

Foods: Bioactives, Processing, Quality and Nutrition

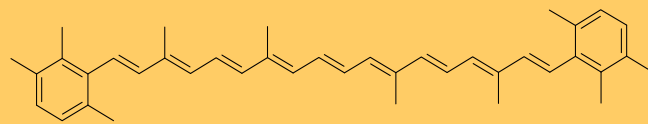
MDPI e-conference

10-12 April 2013

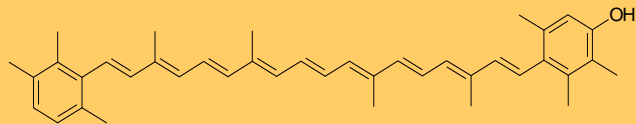


<http://www.mdpi.com/journal/foods>

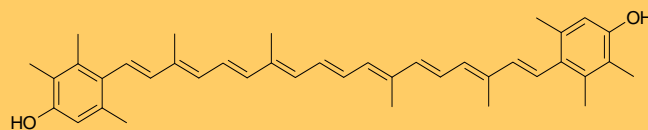
Aryl carotenoids such as isorenieratene and hydroxyl derivatives are produced by a very small number of microorganisms. Some are anaerobic and photosynthetic (Chlorobiaceae, Chromatiaceae...). Non photosynthetic bacteria are more easy to use and aryl carotenoid occurrence was reported in *Brevibacterium linens*, *Streptomyces mediolani* and *Mycobacterium aurum*, all belonging to Actinomycetales, an order of Actinobacteria.



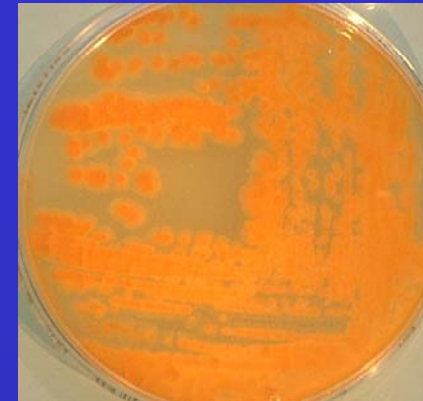
isorenieratene



3-hydroxy-isorenieratene



3,3'-di-hydroxy-isorenieratene



Streptomyces mediolani



***Brevibacterium linens*: the food grade bacteria producing aryl carotenoids**



Producers : SKW Biosystems
Rhodia
Chr. Hansen



**Gram positive bacteria
orange pigmented
impart strong odor to ripened cheese**

Not only color !!!



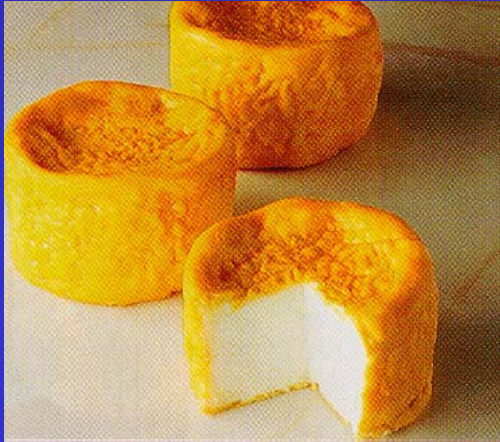
Brevibacterium linens: the food grade bacteria producing aryl carotenoids



Color range available from producers



***Brevibacterium linens*:**
the food grade bacteria
producing aryl carotenoids



**Bacteria used in dairy
processing,
ripening of smeared cheeses**



RED-SMEAR and RELATED ONES

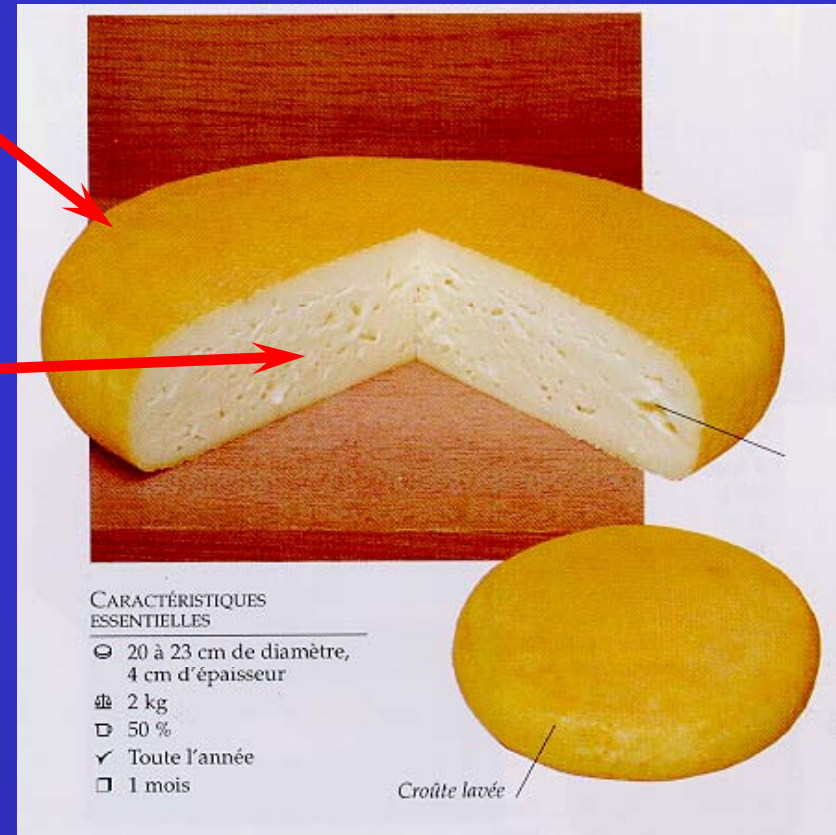
WHICH KIND OF CHEESES ??



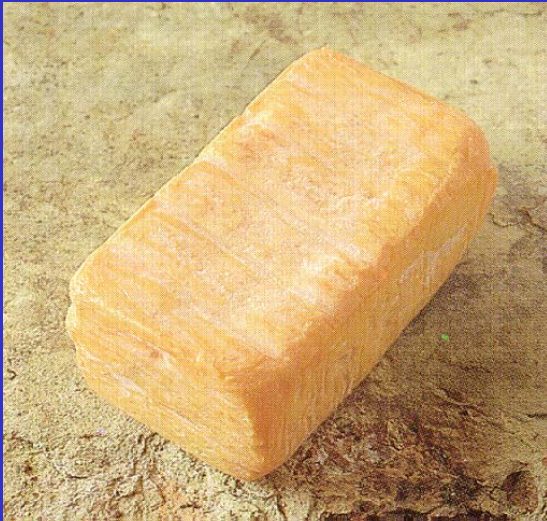
Colored rind

(pale orange to almost red)

Inside is yellowish,
more or less creamy



RED-SMEAR CHEESES and RELATED ONES: NOT ONLY FRENCH PRODUCTS



Limburger or Tilsit (D, USA)

Brick cheese (USA)

Taleggio (Italy)



Herve (Belgium)

Münster (D)

Liederkrantz (USA)

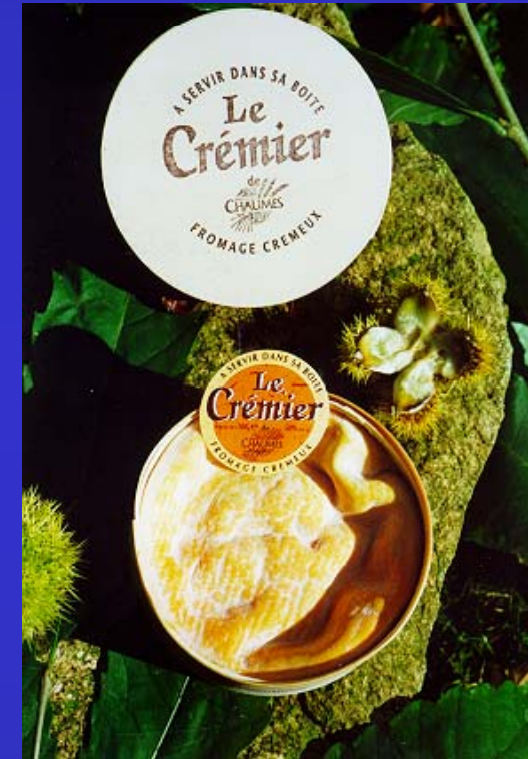
SOFT CHEESES ARE VERY IMPORTANT IN FRENCH LIFE, some examples



Ami du Chambertin

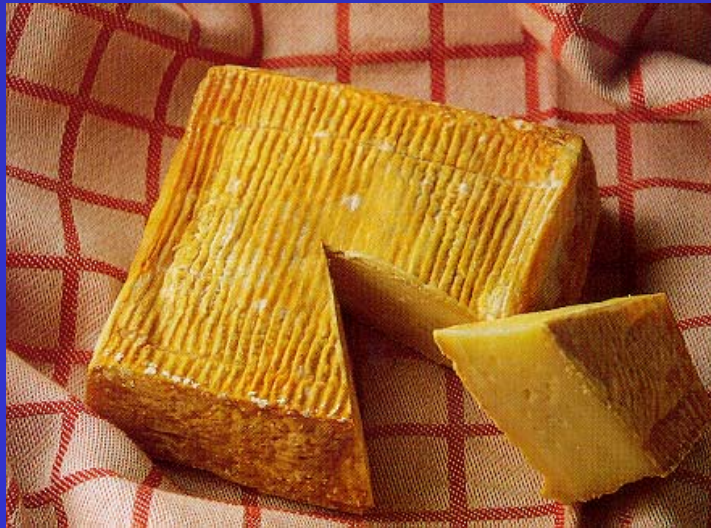


Epoisses



Crémier de Chaumes

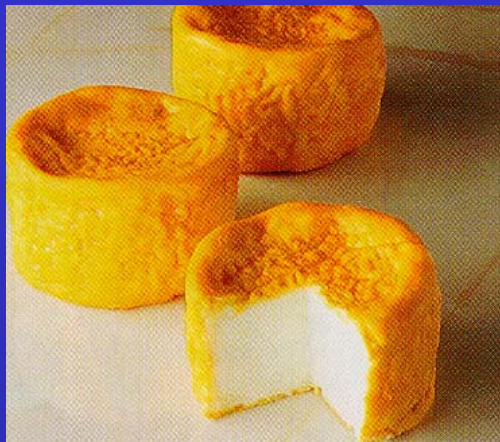
SOFT CHEESES ARE VERY IMPORTANT IN FRENCH LIFE, some examples



Carré de l'Est

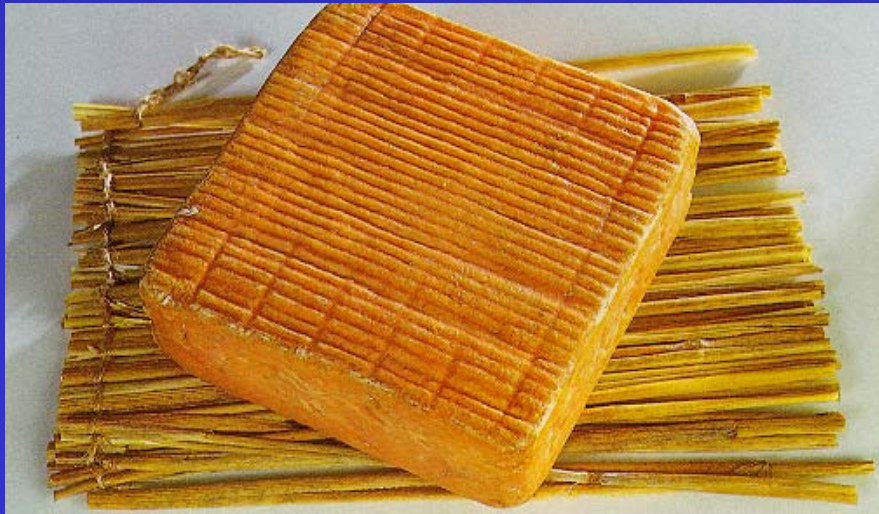


Livarot



Langres

**SOFT CHEESES ARE VERY IMPORTANT
IN FRENCH LIFE, some examples**



Maroilles



Munster



Rollot

Examples of cheeses 100% colored with *B. linens*



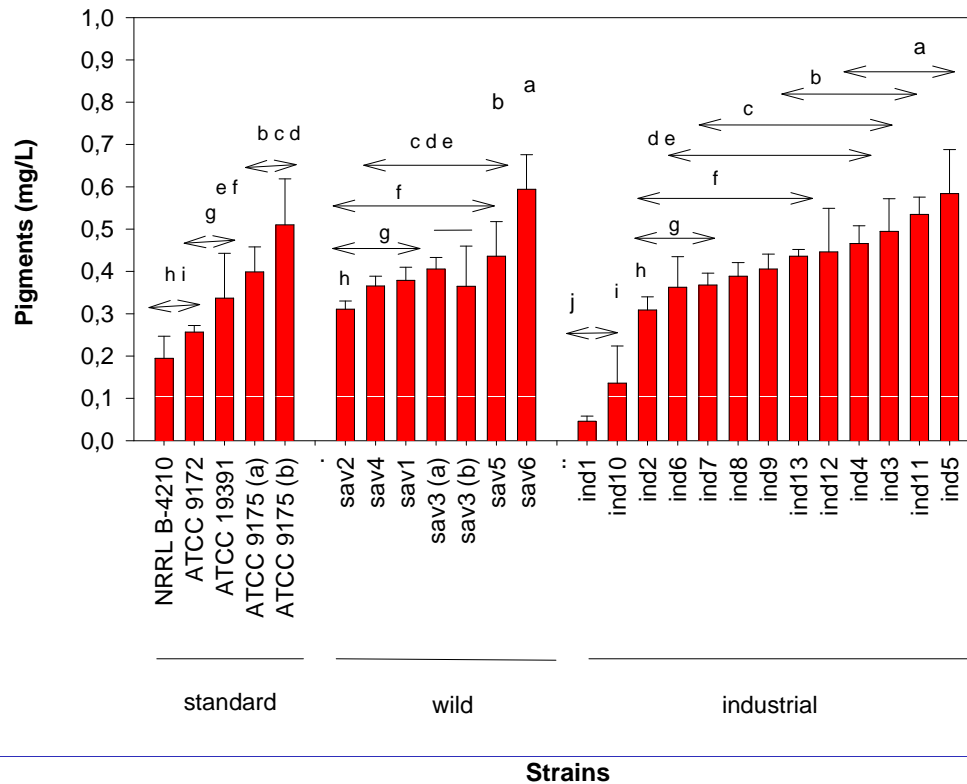
Epoisses



Maroilles

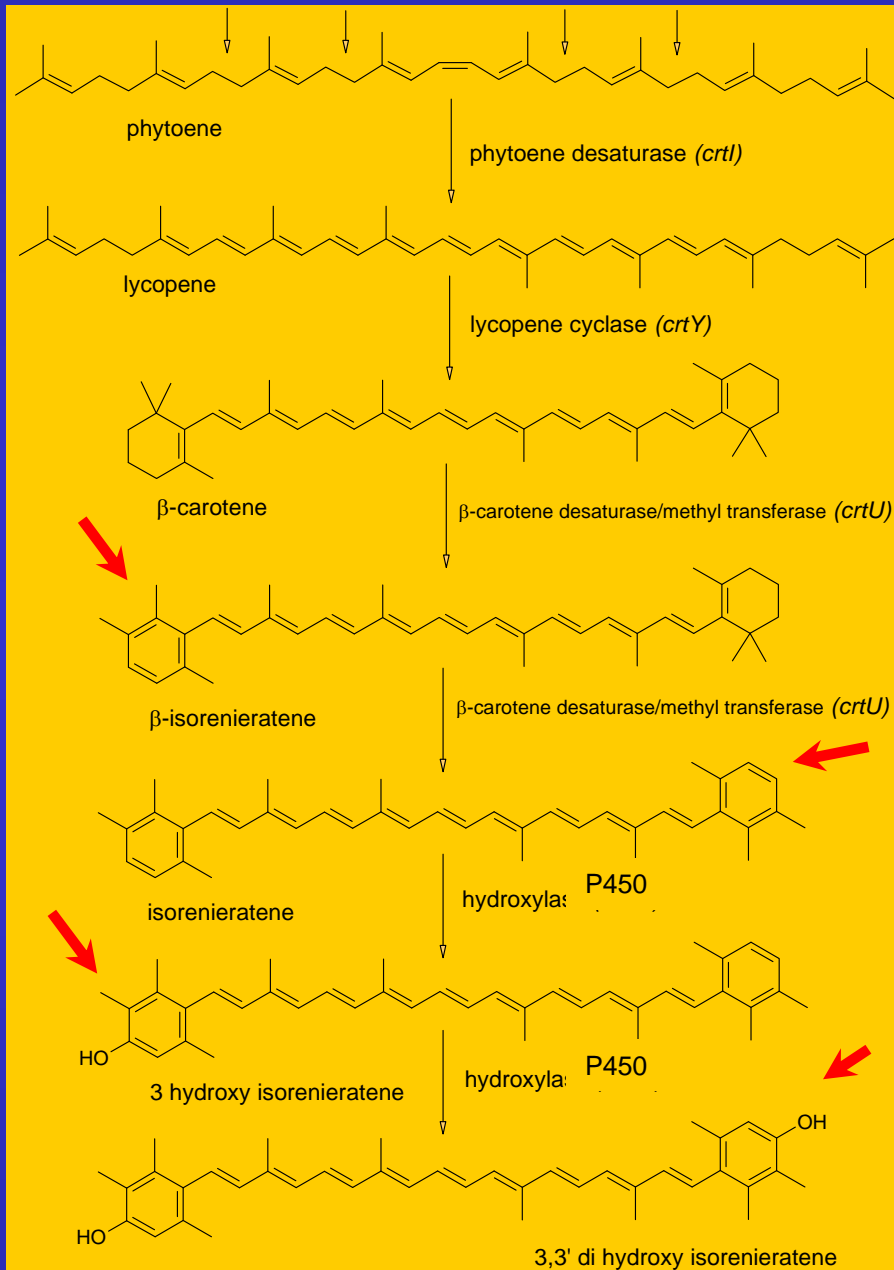


Brevibacterium linens: the food grade bacteria producing aryl carotenoids



**Carotenoid
production
investigated
for hundreds
of strains
50-600 $\mu\text{g/L}$**

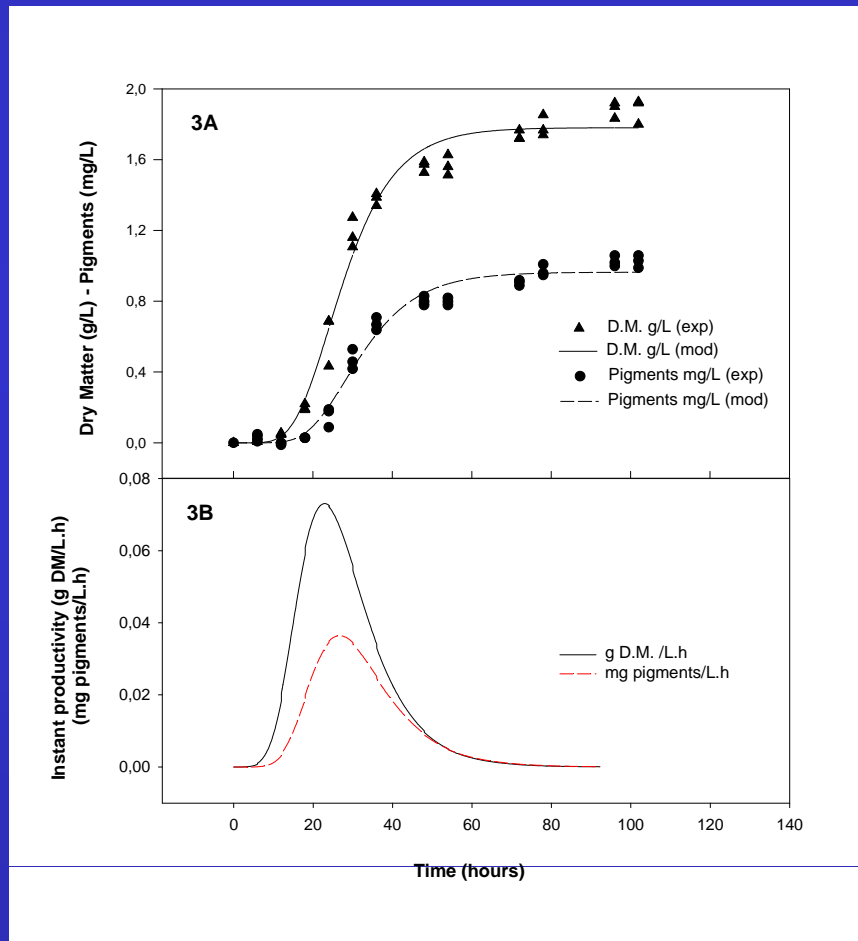
Brevibacterium linens: the biosynthetic pathway



Classical pathway
up to β -carotene,
then intervention of
a desaturase /
methyl transferase,
followed by
hydroxylation
involving a P450



Brevibacterium linens: the food grade bacteria producing aryl carotenoids



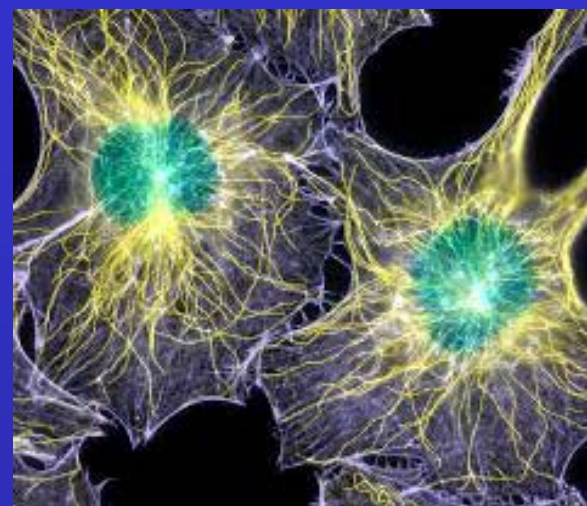
Carotenoid
production
is growth
associated
(primary
metabolism)

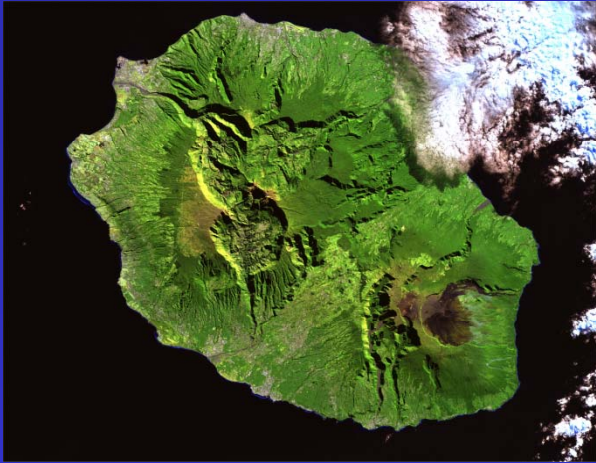


Health properties of aryl carotenoids

When tested among carotenoids including astaxanthin, β -cryptoxanthin, zeaxanthin and lutein, 3,3'-dihydroxyisorenieratene (DHIR) proved to be a superior, a "top of the list" antioxidant (best radical scavenger and singlet oxygen quencher).

The experimental date obtained through various antioxidative activity tests suggest that DHIR acts as a bifunctional radical scavenger owing to its polyenic and phenolic sub-structures.





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Réunion island

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