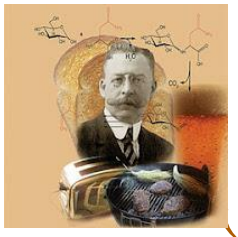
Departamento de Alimentos e Nutrição Experimental
Química de Alimentos

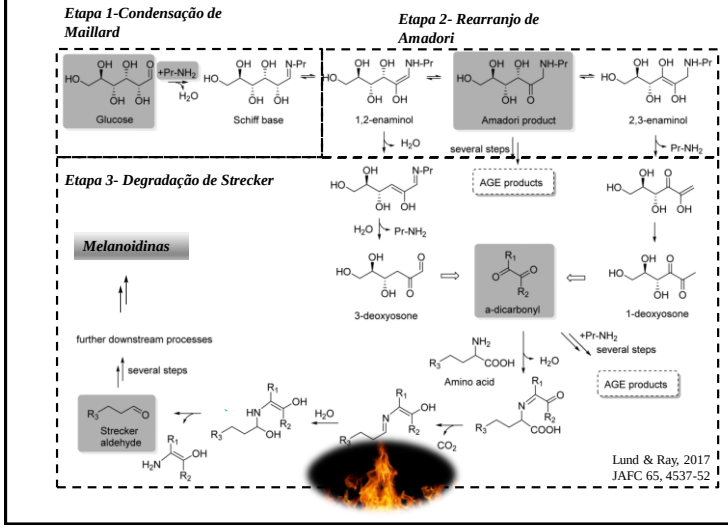
Reação de Escurecimento não enzimático

Profa. Neuza Mariko A. Hassimotto
2/2023

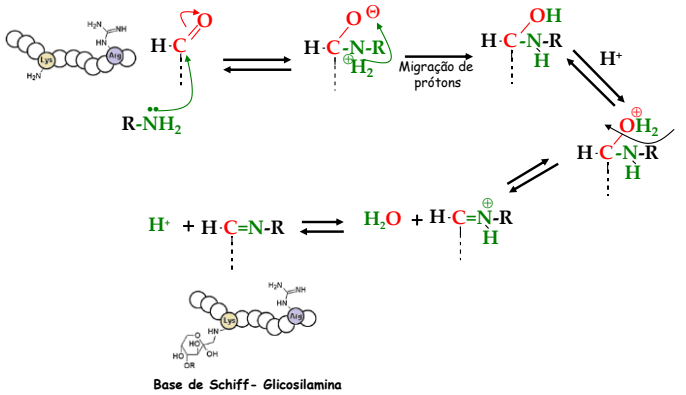


Louis Camille Maillard, 1912
Comptes Rendues de l'Académie des Sciences

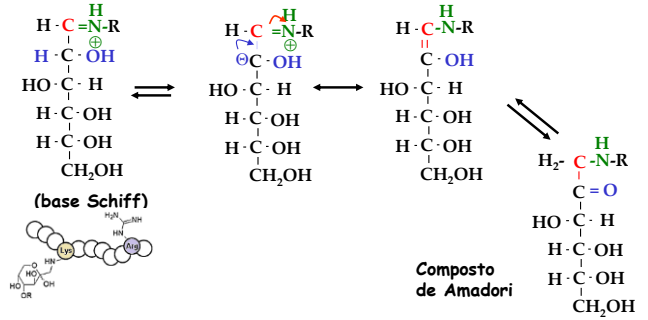
Reação de Maillard



Condensação de Maillard

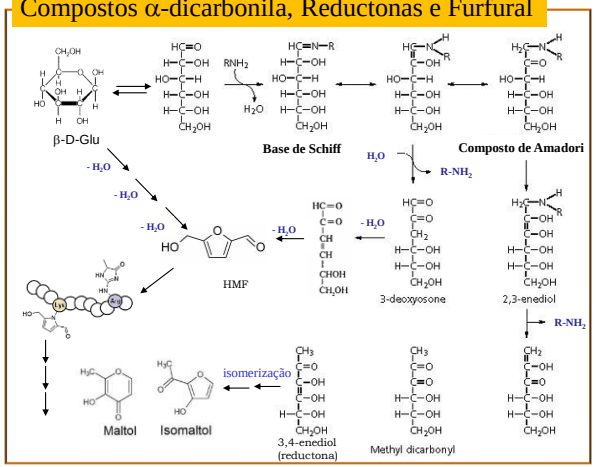


Rearranjo de Amadori

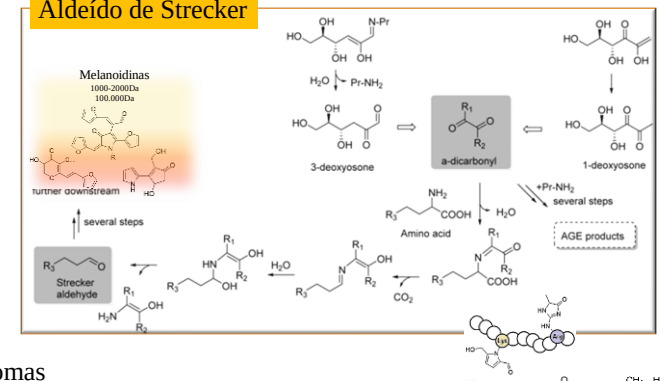


Degradação de Strecker

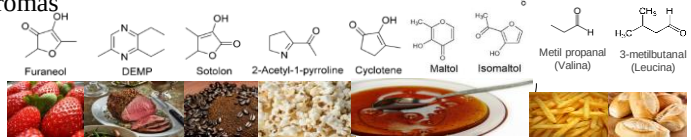
Compostos α-dicarbonila, Reductonas e Furfural



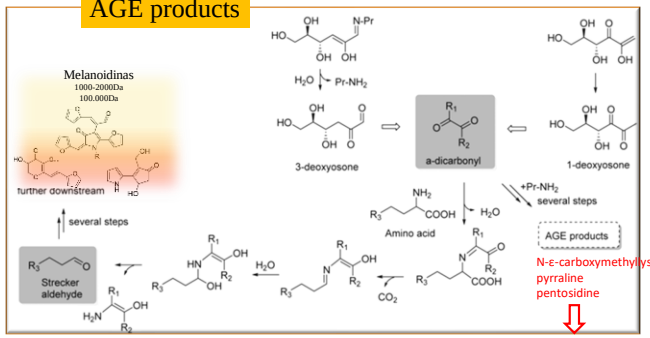
Aldeído de Strecker



Aromas



AGE products

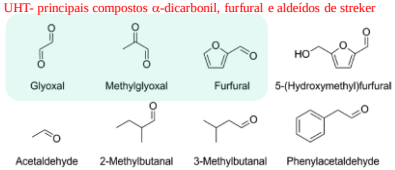


Hellwig and Henle
Angew. Chem. Int. Ed. 2014, 53, 10316 – 10329

Trapping of Carbonyl Compounds by Epicatechin: Reaction Kinetics and Identification of Epicatechin Adducts in Stored UHT Milk

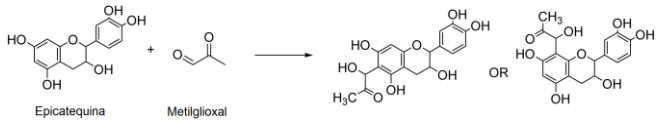
Controle

Leite UHT- principais compostos α-dicarbonil, furfural e aldeídos de streker



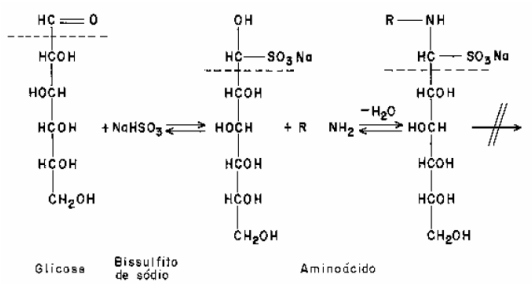
Principais alfa-dicarbonílicos

Principais aldeídos de Strecker- perda de qualidade

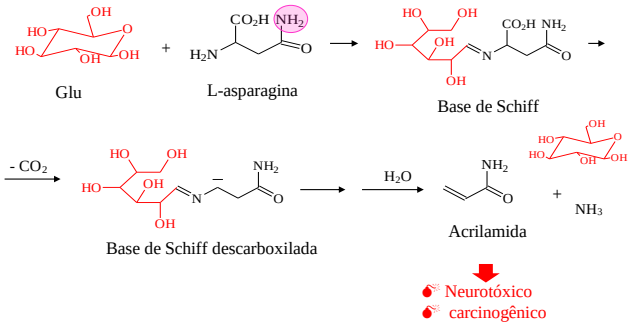


Zhu et al.
J. Agric Food Chemistry,2020, 28

Inibidores



Acrilamida



Neurotóxico

carcinogênico

Estabelecido (JECFA, FAO/OMS, 2005) 1 µg/dia

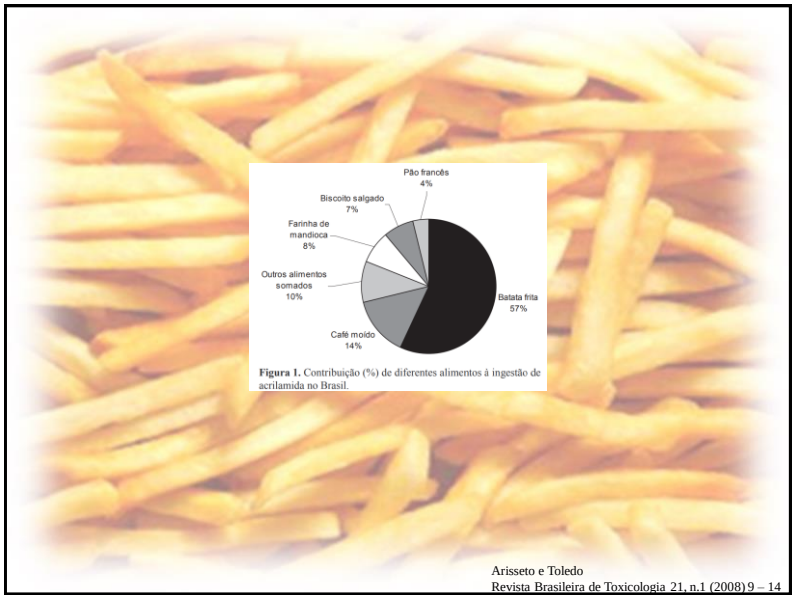
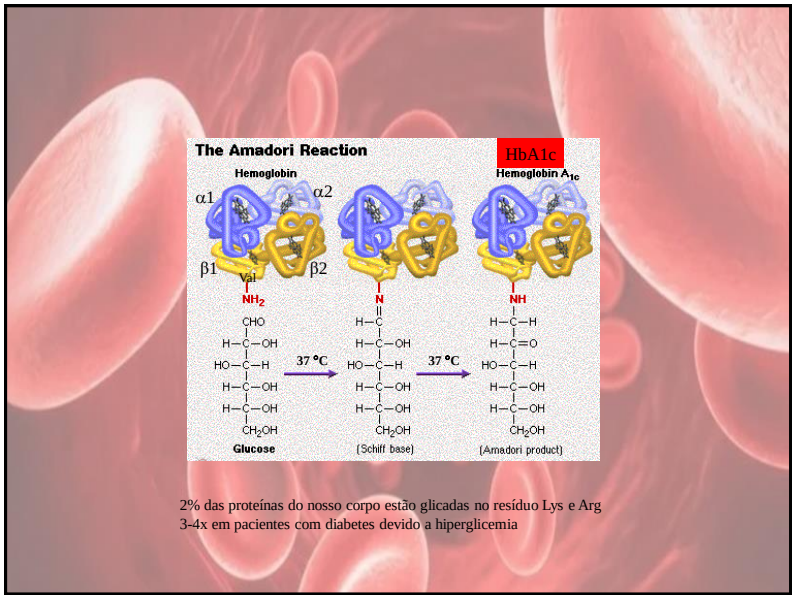


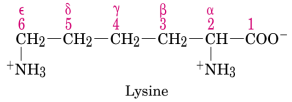
Figura 1. Contribuição (%) de diferentes alimentos à ingestão de acrilamida no Brasil.

Arisseto e Toledo
Revista Brasileira de Toxicologia 21, n.1 (2008) 9 – 14

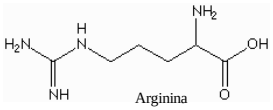


2% das proteínas do nosso corpo estão glicadas no resíduo Lys e Arg
3-4x em pacientes com diabetes devido a hiperglicemia

Reação de Maillard- Implicação nutricional

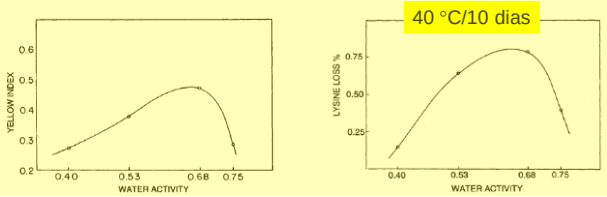


Lysine



Arginina

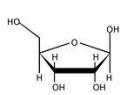
Perda de Lys em leite em pó



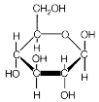
Fatores que afetam a velocidade da Reação de Maillard

1. Natureza do aa
2. Natureza do CHO
3. Temperatura
4. pH
5. aw

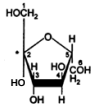
Carboidratos



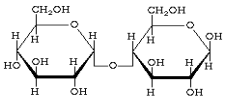
ribose



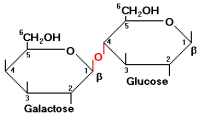
D-glu



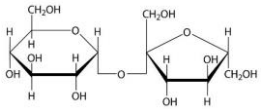
fru



maltose

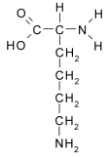


lactose

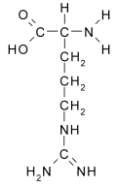


sacarose

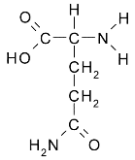
Aminoácidos



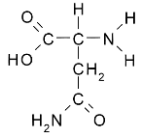
Lisina



Arginina



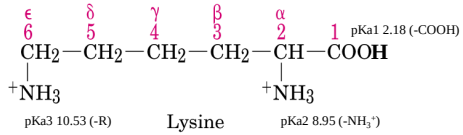
Glutamina



Asparagina

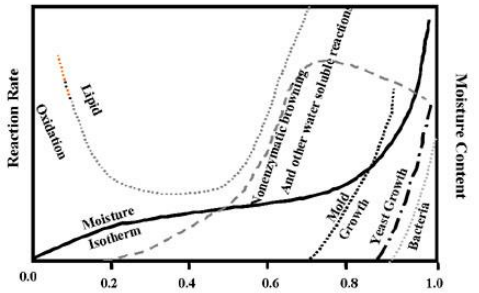
pH

- pH ácido

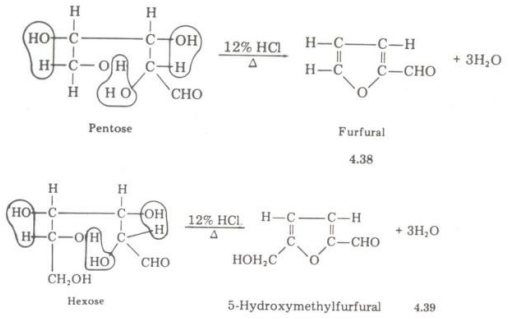


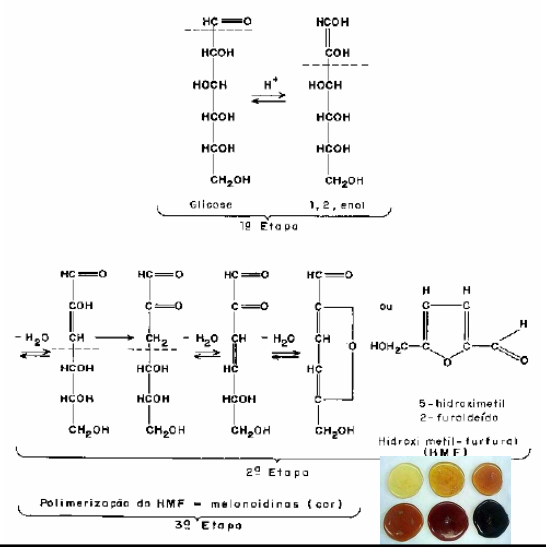
- pH 6-7, velocidade de reação é máxima

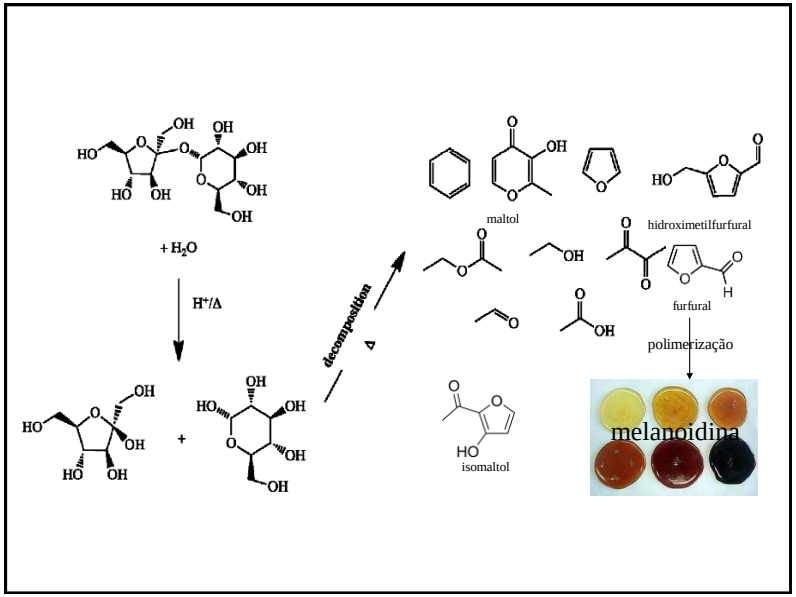
aw



Caramelização




Glicose
1, 2, enol
1ª Etapa
ou
5-hidroximetil
2-furaldeído
Hidroxi metil-furfural
(HMF)
2ª Etapa
Polimerização do HMF = melanoidinas (cor)
3ª Etapa


+ H2O
H+/Δ
decomposição
Δ
maltol
hidroximetilfurfural
furfural
polimerização
isomaltol
melanoidina