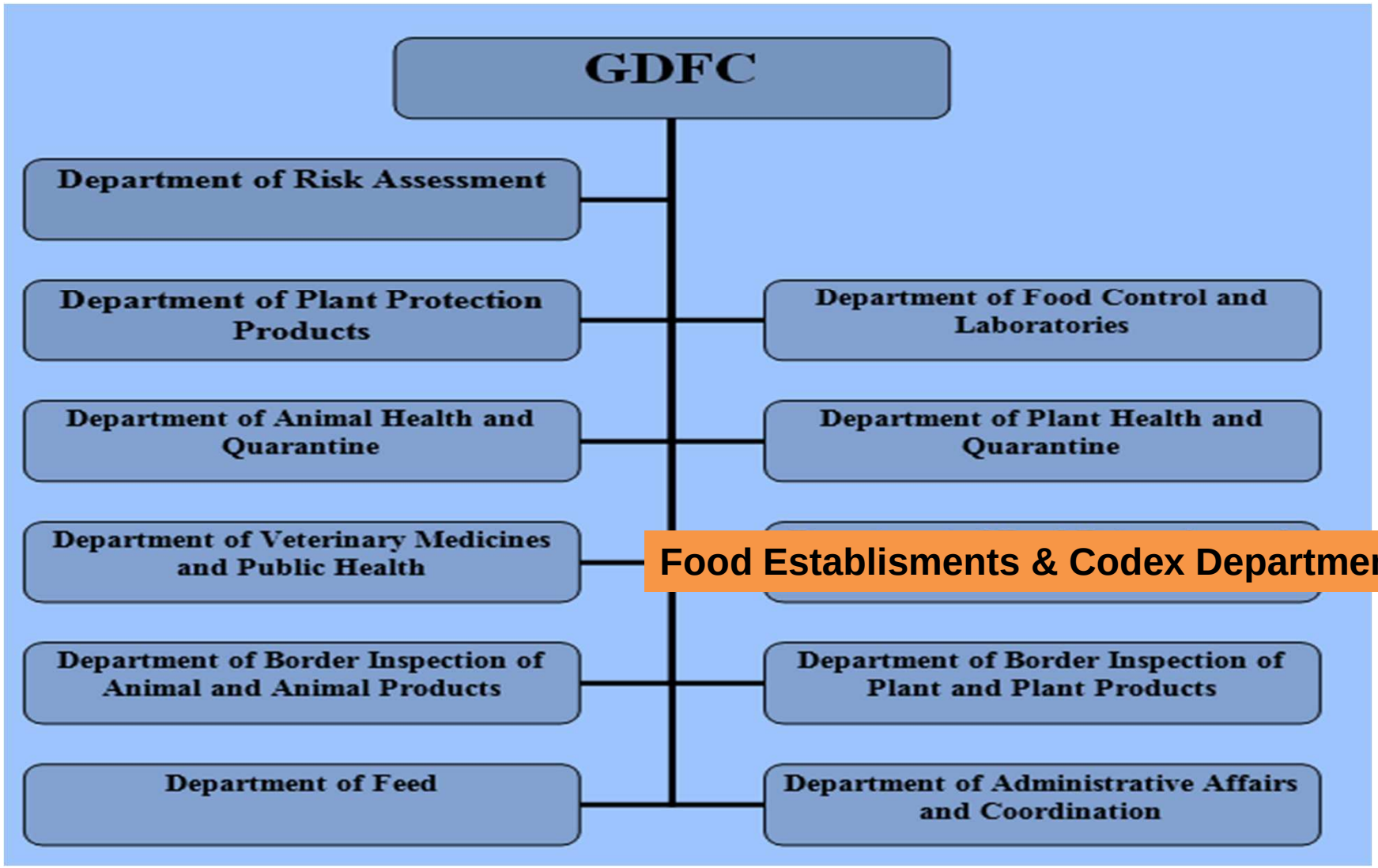
# *CODEX CONTACT POINT IN TURKEY*

# Organization / GDFC



# GDFC – Central Authority in Turkey

**81** Provincial Directorates

**1** National Food Reference Laboratory

**41** Food Control Laboratories

**1** Food Control and Research Institute

**9** Veterinary Control Institutes

**9** Directorates of Veterinary Border Inspection Posts

**12** Directorates of Plant Quarantines

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# *OUTLINE*

I. Contaminants, mycotoxins & risk

II. Case Study: Dried Fig

III. International standards & their importance

IV. Codex Comittee on Contaminants in Food

# International Trade & Standards

1
- Role &importance of product
- Data, data, more data (produce, import, export)

2
- Define risk vs trade problem
- Risk evaluation & toxicological aspect

3
- Sampling, analysing method
- Maximum Limit

**FINAL**

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# *CASE STUDY: DRIED FIG*

# Figs – older than the human

**Figs, which have a story starting with "Adam & Eve", are accepted as sacred fruit and mentioned in all holy books.**

**Since the beginning of human history & based upon archeological findings in the Mediterranean region , figs were most probably one of the first domestically used plants, ca 12000 years ago.**

# Dried Fig – nutrition value(*)

| √ | X |
|---|---|
| carbohydrates | sodium |
| dietary fibers (high water soluble) | fat |
| At least 17 types & essential amino acids (aspartic acid & glutamic acid) | cholesterol |
| phenolic compounds | |
| minerals | |
| vitamins A, B1, B2 and C | |

| Recommended Daily Allowances / dried fig (100 g) |
|---|
| energy (10%) |
| protein (7 %) |
| Calcium (17 % ) |
| Magnesium (30 %) |
| Vitamin $B_1$ (5.2 % ) |
| Vitamin $B_2$ (4.5 %) |

(*): Vinson, A., 1999, The Functional Food Properties of Figs, Cereal Foods World, 44(2), 82-87

# Dried Figs –producing countries

- **Turkey**
- **Iran**
- **The United States**
- **Greece**
- **Spain**
- **Italy**

**Turkey leads the field, both in terms of quality and production in the world.**

**The annual global trade in dried figs ranges from 110,000–150,000 tons (years between 2006 – 2011).**

# Dried Fig – in Turkey

**Annual dried fig export ranges between 56,000–70,000 tons based upon the yearly conditions.**

# Dried Fig – cultivation

- **The main area of dried figs production:**

  **The Aegean region**

- **The cultivation area:**

  **~ 485.30 km square**

- **Dried fig farmers: generally resource poor and manage small orchards (1 - 5 ha) mainly as low-input**

# Dried Fig – socio-economic importance

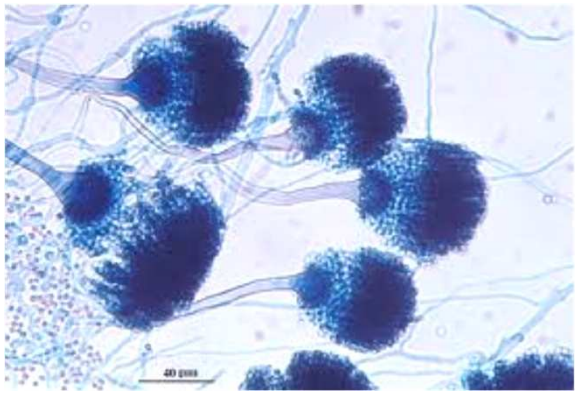
- **Figs are mainly grown on marginal land that can not be utilized for other crops.**
- **In Turkey as is typical throughout the world, and in other Mediterranean countries, numerous small farmers are involved in the commercial dried fig production.**
- **Worldwide, the number of farmers who produce dried figs is assumed to be at least 60,000. In addition, if the seasonal and permanent workers working in fig packaging and trading facilities and in the orchards during the harvest period are taken into account, it can be assumed that in Turkey, in addition to 30,000 growers at least 50,000 people derive income from this product. Number of people with their families making a living from dried figs either directly or indirectly are estimated to be 250,000 individuals.**

# Mycotoxin

- **Seconder metobolites** of moulds
- Under **conducive favourable environmental conditions** (temperature & moisture)
- Fungi proliferate & may produce mycotoxins
- Commonly **enter the food chain** through contaminated food and feed crops, **mainly cereals**

# Dried Fig - Aflatoxin

- **Tree nuts**
- **Maize**
- **Groundnuts**
- **Oilseeds**
- **Cocoa products**
- **Spices**
- **Dried fruits**



***Aspergillus flavus & A. parasiticus***

**In dried fig**

- **Fruit structure**
- **Formation**
- **Harvesting**
- **Drying**

# International standards

## International standards

- **Equal**
- **Fair**
- **Safe**
- **Transparent**

**Consumer & Producer**

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# *CAC & CCCF*

# Codex Alimentarius Commission (FAO & WHO; 1963)

- **standards**
- **guidelines**
- **related texts**

**The main purposes of this Commission**;

- **protecting health** of the consumers
- ensuring **fair trade** practices in the food trade,
- promoting **coordination** of all food standards work undertaken by international governmental and non-governmental organizations.

# CODEX GENERAL STANDARD FOR CONTAMINANTS AND TOXINS IN FOOD AND FEED

**CODEX STAN 193-1995**

## 1. PREAMBLE

### 1.1 SCOPE

This Standard contains the main principles which are recommended by the Codex Alimentarius in dealing with contaminants and toxins in food and feed, and lists the maximum levels and associated sampling plans of contaminants and natural toxicants in food and feed which are recommended by the CAC to be applied to commodities moving in international trade.



#### 1.2.2 Contaminant

Codex Alimentarius defines a contaminant as follows:

"Any substance not intentionally added to food, which is present in such food as a result of the production (including operations carried out in crop husbandry, animal husbandry and veterinary medicine), manufacture, processing, preparation, treatment, packing, packaging, transport or holding of such food or as a result of environmental contamination. The term does not include insect fragments, rodent hairs and other extraneous matter".

This standard applies to any substance that meets the terms of the Codex definition for a contaminant, including contaminants in feed for food-producing animals, except:

1) Contaminants having only food and feed quality significance (e.g. copper), but no public health significance, in the food(s) given that the standards elaborated within the Codex Committee on Contaminants in Foods (CCCF) has the objective to protect public health.

2) Pesticide residues, as defined by the Codex definition that are within the terms of reference of the Codex Committee on Pesticide Residues (CCPR).

3) Residues of veterinary drugs, as defined by the Codex definition, that are within the terms of reference of the Codex Committee on Residues of Veterinary Drugs in Foods (CCRVDF).

4) Microbial toxins, such as botulinum toxin and staphylococcus enterotoxin, and microorganisms that are within the terms of reference of the Codex Committee on Food Hygiene (CCFH).

5) Residues of processing aids that are within the terms of reference of the Codex Committee on Food Additives (CCFA)[1].

# Contaminants

## Codex Alimentarius definition(*)

"Any substance **not intentionally added to food or feed** for food producing animals, which is present in such food or feed as a result of the production (including operations carried out in crop husbandry, animal husbandry and veterinary medicine), manufacture, processing, preparation, treatment, packing, packaging, transport or holding of such food or feed, or as a result of environmental contamination. **The term does not include insect fragments, rodent hairs and other extraneous matter**".

**(*): CODEX STAN 193-1995, last amendment 2014**

# Contaminants Legislation Philosophy ALARA principle

- **Presence of contaminants cannot be completely avoided**
- **Contaminant levels in food and feed shall be As Low As Reasonably Achievable through best practice such as Good Agricultural Practice (GAP) & Good Manufacturing Practice (GMP) following an appropriate risk assessment.**
- **Limits set for those foods which contribute the most to consumers diets**
  - **Foods known to occur with high levels of contamination**
  - **Foods for vulnerable groups**

# Code of Practice (CoP) – Dried Fig

## *CCFAC 2006*

**Turkey introduced the document of 'Discussion Paper on the Development of a Maximum Level for Aflatoxins in Dried Figs' contained in CX/FAC 06/38/40 and proposed that the Committee consider new work on the development of a Maximum Level for aflatoxins in dried figs and of a Code of Practice for the prevention and reduction of aflatoxin contamination in dried figs.**

# CoP – Dried Fig

**In 2006, the Turkish National Code was taken as the basis to prepare the Draft Codex Code of Practice. In other words, although international Code of Practice for dried figs was only first published in 2008, the Code of Practice for dried figs has been applied in Turkey for a decade.**

1

# CODE OF PRACTICE FOR THE PREVENTION AND REDUCTION OF AFLATOXIN CONTAMINATION IN DRIED FIGS

*CAC/RCP 65-2008*

## INTRODUCTION

1. The elaboration and acceptance of a Code of Practice for dried figs by Codex will provide uniform guidance for all countries to consider in attempting to control and manage contamination by various mycotoxins, specifically aflatoxins. It is of high importance in order to ensure protection from aflatoxin contamination in both producer and importer countries. All dried figs should be prepared and handled in accordance with the Recommended International Code of Practice – General Principles of Food Hygiene[1] and Recommended International Code of Hygienic Practice for Dried Fruits[2] which are relevant for all foods being prepared for human consumption and specifically for dried fruits. It is important for producers

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Agenda Item 1

CX/CF 12/6/1
November 2011

**JOINT FAO/WHO FOOD STANDARDS PROGRAMME**

**CODEX COMMITTEE ON CONTAMINANTS IN FOODS**

**Sixth Session**
**Maastricht, The Netherlands, 26 – 30 March 2012**

| | | |
|---|---|---|
| 10 | Priority List of Contaminants and Naturally Occurring Toxicants Proposed for Evaluation by JECFA | CL 2009/34-CF<br>ALINORM 09/32/4 Appendix IX |
| | - Comments (in response to CL 2009/34-CF) | CX/CF 10/4/10 |
| 11 | Other Business and Future Work | |

# New substances – JECFA evaluation

**Nomination of new substances for the Priority List of Contaminants and Naturally Occurring Toxicants for evaluation by JECFA**

**1. Basic information**

1) Proposal for inclusion submitted by:

2) Name of compound; chemical name(s):

3) Identification of (additional) data (toxicology, metabolism, occurrence, food consumption) which could be provided to JECFA:

4) List of countries where surveillance data are likely to be available, and if possible list of contact person who could provide such data, including quality assurance information on the data.

5) Timeline for data availability:

**2. Detail information**

1) Whether or not the occurrence of the compound in commodities will have potential to cause public health and/or trade problems;

2) Whether or not commodities containing the compound are in international trade and represent a significant portion of the diet; and,

# Occurrence data – Dried Fig

***In 2006***

**Occurrence data (~ 37,622) in dried figs between the years 2003 – 2006 reported and toxicological evaluations of aflatoxins done by JECFA 68$^{th}$ meeting**

# Risk

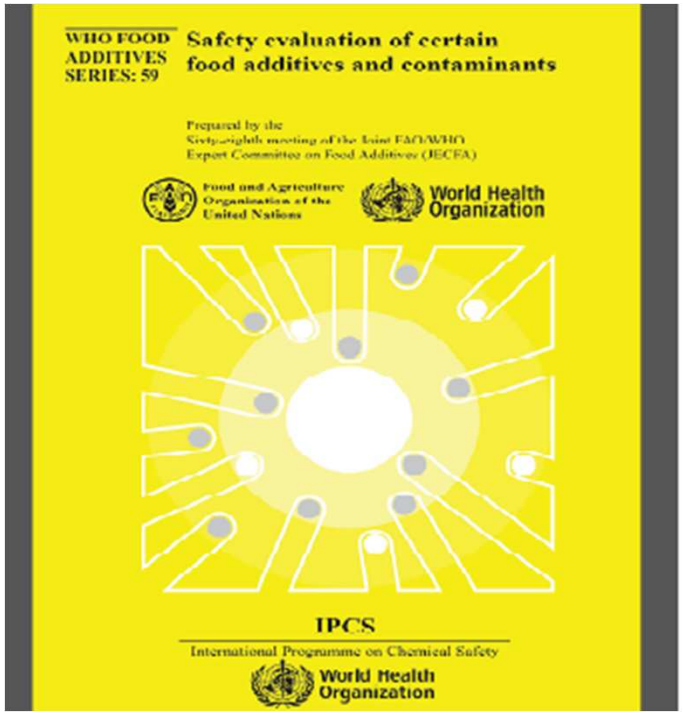
**Human (and animal) health risks depend on**

- **the mycotoxin toxicity**
- **contamination and**
- **the quantity of contaminated food consumed**

**Toxicological evaluation**

# JECFA 68th meeting, 2

## AFLATOXINS:
## IMPACT OF DIFFERENT HYPOTHETICAL LIMITS FOR ALMONDS, BRAZIL NUTS, HAZELNUTS, PISTACHIOS AND DRIED FIGS






*5.1.6 Turkey*

Turkey submitted occurrence data for 37 622 samples of dried figs to be exported for the 2003–2006 period (Turkish Ministry of Agriculture and Rural Affairs, 2007). AFL concentrations were reported as below the reporting limit (LOD and LOQ) for 8% of the dried fig samples. The most common LOD reported for $AFB_1$ was 0.2–0.3 µg/kg, and the LOD ranged between 0.1 and 0.4 µg/kg for the other AFL ($AFB_2$, $AFG_1$ and $AFG_2$). Average AFL concentrations for Turkish exported dried figs were around 0.6 µg/kg for $AFB_1$ and 1.0 µg/kg for AFT (as shown in Table 5 below).

**National surveillance data were collected all around the world**

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Agenda Item 1

CX/CF 12/6/1
November 2011

**JOINT FAO/WHO FOOD STANDARDS PROGRAMME**

**CODEX COMMITTEE ON CONTAMINANTS IN FOODS**

**Sixth Session**
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| 11 | Other Business and Future Work | |

# CCCF 2010



APPENDIX IX

## PROJECT DOCUMENT

## PROPOSAL FOR NEW WORK ON

## A MAXIMUM LEVEL FOR TOTAL AFLATOXIN IN DRIED FIG

**1. The purpose and scope of the project**

This project aims to establish a maximum level for total aflatoxin in ready-to eat dried figs.

**2. Relevance and timeliness**

Aflatoxins were evaluated by the JECFA at its 31st, 46th, 49th and its 56th meetings (AFM1 only). At its 49th meeting in 1997, JECFA considered estimates of the carcinogenic potency of aflatoxin and the potential risks associated with their intake. In the evaluation at its 68th meeting in 2008, the JECFA reported that Turkey is the main country producing dried figs, covering approximately 63% of the world market. The proportion of rejected dried figs samples from the world market would be between 1% for an ML set at 20 µg/kg or 10 µg/kg and 3% for an ML set at 4 µg/kg.

"A Code of Practice for the Prevention and Reduction of Aflatoxin Contamination in Dried Figs (N10-2007)" was adopted by the Codex Alimentarius Commission at its 31st Session. Therefore, there is a need for an international regulatory level, based upon scientific evidence, having as its goal the protection of human health with a minimum of economic impact on international trade.

**3. The main aspects to be covered**

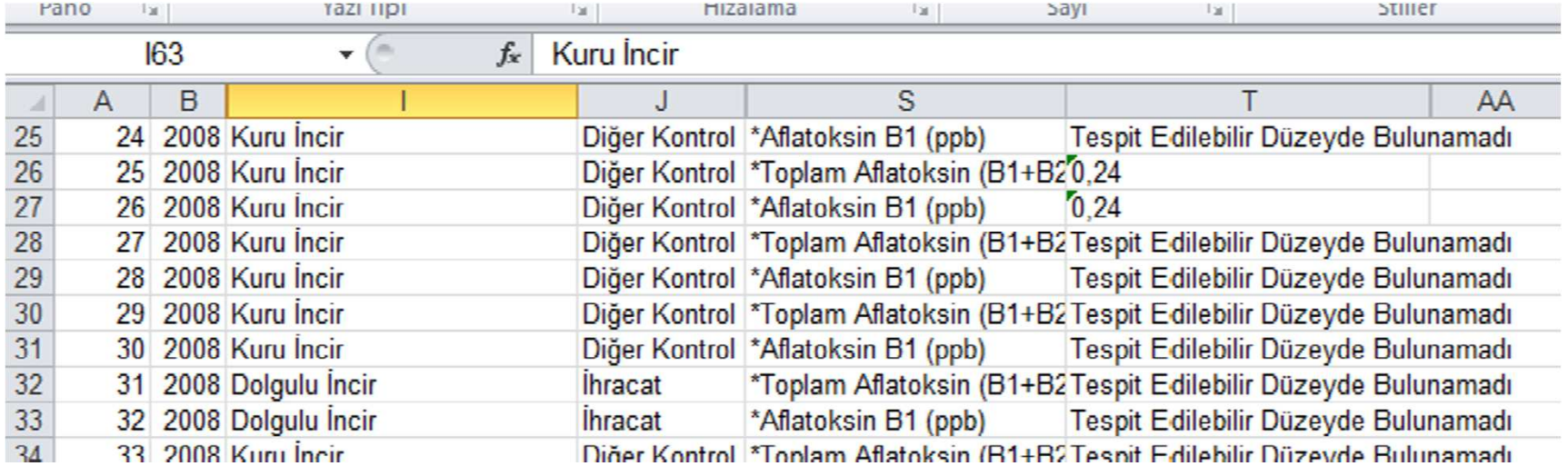
# Draft proposal document – Dried Fig

***In 2010***

- **Sending invitation letter to EWG members**
- **Updating occurrence data (~ 15,538) in dried figs between the years 2007 – 2010**
- **Preparing draft proposal document (at step 3)**

**(14 countries, 1 international NGO, FAO and WHO)**

# Difficulties – Dried Fig



Pano | Yazı Tipi | Hizalama | Sayı | Stiller

I63 — Kuru İncir

| | A | B | I | J | S | T | AA |
|---|---|---|---|---|---|---|---|
| 25 | 24 | 2008 | Kuru İncir | Diğer Kontrol | *Aflatoksin B1 (ppb) | Tespit Edilebilir Düzeyde Bulunamadı | |
| 26 | 25 | 2008 | Kuru İncir | Diğer Kontrol | *Toplam Aflatoksin (B1+B2 | 0,24 | |
| 27 | 26 | 2008 | Kuru İncir | Diğer Kontrol | *Aflatoksin B1 (ppb) | 0,24 | |
| 28 | 27 | 2008 | Kuru İncir | Diğer Kontrol | *Toplam Aflatoksin (B1+B2 | Tespit Edilebilir Düzeyde Bulunamadı | |
| 29 | 28 | 2008 | Kuru İncir | Diğer Kontrol | *Aflatoksin B1 (ppb) | Tespit Edilebilir Düzeyde Bulunamadı | |
| 30 | 29 | 2008 | Kuru İncir | Diğer Kontrol | *Toplam Aflatoksin (B1+B2 | Tespit Edilebilir Düzeyde Bulunamadı | |
| 31 | 30 | 2008 | Kuru İncir | Diğer Kontrol | *Aflatoksin B1 (ppb) | Tespit Edilebilir Düzeyde Bulunamadı | |
| 32 | 31 | 2008 | Dolgulu İncir | İhracat | *Toplam Aflatoksin (B1+B2 | Tespit Edilebilir Düzeyde Bulunamadı | |
| 33 | 32 | 2008 | Dolgulu İncir | İhracat | *Aflatoksin B1 (ppb) | Tespit Edilebilir Düzeyde Bulunamadı | |
| 34 | 33 | 2008 | Kuru İncir | Diğer Kontrol | *Toplam Aflatoksin (B1+B2 | Tespit Edilebilir Düzeyde Bulunamadı | |

**Antalya İl Kontrol Laboratuvar Müdürlüğü**
**2007-2008-2009-2010 Yıllarına Ait Kuru İncir ve İncir Ezmesi Numunelerindeki Aflatoksin Miktarları**

| Sıra No | Yıl | Rapor No | Denetim | | Ozel Istek | | Ithalat | | Ihracat | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Afl $B_1$ | Top.Afl | Afl $B_1$ | Top.Afl | Afl $B_1$ | Top.Afl | Afl $B_1$ | Top.Afl |
| | 2007 | - | - | - | | | | | | |
| 1 | 2008 | 80 | TEDB | TEDB | | | | | | |
| 2 | | 83 | TEDB | TEDB | | | | | | |
| 3 | | 109 | TEDB | TEDB | | | | | | |
| 4 | | 124 | TEDB | TEDB | | | | | | |
| 5 | | 153(I.ezmesi) | 0,66 | 0,66 | | | | | | |
| 6 | | 198 | TEDB | TEDB | | | | | | |
| 7 | | 205 | 152,37 | 213,31 | | | | | | |
| 8 | | 246(I.ezmesi) | 0,70 | 1,38 | | | | | | |
| 9 | | 355(I.ezmesi) | 57,26 | 98,11 | | | | | | |
| 10 | | 360 | 73,76 | 88,08 | | | | | | |
| 11 | | 361 | TEDB | TEDB | | | | | | |
| 12 | | 370 | - | - | 0,34 | 0,34 | - | - | - | - |
| 13 | | 430 | TEDB | TEDB | | | | | | |
| 14 | | 446(I.ezmesi) | 0,35 | 0,35 | | | | | | |
| 15 | | 448 | TEDB | TEDB | | | | | | |
| 16 | | 520 | 14,03±0,98 | 16,21±1,02 | | | | | | |
| 17 | | 522(I.ezmesi) | 12,50 | 18,82 | | | | | | |

# ***CCCF 2011***

**3**

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Agenda Item 7

CX/CF 11/5/7

December 2010

JOINT FAO/WHO FOOD STANDARDS PROGRAMME

CODEX COMMITTEE ON CONTAMINANTS IN FOODS

5th Session

The Hague, The Netherlands, 21 – 25 March 2011

## PROPOSED DRAFT MAXIMUM LEVELS FOR TOTAL AFLATOXINS IN DRIED FIGS (N11-2010)

Prepared by the Electronic Working Group led by Turkey

# Sampling plan – Dried Fig

***In 2011***

- **Sending invitation letter to EWG members**
- **totally 1280 dried fig samples were analyzed,** and the results of analyses were further evaluated statistically.
- **Preparing draft proposal sampling plan**

**(24 countries, 1 international NGO, FAO and WHO)**

# Sampling plan design – Dried Fig/1

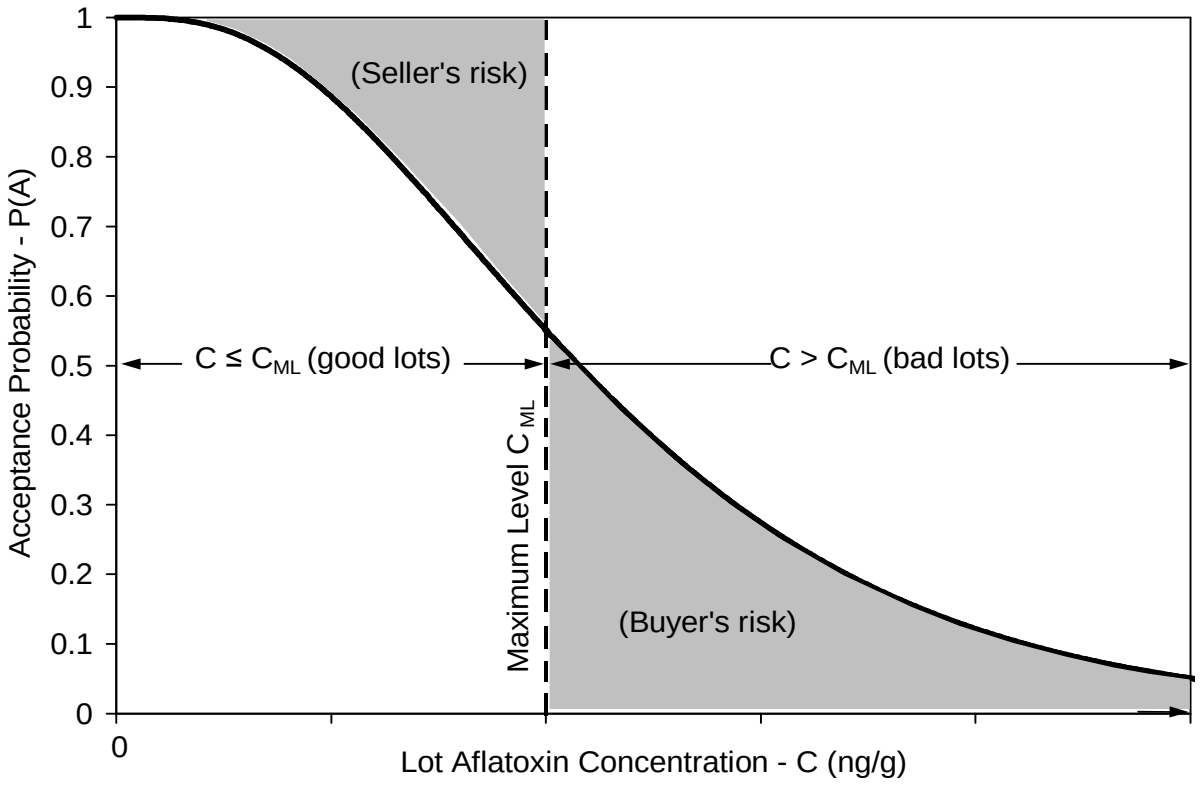
**A highly experienced team performed the sampling plan (who also prepared sampling plan for hazelnut)**

- **Sampling plan study structured by Dr. Tom Whitaker**
- **Statistical analysis by Dr. Tom Whitaker & Mr. Andrew Slate**
- **Sampling and analyses by TUBITAK Marmara Research Center in Turkey**
- **Sampling by authorized personnel of Aydın Provincial Directorate of MoFAL**
- **Other stakeholders (International Nut and Dried Fruit Foundation (INC), & the Aegean Dried Fruits Exporters' Association, Ege University, Fig Research Institute, Commodity Exchange, Farmers Cooperatives) provided support for the project at different stages**

# Sampling plan design – Dried Fig/2

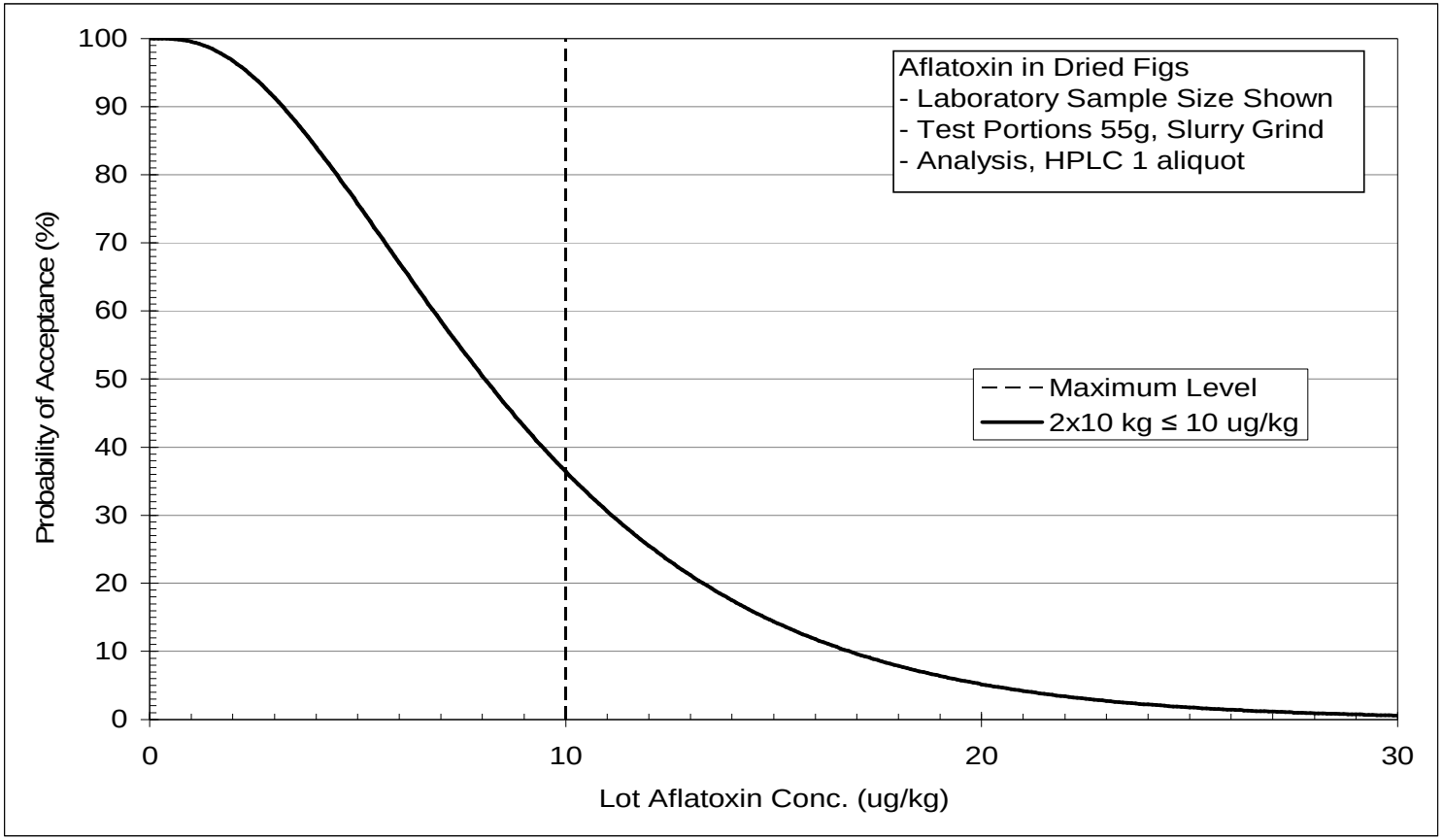
**Operating Characteristic (OC) curve is the function of**

- ✓ **Sample size**
- ✓ **Multiple samples**
- ✓ **Accept/reject level**



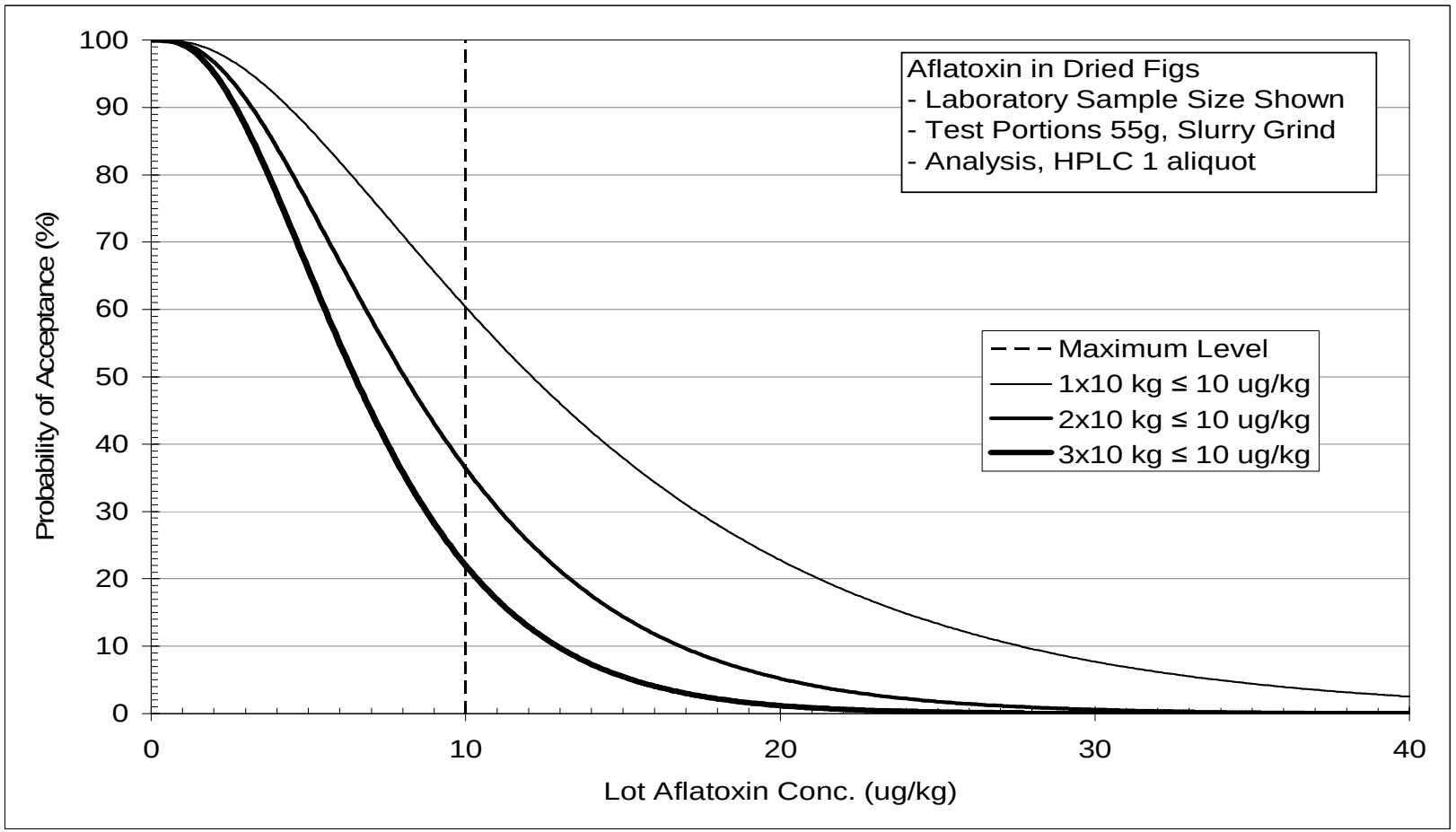
# Sampling plan design – Dried Fig/3

## Proposed draft for sampling plan 2x10 kg ≤ 10 µg/kg



# Sampling plan design – Dried Fig/4

## Sampling plan 2x10 kg or 3x10 kg
## ≤ 10 µg/kg



# ***CCCF 2012***

FINAL

REP12/CF APPENDIX VI

APPENDIX VI

## PROPOSED DRAFT MAXIMUM LEVELS FOR TOTAL AFLATOXINS IN DRIED FIGS (INCLUDING SAMPLING PLAN)

(At Step 5/8)

| Product Name | ML (µg/kg) |
|---|---|
| Dried Figs | 10 |

Annex

## SAMPLING PLAN FOR AFLATOXIN CONTAMINATION IN DRIED FIGS

DEFINITION

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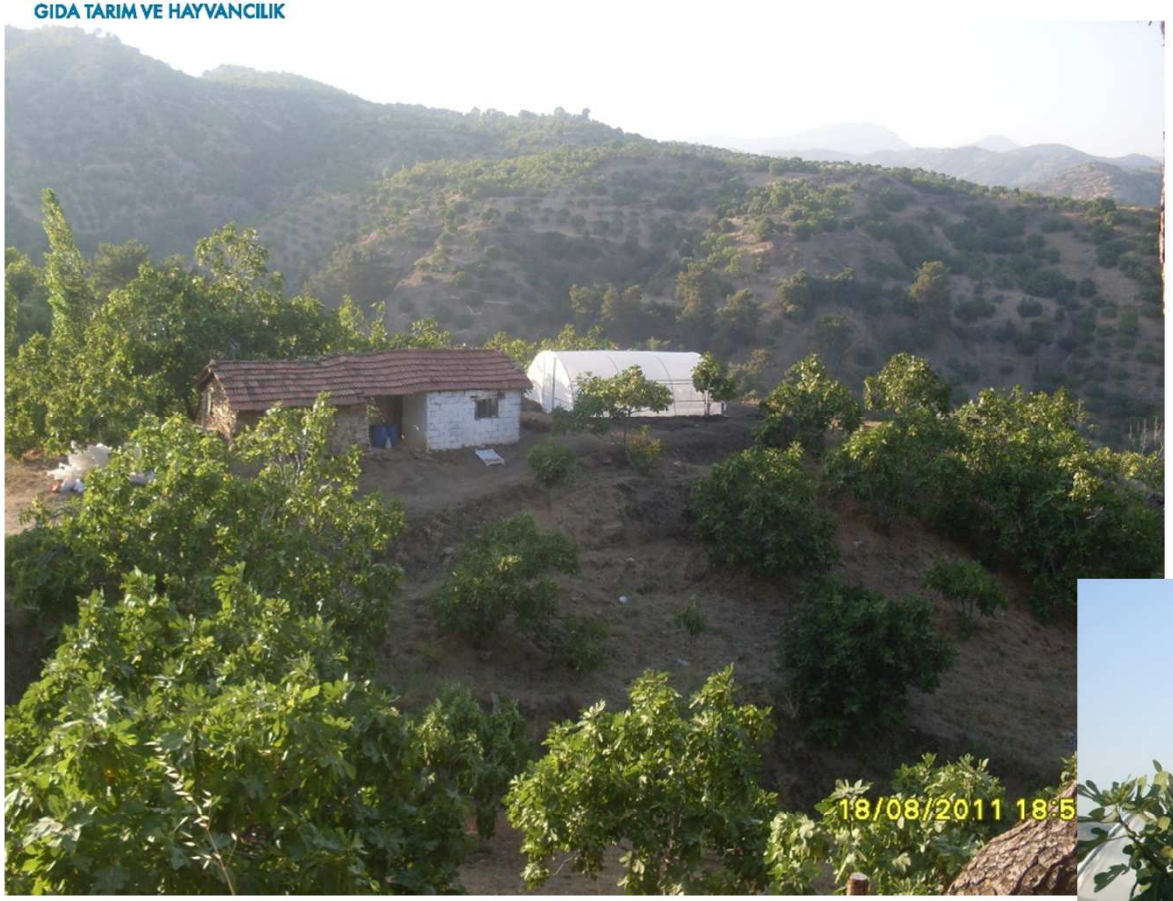
# *AFTER CCCF*

# Climatic conditions – Dried Fig

**Farmers and industries together with governmental leadership have been making considerable efforts voluntarily since the 1940s and consciously since 1988, to prevent fungal growth and aflatoxin formation in dried figs.**

**Particularly, in the case of dried figs, the climatic conditions cannot be controlled. The frequency and level of aflatoxin contamination shows variations according to yearly climatic conditions. Drought and excessive rain during maturation and drying period seem to trigger toxin formation.**

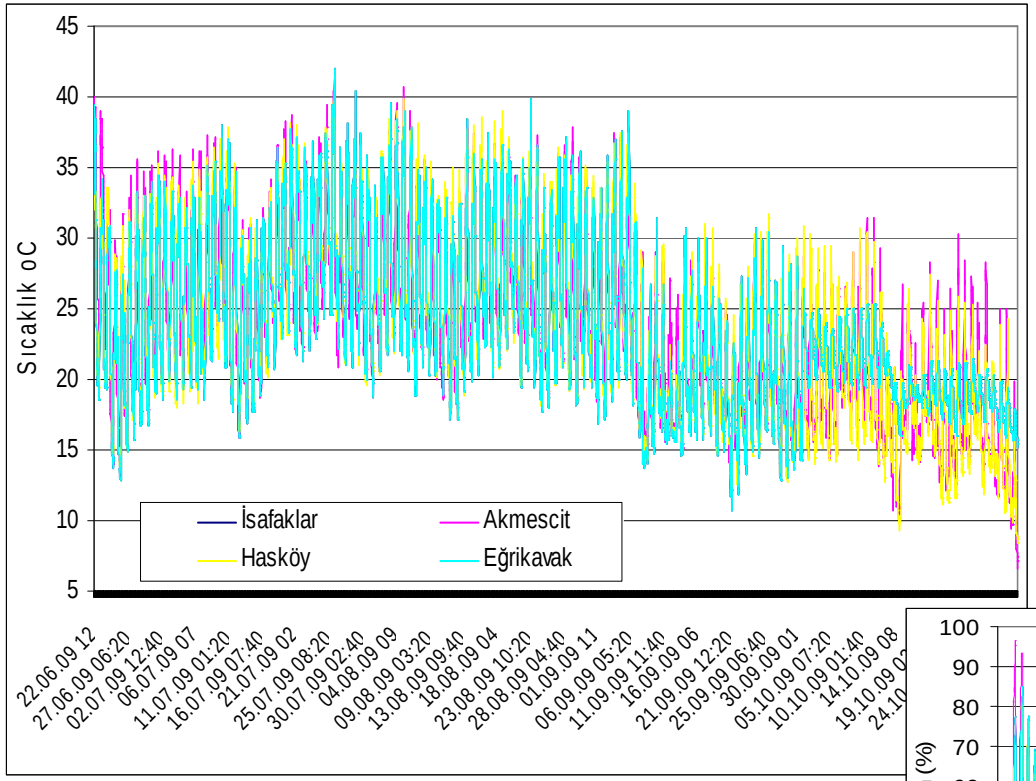
# Drying tunnels

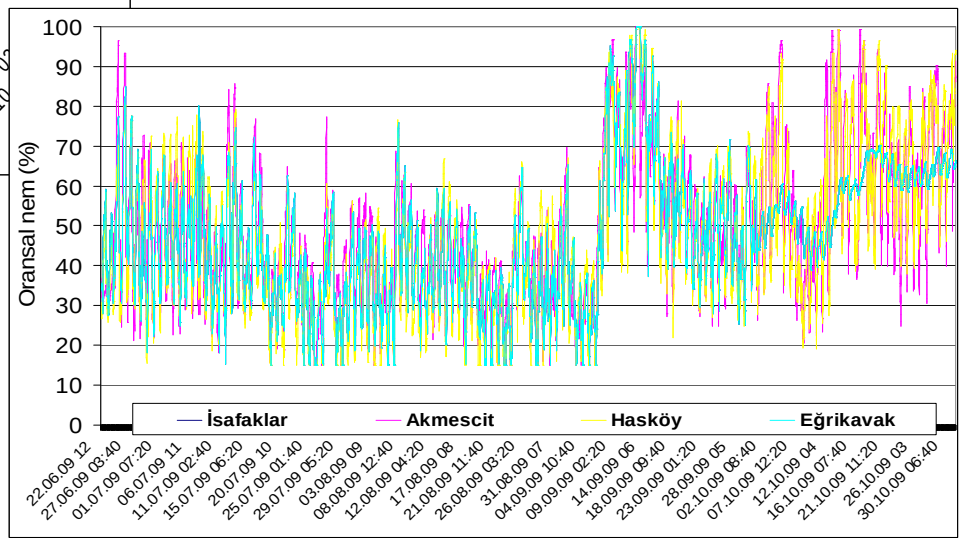



# Dried Fig

## Inside the tunnels:
## Higher temperatures & quick drying

# Collection of climatic data



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# *&*
# *THANK YOU*

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