Société Française de Toxicologie: 33ème Congrès

Évaluation du risque de produits néoformés au cours du process

L'ACRYLAMIDE

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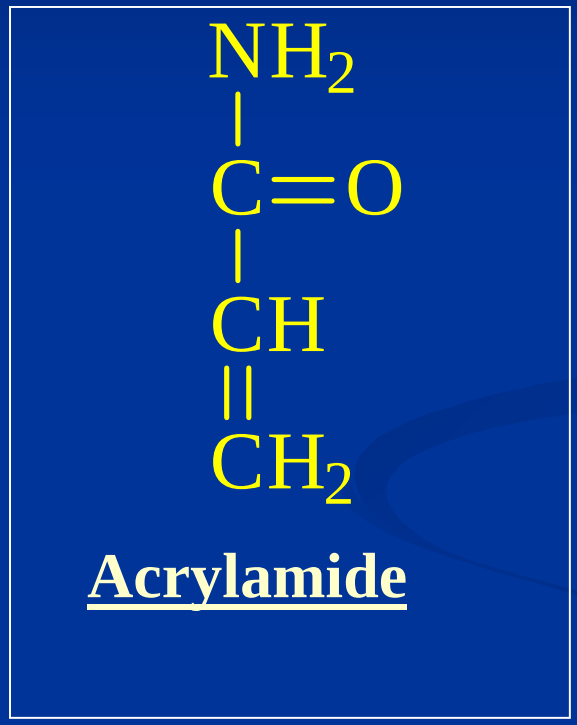
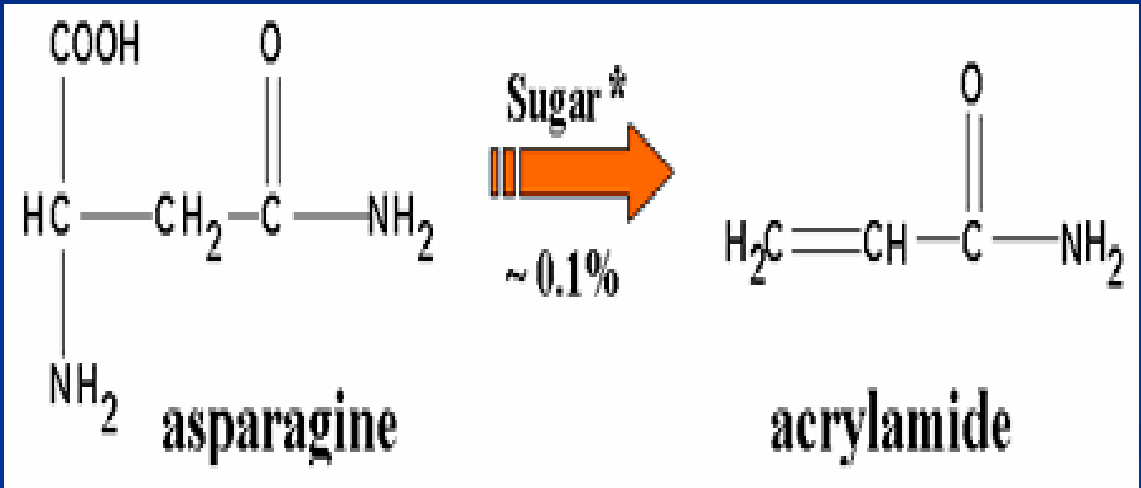


Acrylamide

ACRYLAMIDE

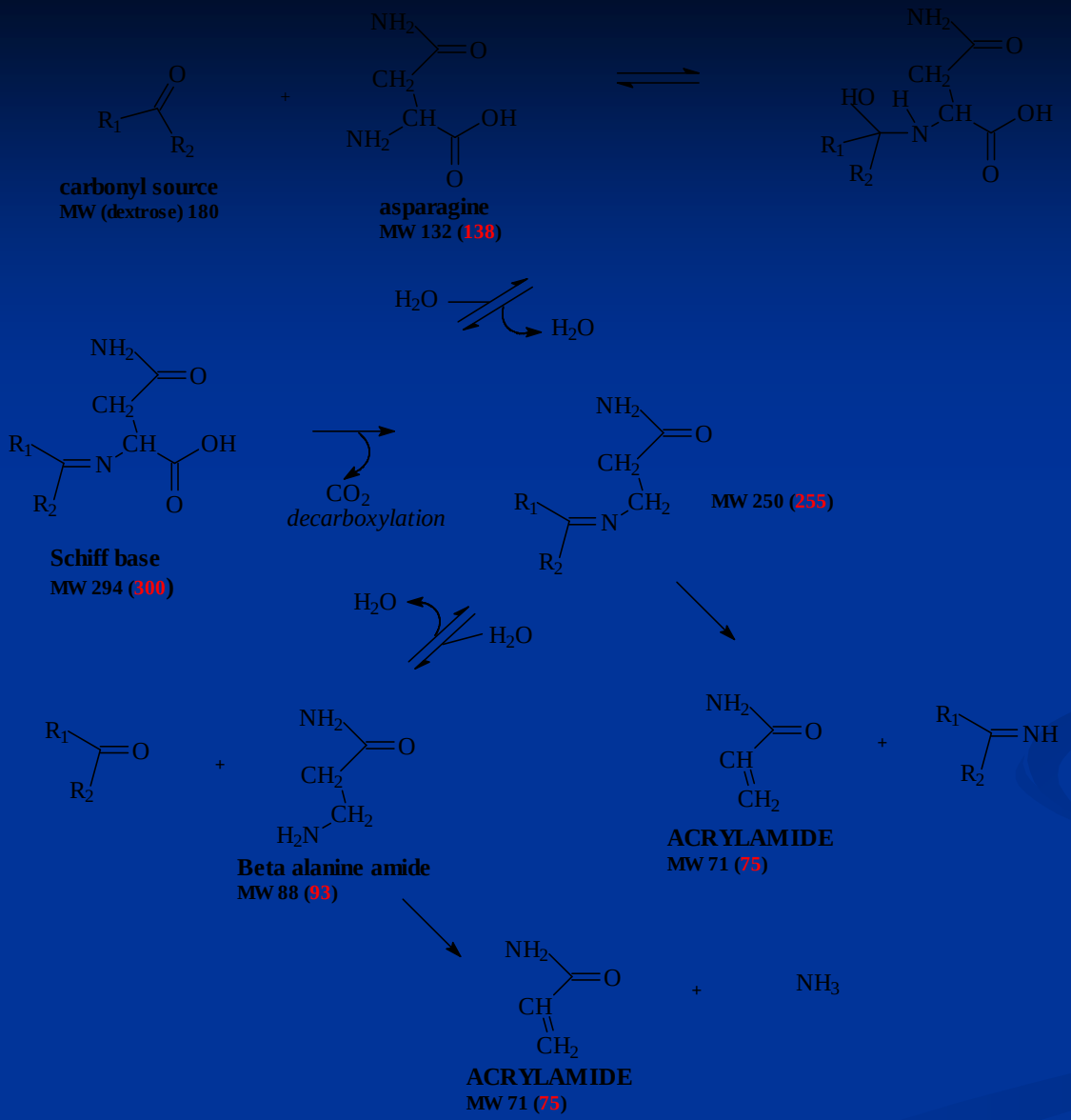


formation de l'acrylamide dans les aliments

* Glucose, fructose, produits de décomposition du saccharose et autres sucres de même qu'autres intermédiaires adéquats (par ex. aldéhydes).

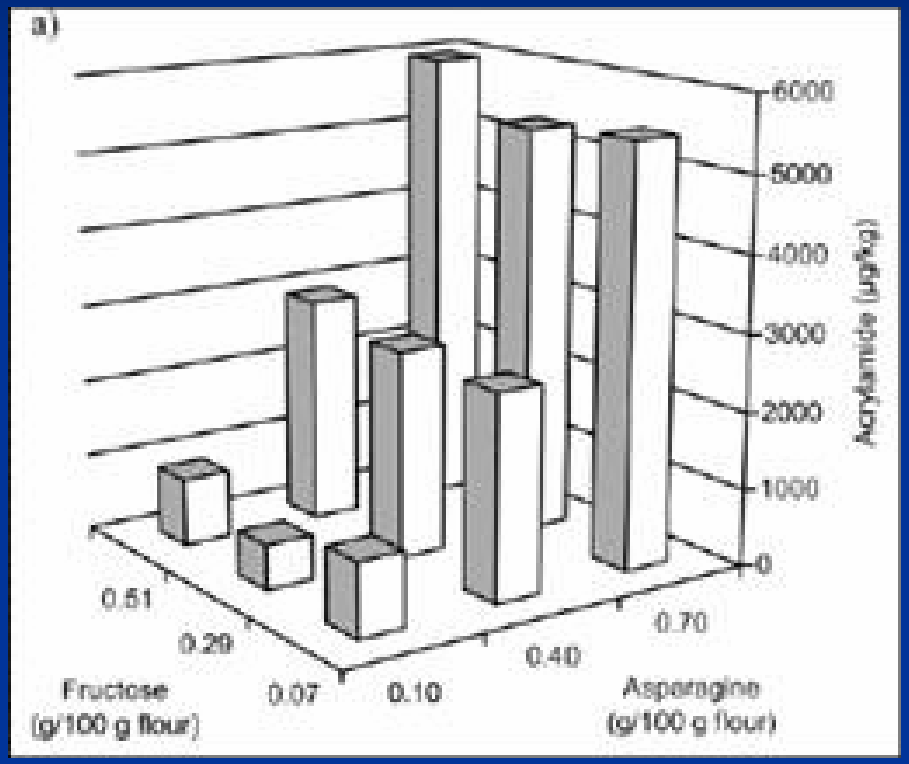
ACRYLAMIDE

Mécanismes de formations de l'Acrylamide



The free amine group of asparagine reacts with a carbonyl source resulting in the loss of water and the formation of a Schiff Base. This reaction is favored during typically cooking conditions as water is evaporated. Under heat, the Schiff base de-carboxylates (facilitated by de-localization of negative charge which Schiff base formation allows), forming a product that can react one of two ways. It can hydrolyze to form β-alanine amide that can further degrade via the elimination of ammonia to form acrylamide when heated. Alternatively, the Schiff base can decompose directly to form acrylamide via elimination of an imine.
In our model heated food system, we determined that β–alanine amide heated without dextrose formed five times the level of acrylamide as compared to an asparagine/dextrose reaction mixture.

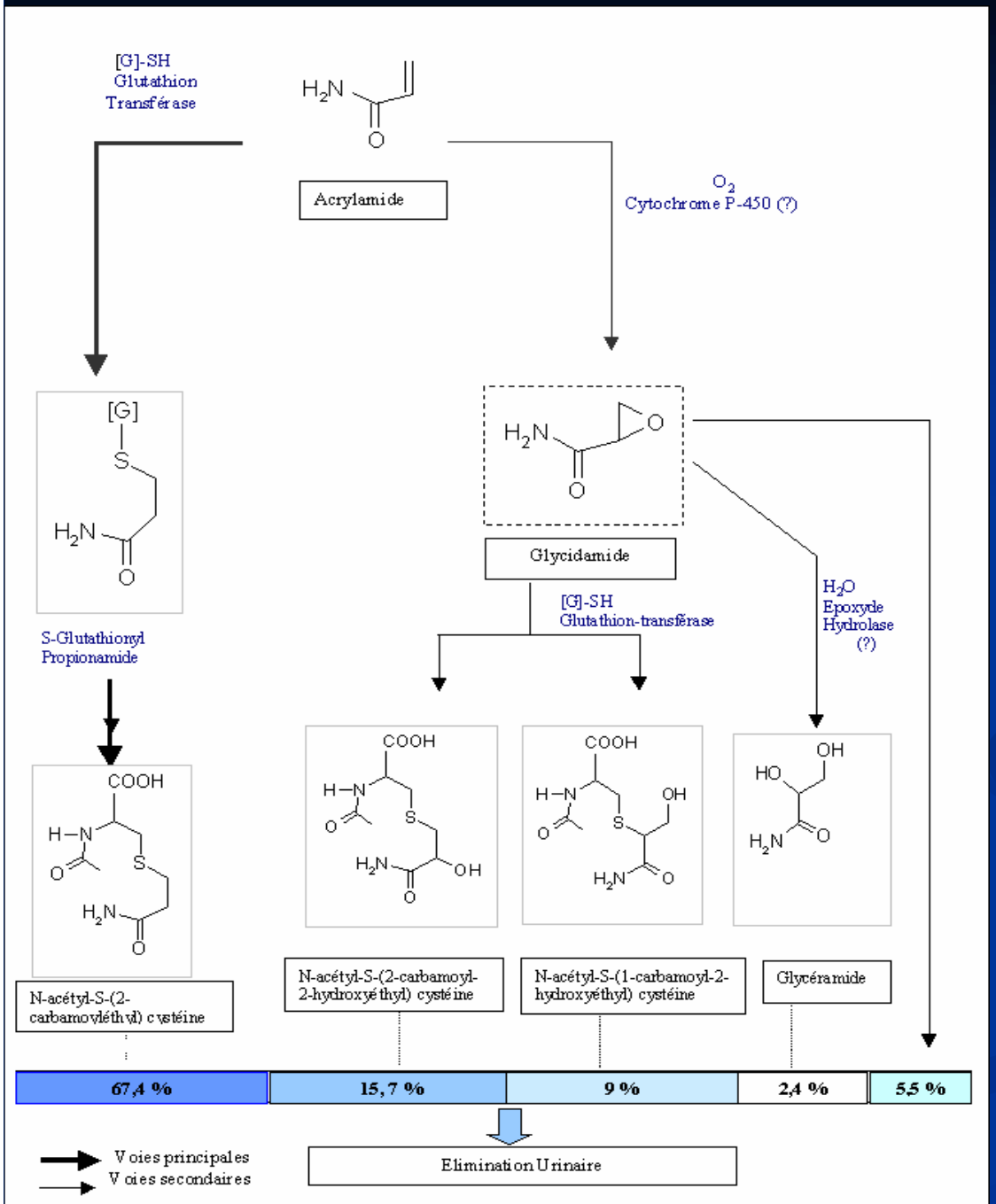
ACRYLAMIDE



Surdyk et al. J Agr Food Chem. 2004

Effect of added aparagine and fructose on acrylamide content in bread crust

ACRYLAMIDE



Métabolisation de l'Acrylamide chez le Rat

(Sumner SCJ et Col. Chem Res. Toxicol, 1992, 5, 81-89)

Top 20 Foods by Mean Acrylamide Intake

Food	Mean AA intake (μg/kg bw-day)	Cumulative Percentile
French Fries (RF*)	0.070	0.16
French Fries (OB*)	0.051	0.28
Potato Chips	0.045	0.38
Breakfast Cereal	0.040	0.47
Cookies	0.028	0.53
Brewed Coffee	0.027	0.60
Toast	0.023	0.65
Pies and Cakes	0.018	0.69
Crackers	0.017	0.73
Soft Bread	0.014	0.77

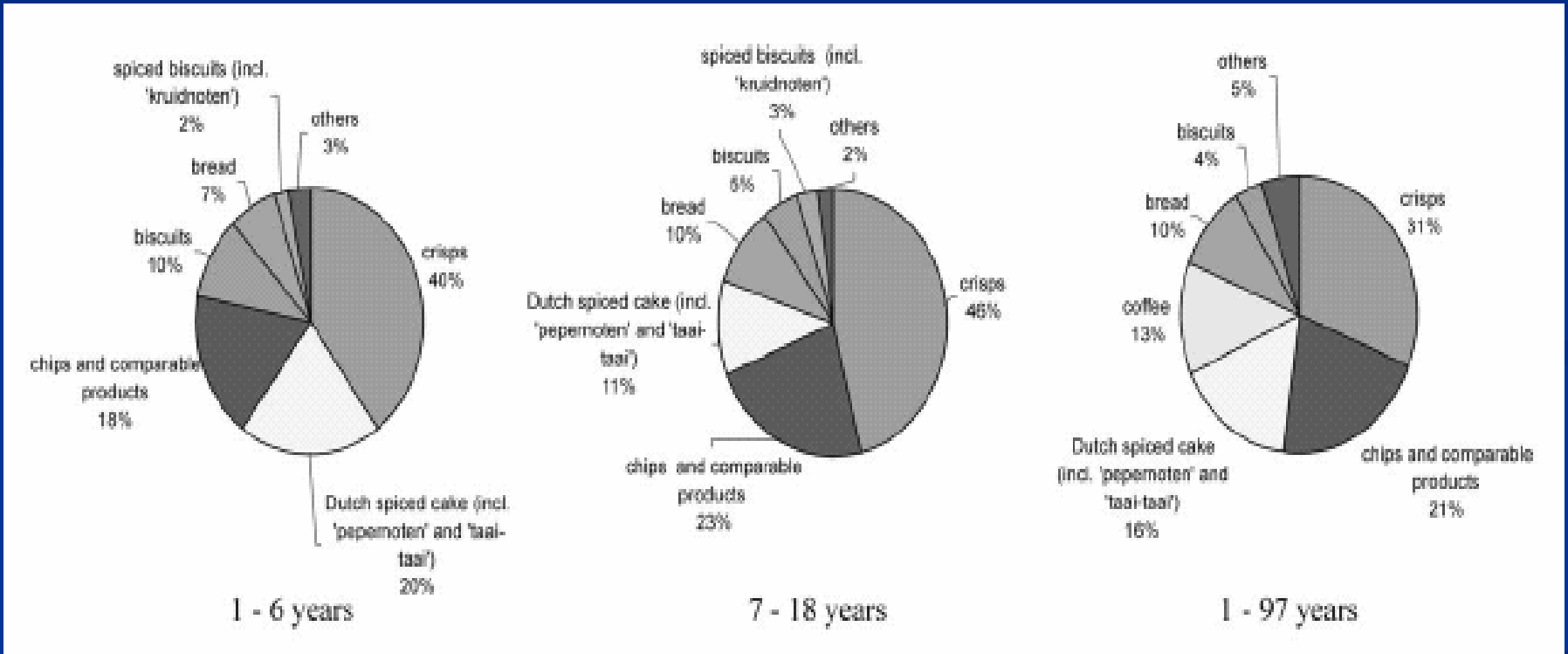
Food	Mean AA intake(μg/kg bw-day)	Cumulative Percentile
Chile con Carne	0.014	0.80
Corn Snacks	0.011	0.82
Popcorn	0.007	0.84
Pretzels	0.007	0.86
Pizza	0.006	0.87
Burrito/Tostada	0.006	0.88
Peanut Butter	0.003	0.89
Breaded Chicken	0.003	0.90
Bagels	0.003	0.90
Soup Mix	0.003	0.91

* RF, restaurant fries; OB, oven baked

Michael DiNovi, Ph.D., FDA/CFSAN, May 2006

ACRYLAMIDE

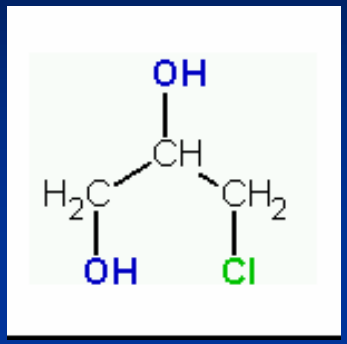
Contribution (%) of the most important food groups to the dietary exposure of acrylamide



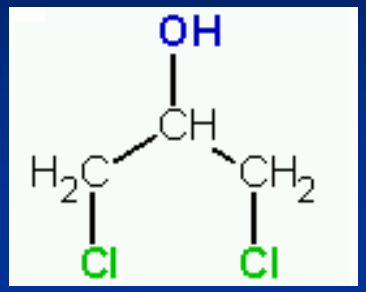
Acrylamide exposure from foods of the dutch population and an assessment of the consequent risks.

Food Chem. Toxicol. 41, 1569-1579. 2003.

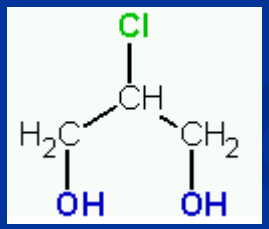
Chloropropanols



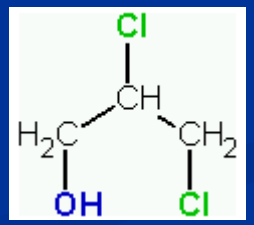
3-Monochloropropane-1,2-diol (3-MCPD)



1,3-dicloro-2 propanol (1,3-DCP)



2-monochloropropane-1,3-diol (2-MCPD)



2,3-dichloro-2-propanol (2,3-DCP

Chloropropanols

Product description	No. of samples	No. of detects 3-MCPD	Range of concentrations 3-MCPD (mg/kg)	No. of detects 1,3-DCP	Range of concentrations 1,3-DCP (mg/kg)
Chicken marinade	1	1	0.017	0	<0.01
Oyster sauce	6	0	<0.01	0	<0.01
Soy sauce	12	6	<0.01 – 3.9	2	<0.01 – 0.11
Soy sauce - dark	2	1	<0.01 – 0.028	0	<0.01
Soy sauce - light	2	1	<0.01 – 0.014	0	<0.01
Soy sauce - mushroom flavour	2	0	<0.01	1	0.005[#] – <0.01
Soy sauce - salty	2	0	<0.01	0	<0.01
Soy sauce - shrimp flavour	1	1	0.025	0	<0.01
Soy sauce - sweet	2	1	<0.01 – 0.044	0	<0.01
Soy sauce - thin	1	0	<0.01	0	<0.01
Soy seasoning sauce	8	7	<0.01 – 150	7	<0.01 – 0.6

Levels of 3-MCPD and 1,3-DCP in a targeted range of soy and oyster sauce products available in Australia in 2001

Chloropropanols

- Les Chloropropanols majeurs
  - le 3-chloro-1,2-propanediol (3-MCPD)
  - Le 1,3-dichloro-2-propanol (1,3-DCP)

  En 2001 le JECFA a établi pour le 3-MCPD une « DJMTP » de 2 µg/kg p.c./j basé sur les effets rénaux

Chloropropanols

Pour les PVHA
limite de 0,1 mg/kg1 pour le 3-MCPD
Réunion CODEX 2007

