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Burden of disease of dietary exposure to aflatoxins in European countries

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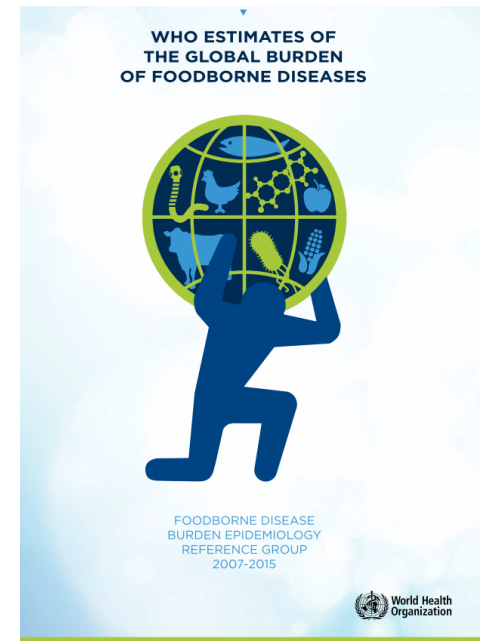


Introduction

“**Safer food saves lives.** With every bite one eats, one is potentially exposed to illness from either microbiological or chemical contamination.”

It is estimated that 210/100k people fall ill from unsafe food every year, in the WHO European Region.

Foodborne diseases can undermine gains in life expectancy, as they lead to **morbidity**, to **reduced quality of life** and contribute to **economic losses**.



Mycotoxins

Chemical contaminants that can negatively affect human and animal health

Aflatoxins (AFTs)

Carcinogenic mycotoxins (IARC group 1) causing hepatocellular carcinoma, the third leading cause of cancer deaths worldwide

Exposure

Recent estimates from EFSA, referred that grains and grain-based products made the largest contribution to the mean chronic dietary exposure to AFB₁ in all age classes

Introduction

Burden of disease associated with exposure to AFTs

Global level (WHO, 2015)	Europe (WHO, 2015)	Portugal (Assunção et al., 2018)	Portugal (Martins et al., 2020)
636,869 DALYs	0.5 (0.3-0.8) DALYs/100,000	0.08-0.30 DALYs/100,000 Consumption and occurrence data	1.7 DALYs/100,000 HBM data

Aim

Considering the recent risk assessment performed by EFSA (EFSA, 2020), **the aim of this work was to estimate the burden associated with the dietary exposure to AFTs across Europe.**

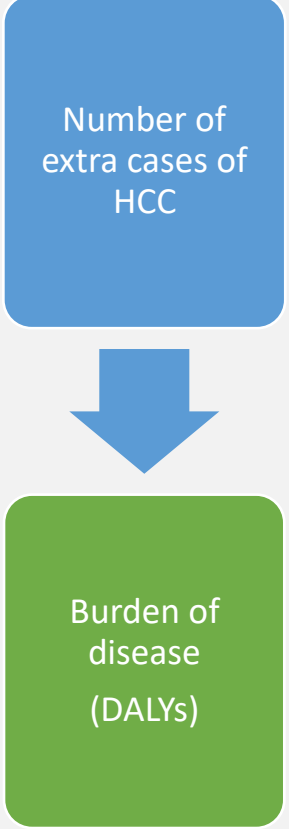
- EFSA scientific opinion “**Risk assessment of aflatoxins in food**” (EFSA, 2020):
 - data from occurrence of AFTs in food
 - data from food consumption
 - estimate the exposure to AFTs in 19 European countries
- **Dose-response**
 - **0.017** cases of HCC/100 000/year/ng/kg bw/day

Exposure
+
Dose-
response



- A **deterministic bottom-up approach** using the **DALY rate specific by country** was considered to estimate the health impact of the exposure to AFTs for the adult population
- **Disability-Adjusted Life Years (DALYs)** - associated to the number of estimated extra-cases of **hepatocellular carcinoma (HCC)** – the AFTs associated health endpoint considered in the risk assessment.

Number of
extra cases of
HCC



Burden of
disease
(DALYs)

Results & Discussion

Table 1. Exposure to aflatoxins estimates, number of extra-cases of HCC and number of DALYs associated with exposure for 19 European countries.

	Exposure AFTs (ng/kg bw/day)	Extra cases of HCC (n)	DALYs (DALY/100,000)
Mean	4.19	0.07	0.62
Median	3.96	0.06	0.58
Min	2.19	0.03	0.32
Max	6.60	0.11	0.97
Sum	79.69	1.35	11.76

European countries and respective DALY Rate (DALY/100,000): Austria (8.68), Belgium (7.29), Croatia (5.74), Czech Republik (4.05), Denmark (7.00), Estonia (5.36), Finland (8.36), France (11.15), Germany (10.61), Hungary (3.80), Ireland (5.99), Italy (6.24), Latvia (4.63), Netherlands (6.56), Portugal (9.83), Romania (4.72), Spain (7.83), Sweden (7.75), United Kingdom (8.35). Min = minimum; Max = Maximum; HCC = Hepatocellular carcinoma; DALY = Disability-Adjusted Life Years; AFT = Aflatoxins

Europe (WHO, 2015)

**0.5 (0.3-0.8)
DALYs/100,000**

Portugal (Assunção et al., 2018)

0.08-0.30 DALYs/100,000
Consumption and occurrence
data

Portugal (Martins et al., 2020)

1.7 DALYs/100,000
HBM data

Results & Discussion

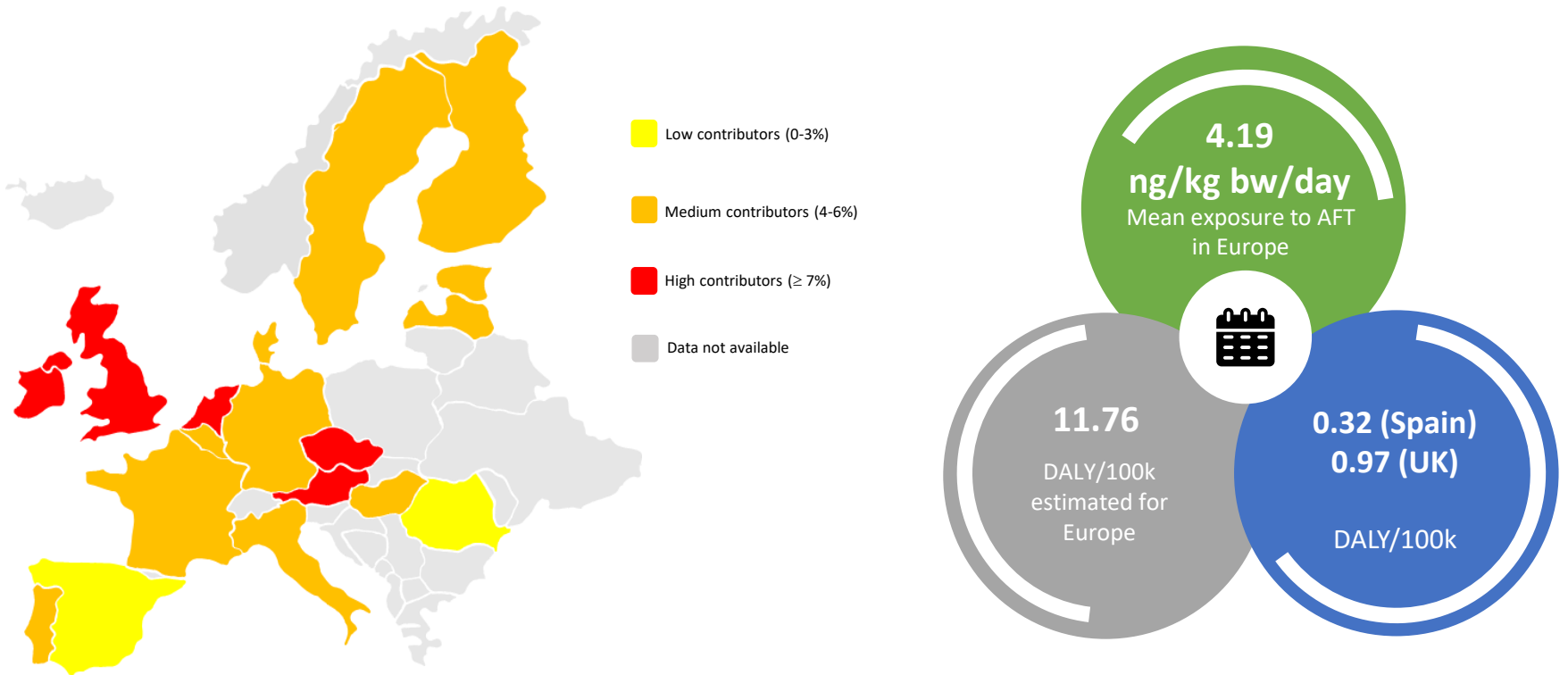


Figure 1. Contribution per country for the total burden associated with exposure to AFTs in Europe.

Conclusions

The present study characterized the **burden associated to the dietary exposure to AFTs** in the **European population** and may constitute a **baseline** for the following years.

Climate change consequences for cereal crops are expected to increase in the next years, being fundamental to implement measures for **control, adaptation and mitigation of AFTs**, to anticipate **negative effects on food safety and human health**.

The obtained results constitute **an important contribution** to define priorities and support the need for further policy actions **to protect European citizen's health**.



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Thank you!

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