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## **L'integrazione delle fonti di informazione: l'acrilamide**

La stampa ha riportato, in una serie di articoli, un allarme intorno a questa sostanza: risulta presente in alimenti amidacei portati ad alta temperatura (prodotti da forno p.e.).

Una società produttrice di prodotti da forno, vuole accertare se possa rappresentare un problema per reale.

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## **Si può cominciare dal raccogliere documentazione conoscitiva sull'acrilamide**

Le prime domande da porsi:

- che cos'è?
  - come si forma?
  - è effettivamente tossica?
  - esistono dei livelli limite?
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Le notizie comparse sulla stampa sono derivate dalla pubblicazione di uno studio dell'Università di Stoccolma, che parlava della sostanza solo come di “probabile carcinogeno umano”

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L'acrilamide è sostanza nota, usata per la fabbricazione di polimeri.

La nuova attenzione nei suoi confronti (2002) è stata originata dalla constatazione che se ne forma durante la cottura di alimenti (cereali, patate) ad alte temperature (cottura in forno, frittura, grigliatura)

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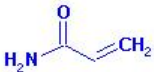
ChemIDplus Lite - A searchable database of 360,000+ chemical substance records - Microsoft Internet Explorer

Indirizzo <http://chem2.sis.nlm.nih.gov/chemidplus/jsp/chemidlite/ChemInfo.jsp?type=notes>

National Library of Medicine  
Specialized Information Services

**ChemIDplus Record**

Acrylamide  
RN: 79-06-1



**Note**  
A colorless, odorless, highly water soluble vinyl monomer formed from the hydration of acrylonitrile. It is primarily used in research laboratories for electrophoresis, chromatography, and electron microscopy and in the sewage and wastewater treatment industries.

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Customer Service: [tehip@tehl.nlm.nih.gov](mailto:tehip@tehl.nlm.nih.gov)  
Last modified on October 1, 2003.

National Library of Medicine, nelle sue banche dati, ne descrive la formula, gli usi, la tossicità (e il RN)

UI - 22255685  
PMID- 12368844  
DA - 20021007  
DCOM- 20021017  
IS - 0028-0836  
VI - 419  
IP - 6906  
DP - 2002 Oct 3  
TI - Acrylamide is formed in the Maillard reaction.  
PG - 448-9  
AB - Reports of the presence of acrylamide in a range of fried and oven-cooked foods have caused worldwide concern because this compound has been classified as probably carcinogenic in humans. Here we show how acrylamide can be generated from food components during heat treatment as a result of the Maillard reaction between amino acids and reducing sugars. We find that asparagine, a major amino acid in potatoes and cereals, is a crucial participant in the production of acrylamide by this pathway.  
AD - School of Food Biosciences, The University of Reading, Whiteknights, Reading RG6 6AP, UK. d.s.dottram@reading.ac.uk  
FAU - Mottram, Donald S  
AU - Mottram DS  
FAU - Wedzicha, Bronislaw L  
AU - Wedzicha BL  
FAU - Dodson, Andrew T  
AU - Dodson AT

Medline è ricca di informazioni sull'argomento: si trovano riferimenti a studi sul meccanismo di formazione

**ACRYLAMIDE IN FOOD**  
**- Mechanisms of formation and influencing factors**  
**during heating of foods**

**Report from Swedish Scientific Expert Committee:**

Prof. Spiros Grivas  
Prof. Margaretha Jägerstad  
Assoc. Prof. Hans Lingnert (chairman)  
Assoc. Prof. Kerstin Skog  
Assoc. Prof. Margareta Törnqvist  
Prof. Per Åman

La formazione nei  
processi di cottura ha  
indotto le autorità  
svedesi a costituire  
una Commissione per  
studiare il problema: i  
primi lavori risultano  
reperibili in rete



EUROPEAN COMMISSION  
HEALTH & CONSUMER PROTECTION DIRECTORATE-GENERAL  
Directorate C - Scientific Opinions  
C2 - Management of scientific committees; scientific co-operation and networks

Scientific Committee on Food

SCE/CS/CNTM/CONT/4 Final  
3 July 2002

**Opinion  
of the Scientific Committee on Food  
on new findings regarding the presence  
of acrylamide in food**

(expressed on 3 July 2002)

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[http://europa.eu.int/comm/food/fs/sc/scf/index\\_en.html](http://europa.eu.int/comm/food/fs/sc/scf/index_en.html)

Anche l'Unione  
Europea ha riunito  
degli esperti ad  
esaminare il problema  
e rende pubblici i loro  
lavori



**Table 1.** Acrylamide levels in different foods and food product groups from Norway, Sweden, Switzerland, the United Kingdom and the United States of America

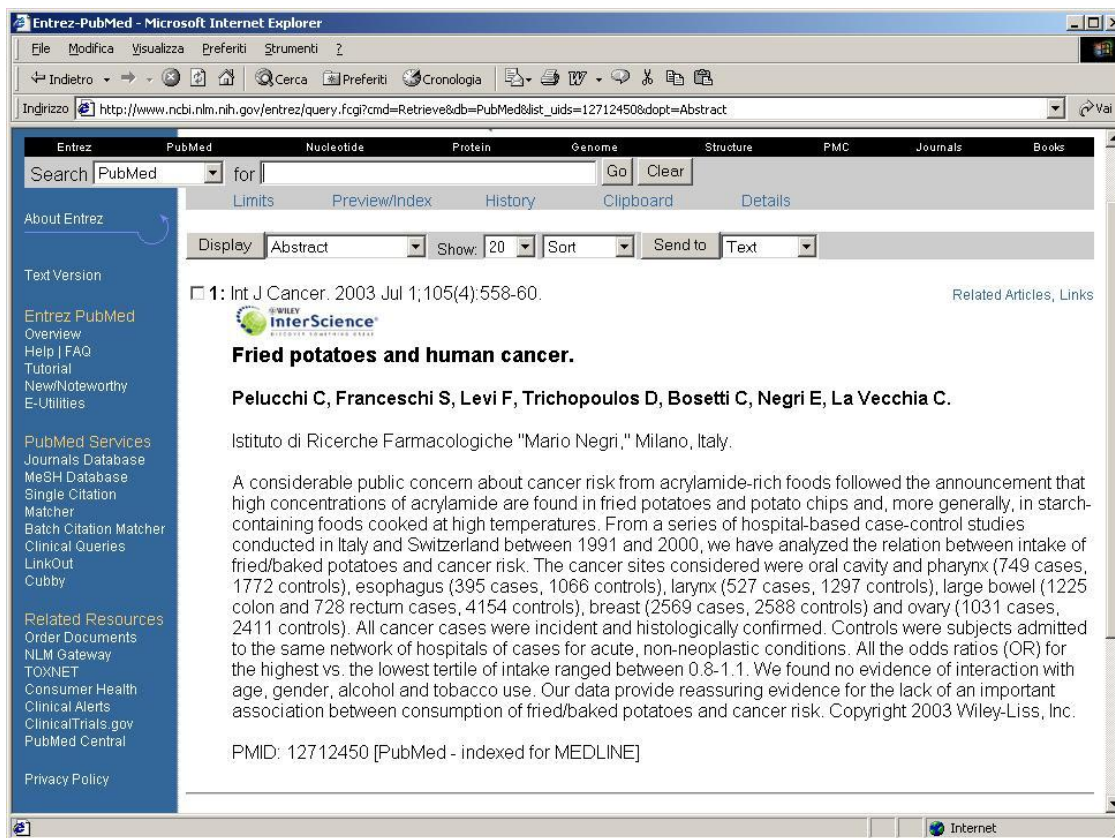
Food/Product Group	Acrylamide levels ( $\mu\text{g}/\text{kg}$ ) <sup>1</sup>			
	Mean <sup>2</sup>	Median <sup>2</sup>	Minimum – Maximum	Number of samples
Crisps, potato/sweet potato <sup>3</sup>	1312	1343	170 – 2287	38
Chips, potato <sup>4</sup>	537	330	<50 – 3500	39
Batter based products	36	36	<30 – 42	2
Bakery products	112	<50	<50 – 450	19
Biscuits, crackers, toast, bread crisps	423	142	<30 – 3200	58
Breakfast cereals	298	150	<30 – 1346	29
Crisps, corn	218	167	34 – 416	7
Bread, soft	50	30	<30 – 162	41
Fish and seafood products, crumbed, battered	35	35	30 – 39	4
Poultry or game, crumbed, battered	52	52	39 – 64	2
Instant malt drinks	50	50	<50 – 70	3
Chocolate powder	75	75	<50 – 100	2
Coffee powder	200	200	170 – 230	3
Beer	<30	<30	<30	1

Da un report di  
FAO/WHO sono  
ricavabili  
indicazioni sui  
livelli medi di  
acrilamide nei cibi  
più comuni

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Da documenti dell'Organizzazione Mondiale della Sanità risulta che:

- l'apporto dietetico giornaliero medio di acrilamide è stimato in un range compreso tra 0.3 e 0.8 microgrammi per kg. di peso corporeo
  - la dose tossica giornaliera è stimata in quattro o cinque ordini di grandezza rispetto al consumo medio
-



MedLine recensisce, tempo dopo, uno studio dell'istituto Mario Negri, che minimizza il ruolo dell'acrilamide alimentare nella cancerogenesi

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## Riassumendo:

- istituzioni internazionali non hanno giustificato allarmi, ma avviato studi e monitoraggi a lungo termine
  - i sistemi di produzione di prodotti da forno non necessitano di interventi correttivi
  - studi sul meccanismo di formazione sono in corso e i risultati consentiranno di ridurre ulteriormente la formazione della sostanza
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I primi risultati pratici, in termini di soluzioni a problemi produttivi, si possono individuare da una ricerca brevettuale

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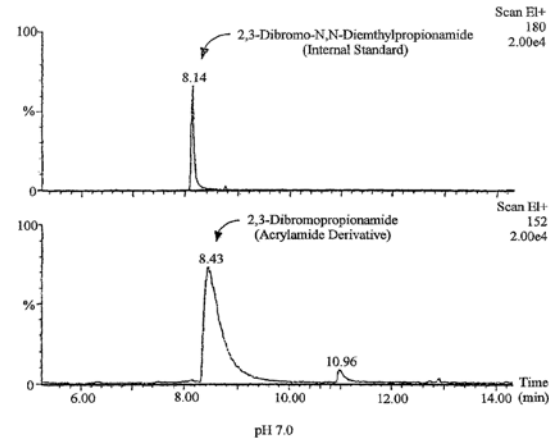
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[Continued on next page]

(54) Title: METHOD FOR THE REDUCTION OF ACRYLAMIDE FORMATION



(57) Abstract: The present invention relates to a method for the reduction of acrylamide formation, in which a nucleophilic a-amino group (-NH<sub>2</sub>) is protonated and converted into a non-nucleophilic amine (-NH<sub>3</sub><sup>+</sup>). The inventive method has the effect of allowing the formation of acrylamide to be highly reduced by simple treatment with a pH-lowering agent. Particularly, when applied to foods or foods ingredients, the inventive method has the effect of allowing the formation of acrylamide to be highly reduced without affecting the flavor and color of the foods or foods ingredients.

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- (74) Agents: HOLLIDAY, Louise, Caroline et al.; D Young & Co., 120 Holborn, London EC1N 2DY (GB).
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(54) Title: ENZYMATIC PROCESS FOR ACRYLAMIDE REDUCTION IN FOODSTUFFS

(57) Abstract: There is provided a process for the prevention and/or reduction of acrylamide formation and/or acrylamide precursor formation in a foodstuff comprising (i) a protein, a peptide or an amino acid and (ii) a first reducing sugar; the process comprising the steps of: (a) contacting the foodstuff with a first enzyme capable of converting the first reducing sugar into a second reducing sugar; and (b) contacting the foodstuff with a second enzyme capable of oxidising a reducing group of the second reducing sugar.