

Food Allergies: The Enemy Within

Franz Ulberth

European Commission
Joint Research Centre
Institute for Reference Materials and Measurements

<http://www.jrc.ec.europa.eu>





- **Allergenic food can cause anaphylaxis, a life-threatening type of allergic reaction**
- **Severe anaphylaxis affects 1-3 per 10,000 people**

- **Allergy**

- **IgE mediated**
- **activate mast cells**
- **release of histamine**
- **dilation of small blood vessels**
- **Itching, swelling, skin rash, diarrhoea**

- **Intolerance**

- **not IgE mediated**
- **may be caused by overreacting T-cells damaging the lining of the gut (coeliac disease)**
- **may be caused by deficiency of enzyme activity (milk intolerance)**

**Fish allergies
in Iceland**

**Celeriac
allergies
Switzerland**



**North-south
divide in
sensitivity
towards
apple
(skin/flesh)**

**Peach and melon allergies
in the Mediterranean**

- **Only a few offending protein families:**
 - **Cupins (peanut, walnut, hazelnut)**
 - **Prolamins (sesame, peach, wheat, rye)**
 - **Plant defence system proteins (banana, avocado, celery, apple)**
 - **Profilins (celery, banana, melon)**



- **At the moment no cure for food allergy**
- **Allergic people have to protect themselves by avoiding the offending foods**
- **Critical importance of food labelling**
- **Certified allergen-free production environments**



- informs consumers on the contents and the composition of food products
- helps consumers to make an informed choice while purchasing their foodstuffs

Caramels with Milk Chocolate Centres

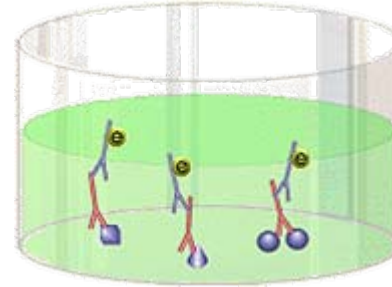
Ingredients: Glucose syrup, Sugar, Milk chocolate (18%) (Milk, Sugar, Cocoa mass, Cocoa butter, Vegetable fat, Emulsifier (E442), Flavourings), Dried whole milk, Hydrogenated vegetable oil, Emulsifier (E471), Salt, Flavouring.

CONTAINS SULPHITES. MAY CONTAIN TRACES OF PEANUT, NUT AND WHEAT.

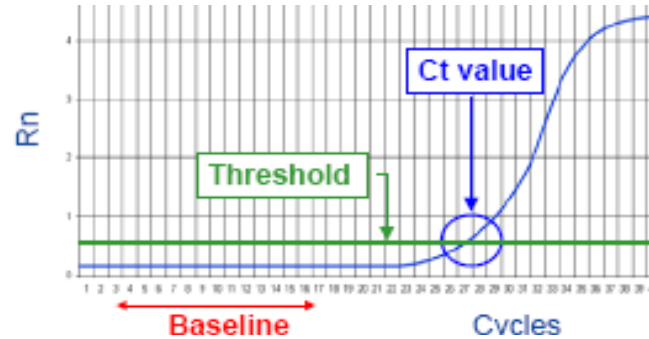
Nutrition Information		Per Sweet	Per 100g
Energy	kJ	135	1910
	kcal	35	455
Protein	g	0.3	4.5
Carbohydrate	g	5.0	68.9
Fat	g	1.3	17.9

Allergen detection methodology

Immunology,
e.g. Elisa

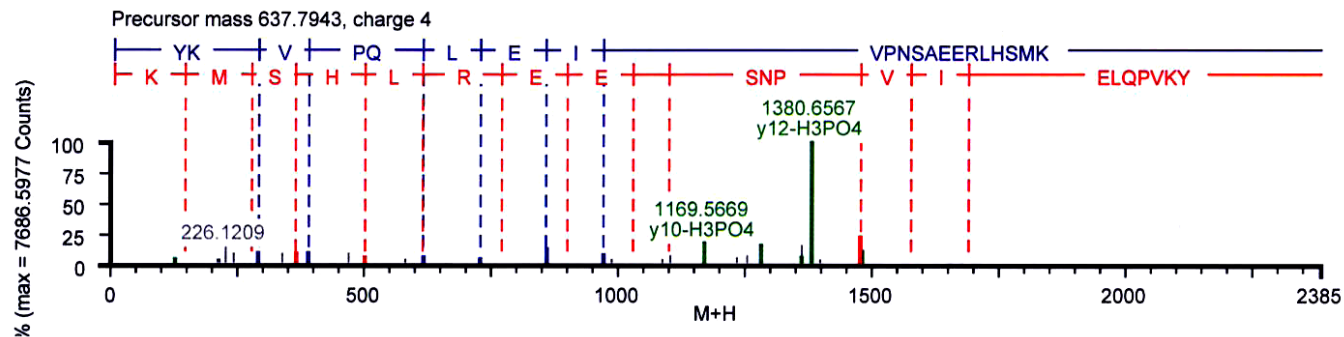


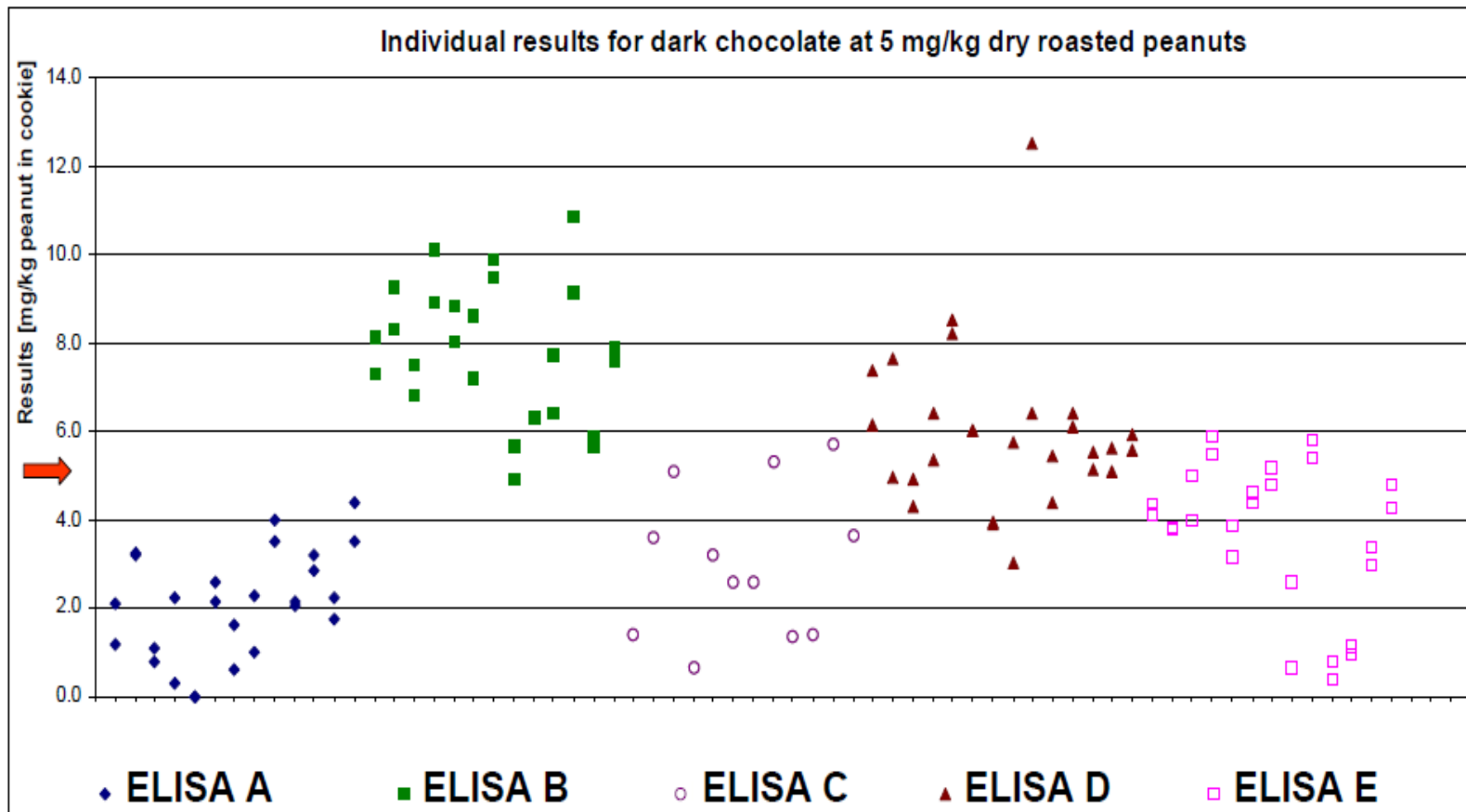
Molecular
biology,
e.g. PCR



Fragmentation for Peptide - 2547.2554

Protein chemistry



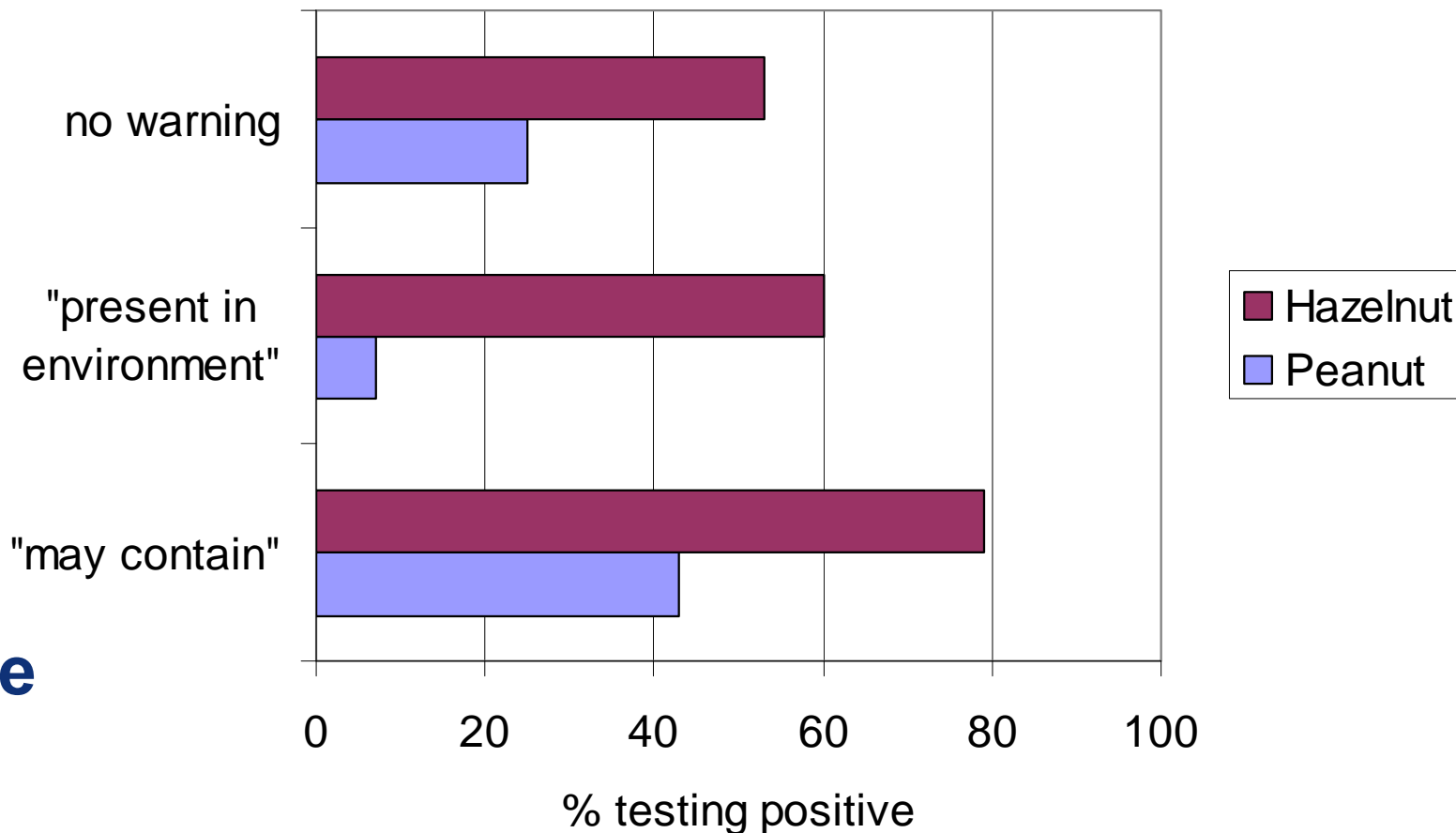


Spiking level

Poms *et al.* (2005)



254 chocolate samples



Buckwheat

Egg

Milk

Peanut

Cereals containing gluten

Tree nuts

Crustaceans*

Fish

Soybean

Sesame seed

Sulphites

Celery

Mustard

Molluscs*

Lupin

Japan & South Korea

USA

**Canada,
Australia,
New Zealand**

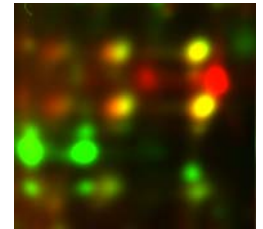
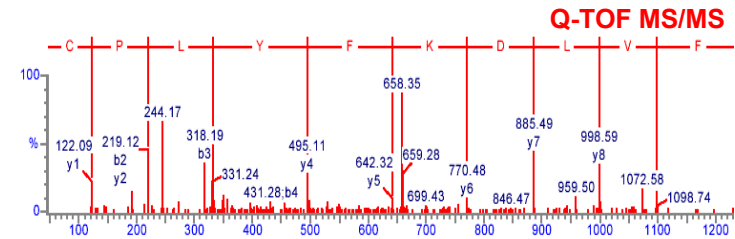
EU

Mandated by Codex Alimentarius

Codex Alimentarius

- Dietary foods may be labelled “gluten-free” if gluten level does not exceed 20 mg/kg
- Foods specially processed to reduce gluten content to above 20 mg/kg but below 100 mg/kg (labelling of those products will be decided at national level → in EU labelled as “very low gluten”, Regulation (EC) No 41/2009)
- Method of analysis will be based on immuno-chemistry
 - Gluten is a *cultivar* dependent complex protein mixture
 - *Processing* (heating, fermentation) changes apparent gluten content
 - Results *assay specific*

- **Harmonisation needs**
 - **Analytical methods**
 - **Screening**
 - **Confirmation**
 - **Labelling**
 - **Precautionary labelling**
- **Thresholds for mandatory labelling**
- **Allergen management programmes**



Thank you!