

fermentech
MENTE QUE AMA O QUE FAZ

A "química do relacionamento"
entre as **caseínas** e o **cálcio**
no leite e nos queijos

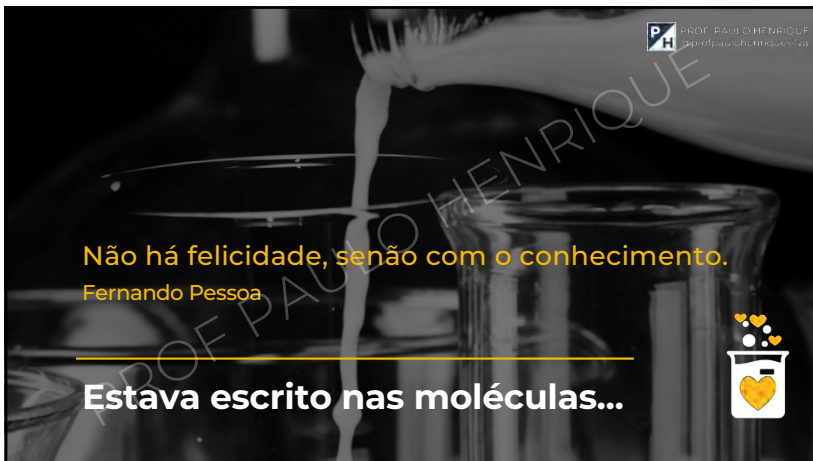
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LABORATÓRIO DE NUTRIÇÃO



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Não há felicidade, senão com o conhecimento.
Fernando Pessoa

Estava escrito nas moléculas...



A **caseína** não está em verdadeira
solução no leite de vaca, mas
puramente suspensa como
inúmeras **partículas**.

Schübler (1818), citado por
Palmer & Richardson (1925)



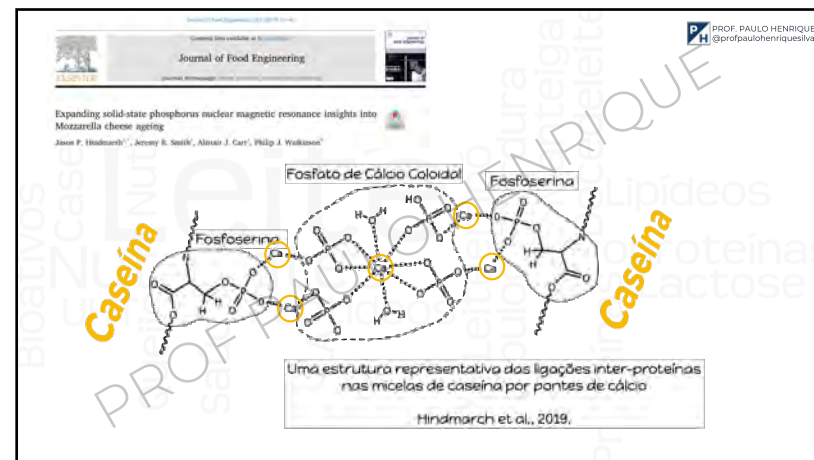
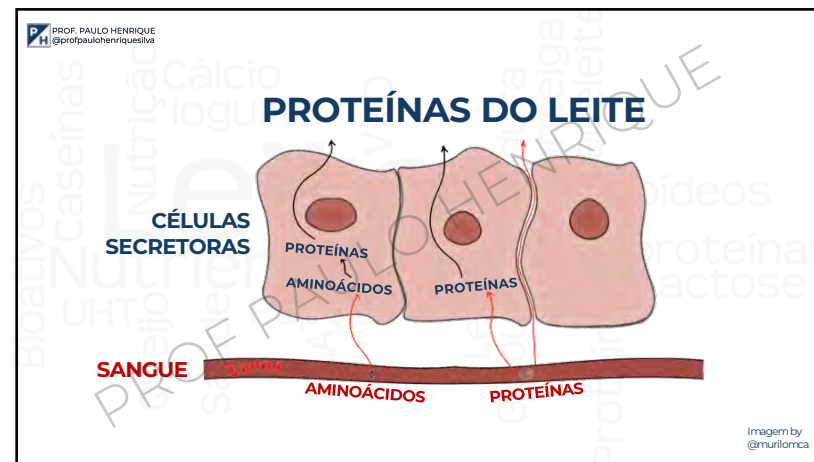
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**Meu sangue ferve contra a vão razão
E pulsa seu amor na escuridão!**
 Ariano Suassuna

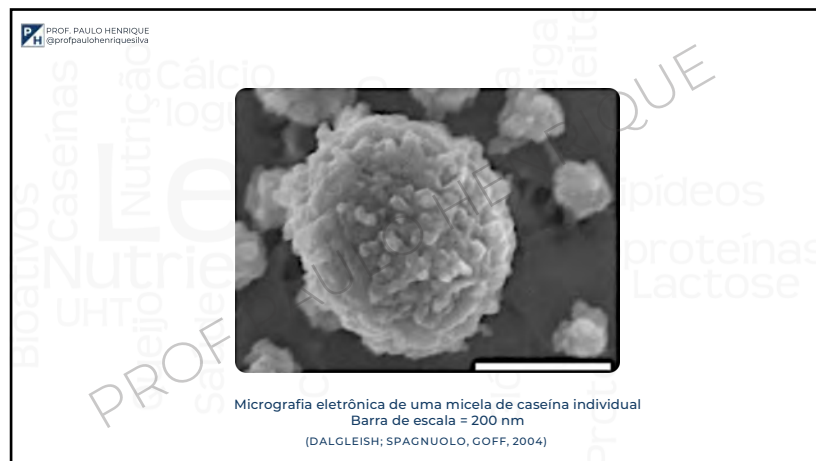
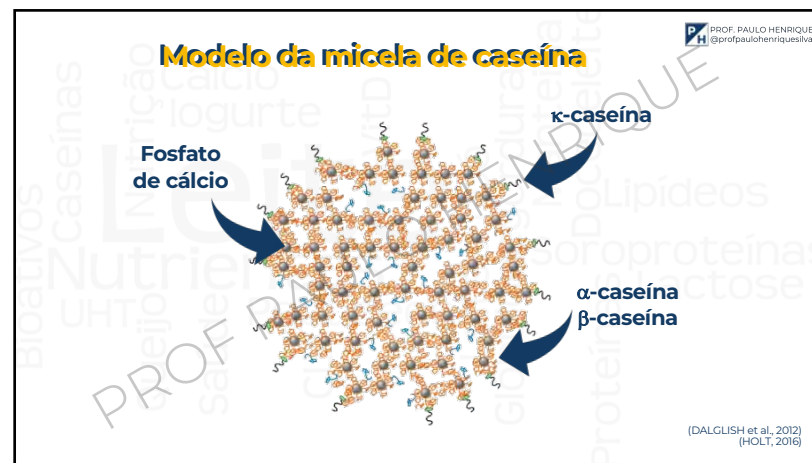

O início do relacionamento





E a gente vive junto
E a gente se dá bem
Lulu Santos

O relacionamento toma forma...



CASEÍNAS

αS_1

αS_2


K

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Superfície da micela
Hidrofílica
Fraca ligação com cálcio

Nada há o que impeça: amor não é amor
Se quando encontra obstáculos se altera
William Shakespeare

Estabilidade do relacionamento



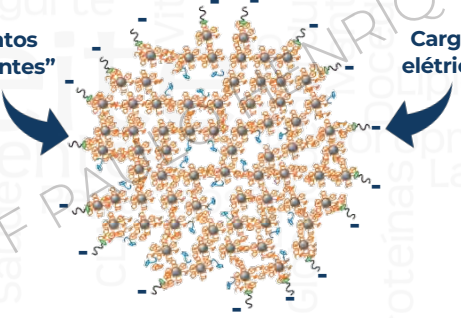
Estabilidade da micela de caseína

"Filamentos Protuberantes"

Cargas elétricas

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(DALGLISH et al., 2012)
(HOLT, 2016)

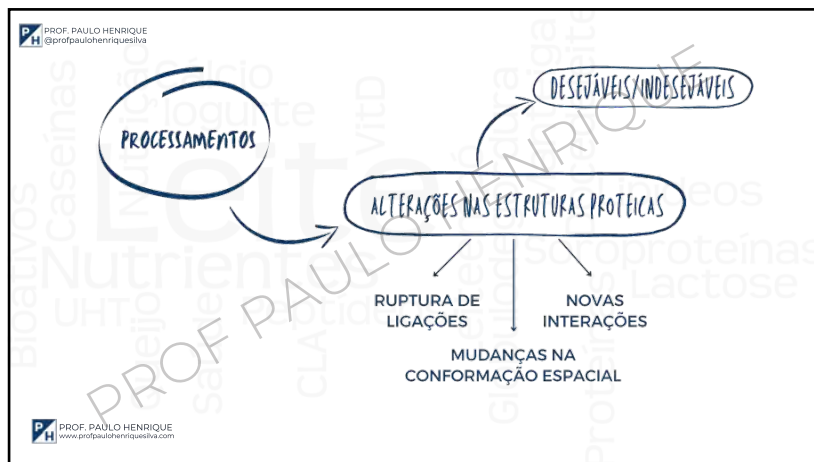


Se desmorono ou se edifico,
se permaneço ou me desfaço,
não sei, não sei.
Não sei se fico ou passo.

Cecília Meireles

Influências no relacionamento

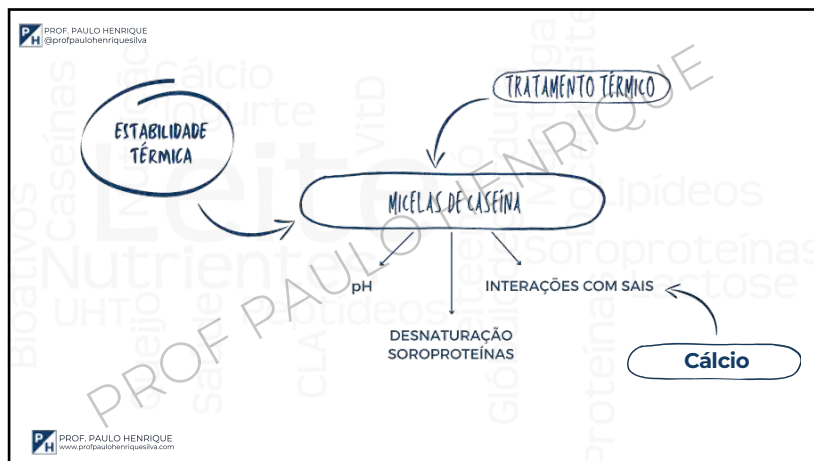




O perfeito homem do mundo seria aquele que jamais hesitasse por indecisão e nunca agisse por precipitação

Arthur Schopenhauer

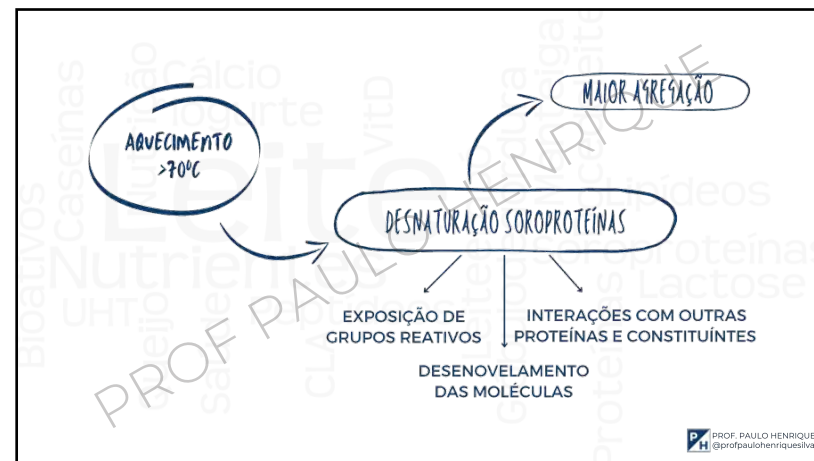
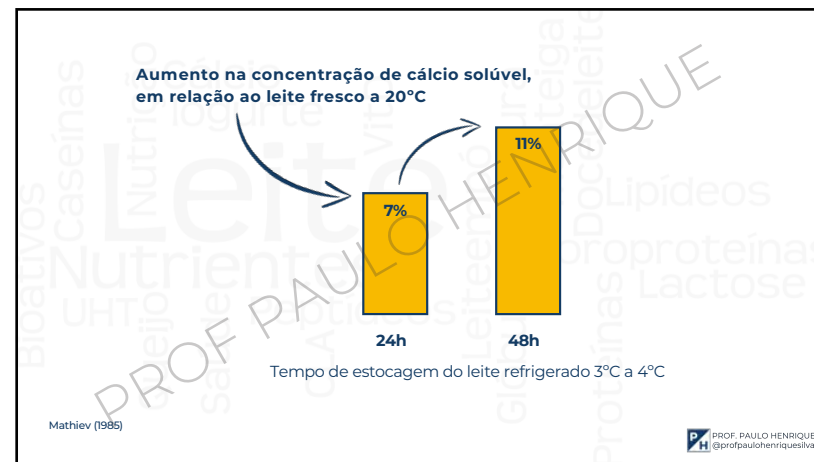
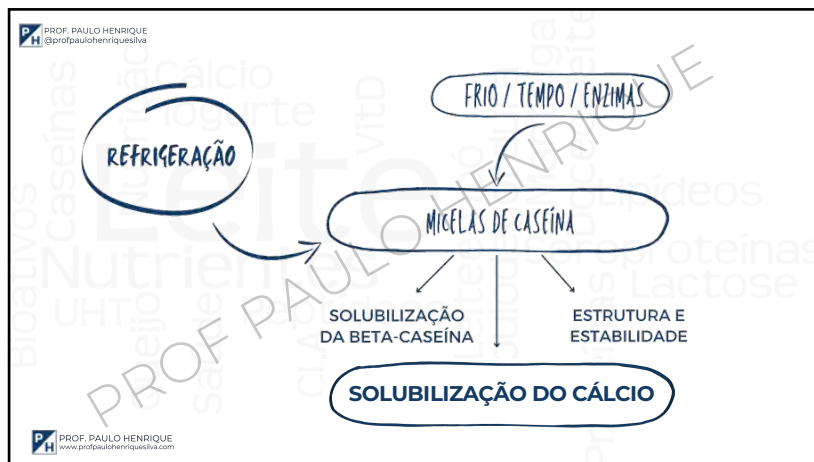
Quando alguém se precipita...

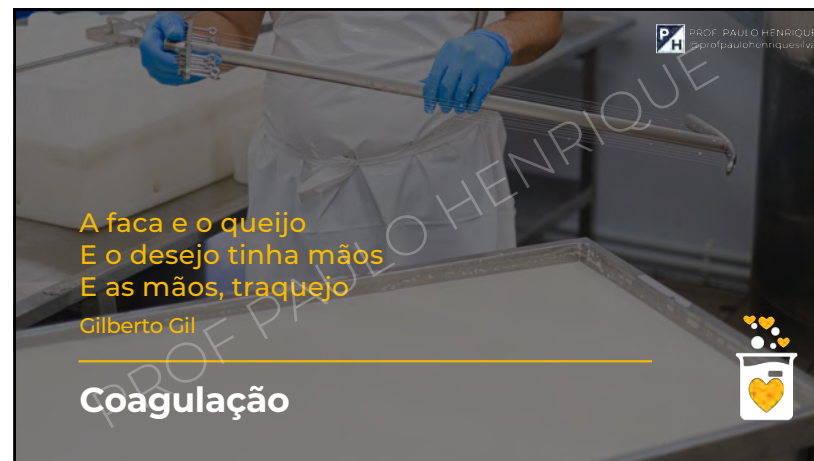
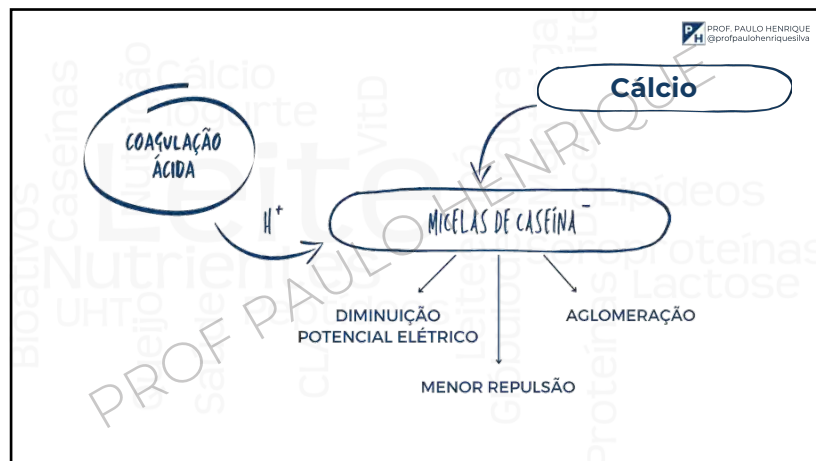
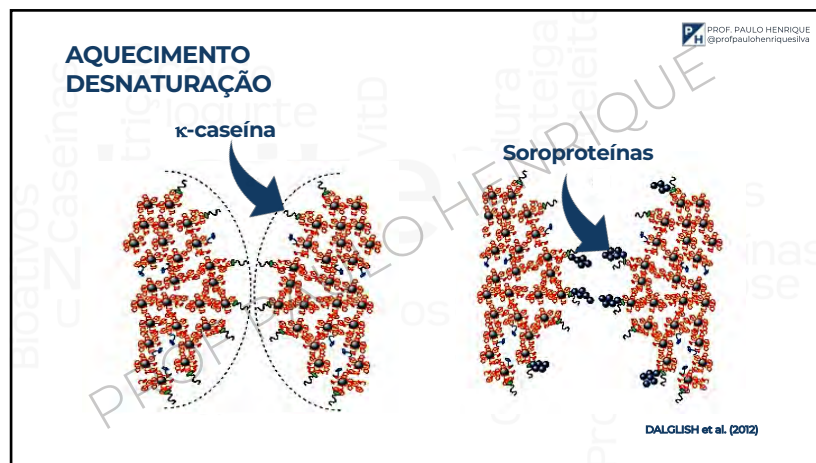


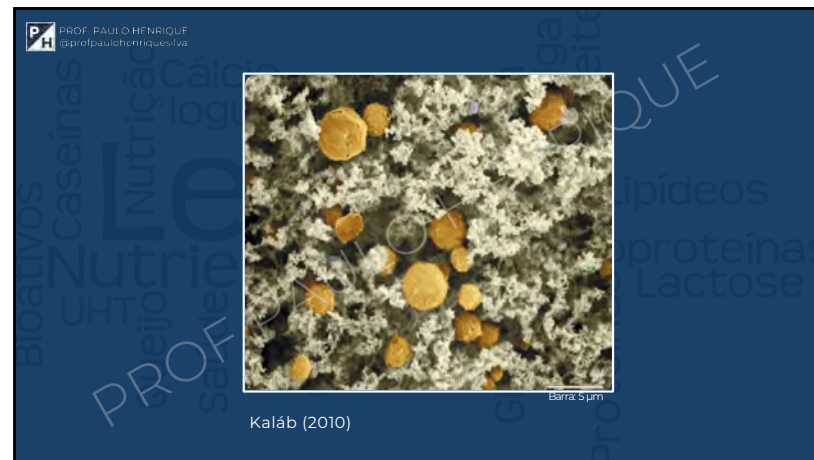
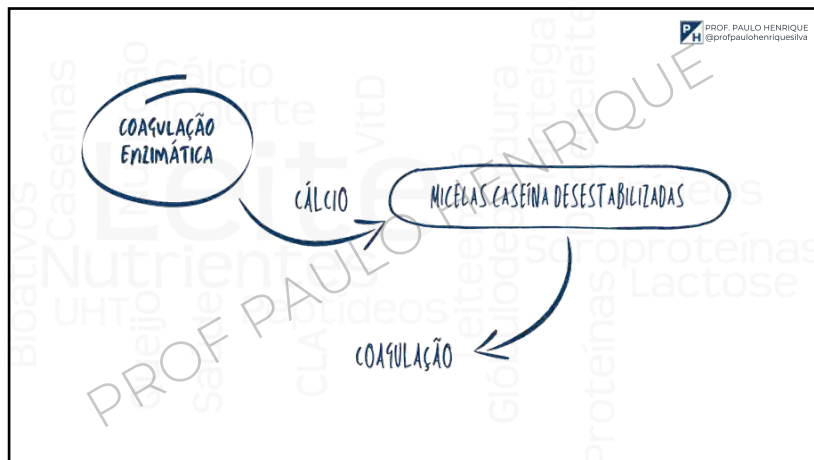
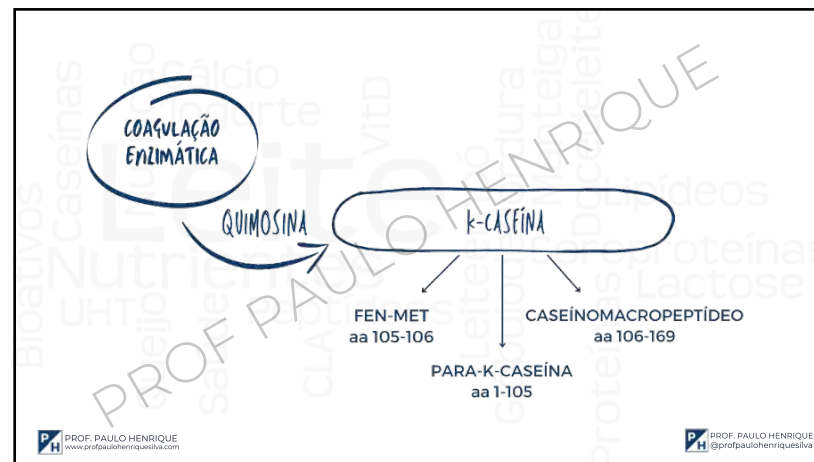
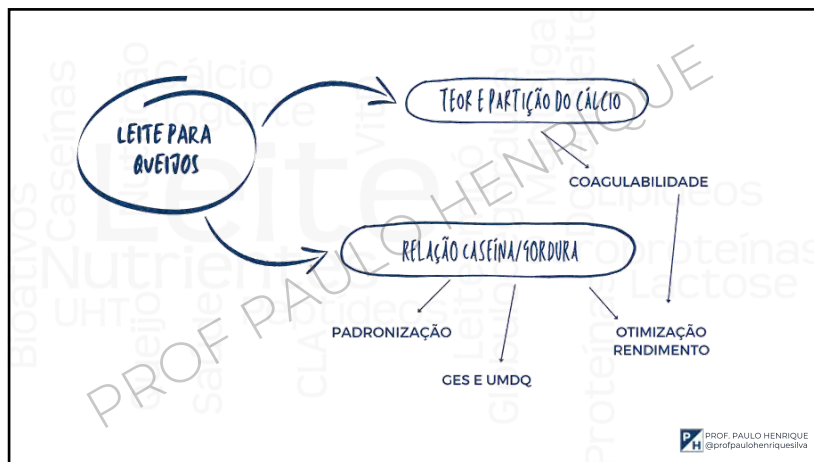
Eu dizia o seu nome
Não me abandone jamais

Paralamas

Quando o relacionamento esfria

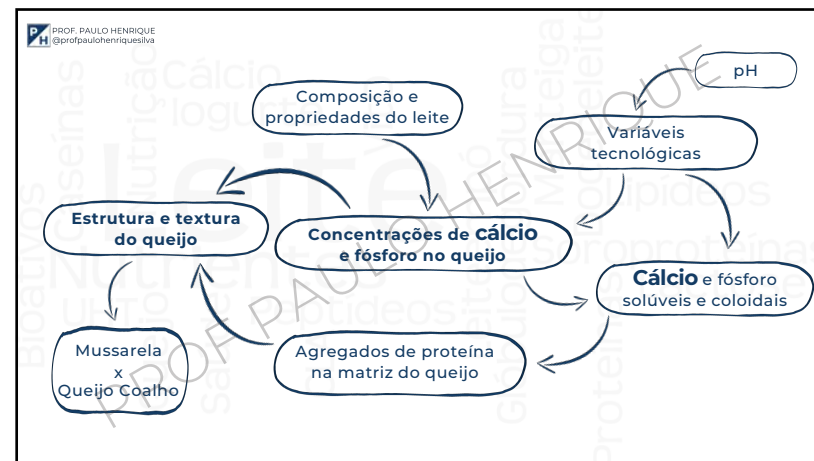
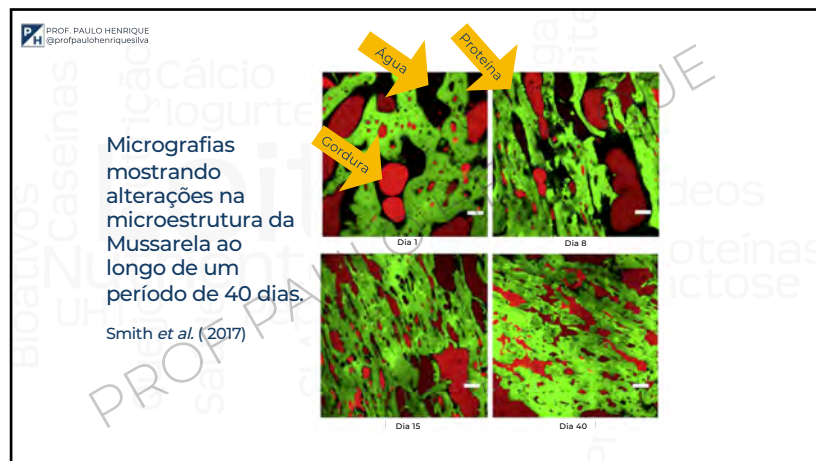
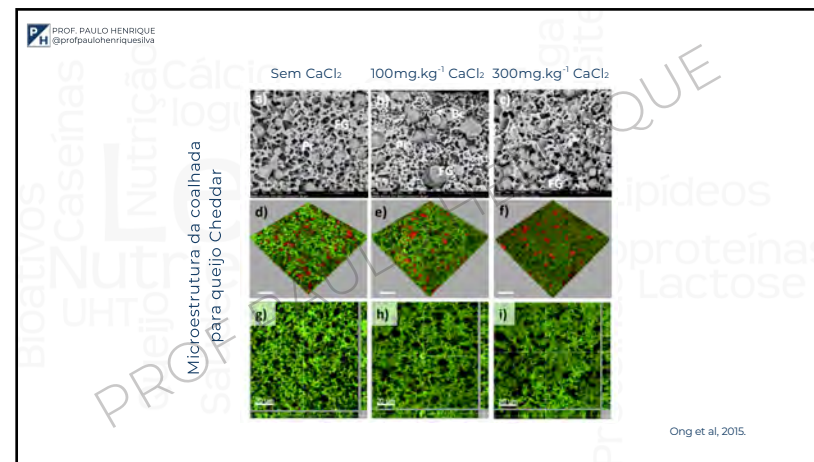


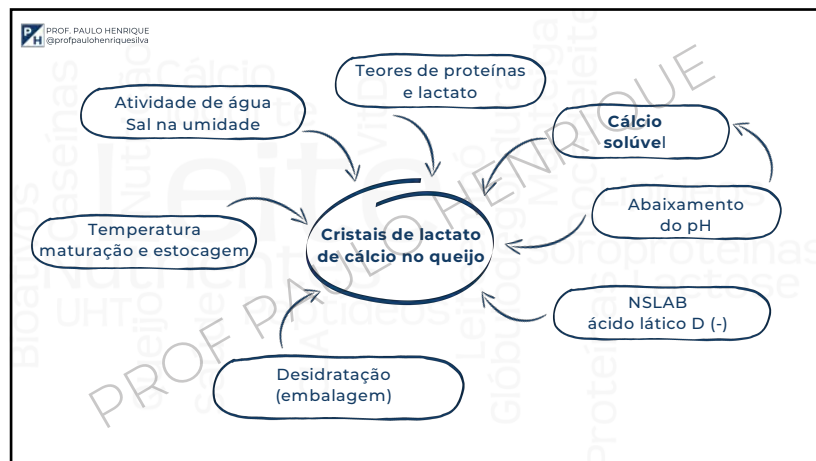
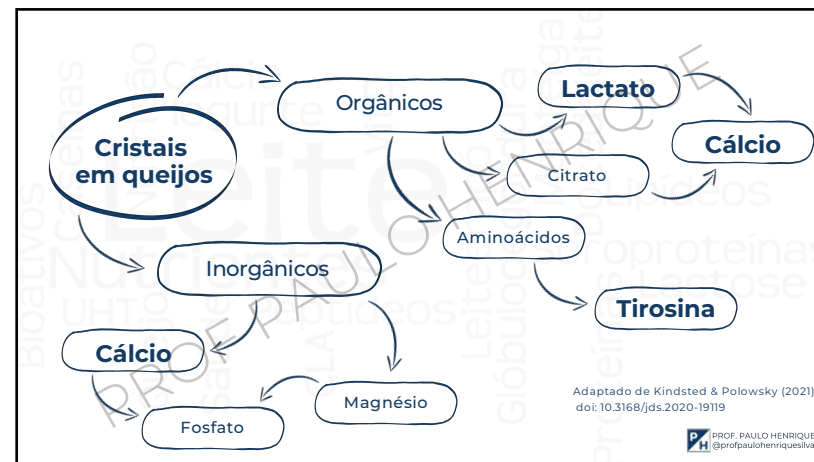




A seguir de fato
 O caminho exato
 Da delicadeza
 E ter a certeza
 De viver no afeto
 Lenine

Quando o relacionamento se fortalece



The Wonderful World of Cheese Crystals

A variety of crystal types exist across the wide spectrum of cheeses in the marketplace. The most prevalent crystals can come about from minerals such as calcium and magnesium, and amino acids such as tyrosine and leucine.

CALCIUM LACTATE
The white powdery smear found on many aged cheddars are crystals of the compound calcium lactate. Calcium lactate is formed as the cheese ages when lactic acid reacts with calcium in the cheese. They don't have any flavor themselves, but usually signify a piece of well-aged cheese that will be flavorful.

TYROSINE & LEUCINE
The crystals found in aged cheddar, Swiss, and Parmesan varieties are usually the amino acids tyrosine (found in cheddar) and/or leucine (powdery smear, difficult to spot). These are formed as the cheese ages when the proteins break down into its constituent amino acids. They can build up to high concentrations and crystallize out.

CALCIUM PHOSPHATE
Calcium and phosphorus are ubiquitous minerals in milk and cheese. Under the correct acidic conditions, these minerals can crystallize. Brushite, a form of calcium phosphate, has been observed in slushy red cheese such as Rip and Camembert, washed rind cheeses, and blue cheeses to name a few.

IKAITÉ & STRUVITE
The grey material associated with washed rind cheese is caused by crystals. Ikaite is a calcium carbonate crystal and struvite is a magnesium ammonium phosphate crystal. The mineral components are commonplace in milk cheese, the carbonate and ammonium is derived from the gases created by the surface microbes.

Brakite formula: $\text{CaHPO}_4 \cdot 2\text{H}_2\text{O}$
Ikaite formula: $\text{CaCO}_3 \cdot 6\text{H}_2\text{O}$
Struvite formula: $\text{MgNH}_4\text{PO}_4 \cdot 6\text{H}_2\text{O}$

https://www.uvm.edu/~pkindste/cheese_crystals/

