Acrylamide in Food

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Self-Regulation: a false promise for public health?
European Parliament
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A quick poll ....

How do you like your morning toast?

A

B

C

And your French fries?

D

E
What is acrylamide (AA)?

- AA is a chemical used in certain industrial processes (e.g. in making paper, dyes, and plastics). Small amounts are also found in some consumer products (caulk, some adhesives) and in cigarette smoke.

- AA also naturally forms when starchy food products are cooked at high-temperature (home-cooking and industrial processing). The main chemical reaction is known as the “Maillard reaction” (or browning).

Source: EFSA, 2014
How was acrylamide discovered in food?

• In 2002, Swedish scientists released new findings that AA is formed during food processing/preparation and occurs in a variety of fried and baked common foodstuffs.

• New analytical methods were developed and Swedish findings were rapidly confirmed in several countries (UK, Switzerland, Norway and USA).

• AA found in a range of foodstuffs. The duration and temperature of cooking determines the amount of acrylamide produced.
Health risks from acrylamide

- Lab tests show that AA in the diet causes cancer in animals.

- Scientists conclude that regularly eating food containing high levels of AA potentially increases the cancer risk for consumers of all ages.

- Other possible, but less likely, consequences are damage to the nervous and reproductive systems.

- It is virtually impossible to eliminate AA from cooked starchy foods. AA amounts found in food should be reduced as much as possible.
An old story ...

- FAO/WHO consultation (2002): AA presence in food recognised as a major concern for humans based on the ability of AA to induce cancer. Recommendation for further studies.

- Scientific Committee on Food (2002): recommended that levels of AA in food should be as low as reasonably achievable (ALARA).

- JECFA (2005), EFSA (2005): efforts to reduce AA concentrations in foodstuffs should continue. More data needed on carcinogenicity and long-term neurotoxicity.

- JECFA (2010): confirmed previous evaluation.


- EFSA (2015): acrylamide in food potentially increases the risk of developing cancer for consumers in all age groups.
Actions so far

- **Voluntary efforts** by industry to reduce AA levels in processed foods since 2002
  - “toolbox” and Codes of Practice with mitigation measures per category of products

- **Monitoring** of AA concentrations in food over time
  - Recommendation 2010/307/EU: No time-limit, regular assessment of need to continue monitoring

- Setting of “indicative values” in 2011
  - For foodstuffs known to contain high AA levels (incl. French fries, potato crisps, soft bread, breakfast cereals, instant coffee, etc.)
  - Member States required to investigate cases where AA levels above the indicative values
  - Indicative values reviewed in 2013. Monitoring to continue.
What effect, if any, on acrylamide levels in food?

- **EFSA (2012)** - Update on AA levels in food from monitoring years 2007 to 2010

  ➢ **No consistent downward trend** in all relevant foodstuffs

  ➢ Indicative values exceeded for 3–20 % of samples in different food categories (2010 monitoring data)

- Implementation of toolbox/mitigation measures by food business operators (especially small ones) insufficient.

Tests by consumer organisations (I)

En test : chips, pains suédois et frites maison

Salons values directives of the Commission européenne les frites peuvent contenir au max. 606 μg/kg d’acrylamide, les chips 1900 μg/kg et les petits pains suédois 450 μg/kg. Certains des échantillons analysés principalement des chips, obtennent un — ou un ©, ce qui signifie qu’ils contiennent plus ou beaucoup plus d’acrylamide que ce qui est autorisé.

- frites : 9 échantillons
- chips : 46 échantillons
- pains grillés : 10 échantillons

Source: Test-Achats, Belgium, 2014 (French fries, crisps and toasted bread)

Source: FRC, Switzerland, 2016 (beers)
# Tests by consumer organisations (II)

<table>
<thead>
<tr>
<th>PATATAS FRITAS Y APERITIVOS</th>
<th>PRECIO</th>
<th>RESULTADOS</th>
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**Source:** OCU, 2012 (crisps)

**Source:** Consumentenbond, 2013 (crisps)
What is the European Commission proposing?

- Mandatory application of industry Codes of Practice (CoPs).
- Food business operators would be required to:
  - Assess suitability of CoP mitigation measures and apply those that are "effective and reasonable" in order to reduce AA in their products to levels which are 'As Low As Reasonably Achievable' (ALARA)
  - Monitor AA levels in finished products at least annually.
Why it is not enough

- Indicative values for AA levels are too high

<table>
<thead>
<tr>
<th>Product type</th>
<th>MS-reported mean AA values (2010-2013)</th>
<th>MS-reported P95 AA values (2010-2013)</th>
<th>EU indicative values (2013)</th>
<th>Danish indicative values (2016)</th>
</tr>
</thead>
<tbody>
<tr>
<td>French fries ready-to-eat</td>
<td>332</td>
<td>1115</td>
<td>600</td>
<td>550</td>
</tr>
<tr>
<td>Potato crisps &amp; snacks</td>
<td>580</td>
<td>1841</td>
<td>1000</td>
<td>750</td>
</tr>
<tr>
<td>Wheat-based soft bread</td>
<td>38</td>
<td>120</td>
<td>80</td>
<td>50</td>
</tr>
<tr>
<td>Non-wheat based soft bread</td>
<td>46</td>
<td>203</td>
<td>150</td>
<td>100</td>
</tr>
<tr>
<td>Roasted coffee</td>
<td>244</td>
<td>563</td>
<td>450</td>
<td>400</td>
</tr>
<tr>
<td>Instant coffee</td>
<td>674</td>
<td>1133</td>
<td>900</td>
<td>800</td>
</tr>
</tbody>
</table>

- Based on AA data reported in EFSA 2015 scientific opinion on acrylamide (pp37-38). AA levels expressed in µg/kg.
- MS data collected between 2010-2013.
- EU values established by EC Recommendation 2013/647/UE
- Danish values adopted in January 2016
Why it is not enough (cont’d)

• Industry not taking acrylamide issue seriously enough even when aware of toolbox/CoPs.

In large industrial-scale manufacturers where the toolbox was well known, some elements of it had been implemented or at least tried out in studies.

Several FBOs replied that although aware of the toolbox, they had not implemented the relevant parts of it. The following reasons were given:
- HACCP plan already considers this aspect, no need for further action
- too costly to implement, laboratory testing too costly (several replies)
- there are no legal limits (several replies)
- not acceptable to make changes / organoleptic properties altered if changes to process conditions or recipes are made
- lack of expertise

Source: European Commission [presentation](#) (2014)

• CoPs leave too much leeway to food businesses to ignore mitigation measures
What is needed

• **Legally binding** maximum limits must be set.

• Existing “indicative values” are outdated and need **immediate revision and then regular update** to keep up with technological progress.

• CoPs need to make it clearer to food businesses that they **have to apply mitigation measures** to avoid or minimise acrylamide formation.

• **Minimum frequencies of controls** by national authorities must be set to verify that the AA maximum limits are complied with.
What about consumers at home?

How to cut down on acrylamide (TIPS)

National authorities in the EU offer advice to consumers tailored to national eating habits and culinary traditions. Also, a careful selection of raw materials and cooking practices can help limit acrylamide formation. A rule of thumb is: “Don’t burn it, lightly brown it.” Further examples of tips from national authorities:

- **During frying**, follow recommended frying times and temperatures to avoid overcooking, excessive crisping and burning.
- **Toast** bread to a golden yellow rather than brown colour.
- **Cook potato products** like French fries and croquettes golden yellow rather than brown.
- **Do not store potatoes in the refrigerator** as this increases acrylamide production during cooking in a dark, cool place.

Source: EFSA

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L’art de bien cuire les frites

Le mode de préparation des frites influence la formation d’acrylamide. Quelques conseils:

- Conservez les pommes de terre à l’abri de la lumière, entre 4 et 8°C. En deçà, des sucs se forment, ce qui favorise la formation d’acrylamide.
- Evitez les “vieilles” pommes de terre car elles contiennent plus de sucs et brunissent donc plus vite pendant la cuisson. Or, les frites brunes contiennent généralement beaucoup d’acrylamide.
- Plongez d’abord les pommes de terre dans de l’eau chaude ou blanchissez-les pour réduire la teneur en sucs réducteurs, qui sont ensuite transformés en acrylamide. Séchez bien les frites en les tamponnant avant de les plonger dans l’huile.

Source: Test-Achats

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 MODELO CONVENCIONAL MAIS BARATO

**Com óleo**

A resistência situá-se no fundo da cuba, junto ao sensor de temperatura que está ligado ao termostato. Esta liga ou desliga a corrente, para manter a temperatura definida.

- **Mais barata** Proporciona fritos mais saborosos
- **Maior quantidade de gordura nos fritos** Requer maior quantidade de óleo

**Sem óleo**

A resistência elétrica a que o ar que, devido a um ventilador, circula pelo interior do recipiente onde estão os alimentos.

- **Requer pouco** ou nenhum óleo para fritar
- **Mais cara e demora mais tempo a fritar** Origina formação de maior quantidade de acrilamida

Source: DECO
Thank you for your attention

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