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Foam based on fish skin collagen by-product: a colloidal approach

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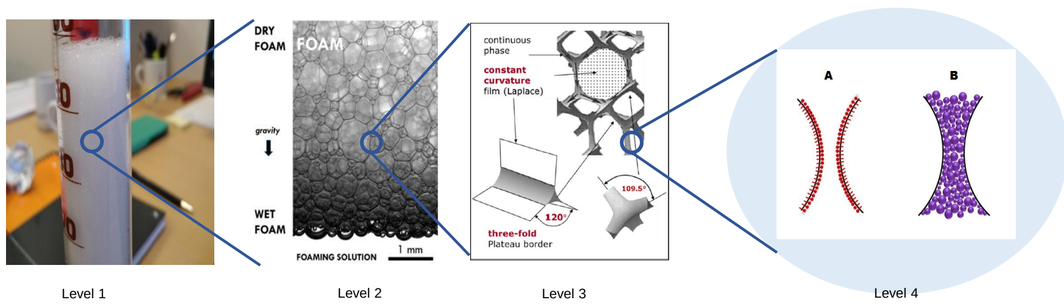
Foams are the essential building component of many aerated food structures: breads, cakes, extruded and expanded cereal, whipped creams, ice creams.

A foam's set state is directly related to its structural stability. Proteins are commonly used to produce food foams with long-term stability.

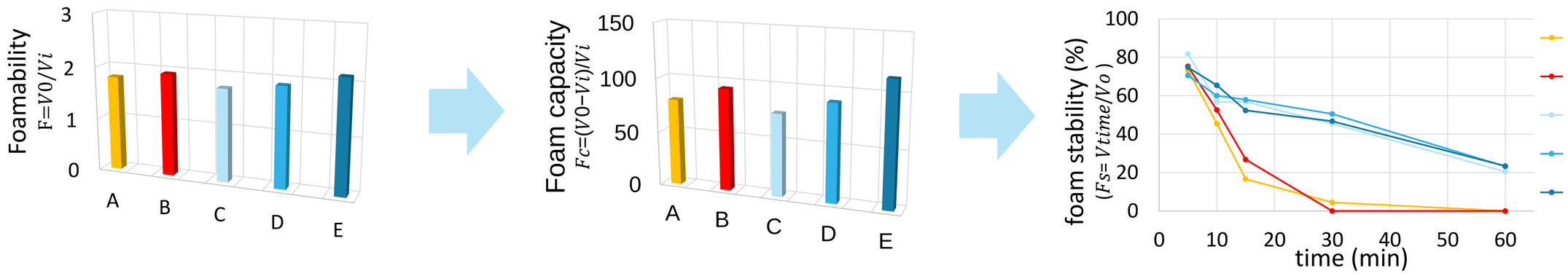


Level 1 – foam scale: liquid fraction, stability, rheology, viscoelastic behavior, yielding behavior, steady-flow behavior
Level 2 – bubble scale: mean bubble size, distribution of bubbles sizes, bubble rearrangement dynamics (1)
Level 3 – lamella scale: thickness, uniformity, permeability, stability (2)
Level 4 – interfacial scale: dynamic and equilibrium conditions of protein absorption, interfacial tension reduction, rheological properties (3)

Recent changing in consumption trends, due to ecological problems, animal welfare, allergies, sanitary and religious restrictions, have led to making a concerted effort to find alternative protein sources that can provide similar functionalities in food systems. The large quantities of by-products generated by the fish-processing industry are a potential source for the production of gelatin.

Research question : Can gelatin by-products be employed as alternative sources of protein ?

We compared the *Foamability* (*F*), the *Foam capacity* (*Fc*) and the *Foam stability* (*Fs*) of 2 commercial fish collagen samples (A and B) and 3 fish skin by-products collagen (C, D and E).



V_0 is the volume of the foam after formation, V_i is the volume of the liquid and V_{time} is the volume of the foam as a function of the time.

Partial conclusions: No significant difference was observed in terms of *F* between the samples. Better *Fc* (+ 25 %) was observed for the sample E. Fish skin by-products collagen present greater *Fs* compared to commercial sample: sample C, D and E present 48 ± 2 % of *Fs* after 30 min whereas A and B present only 4.4 % and 0 %.

Future directions: In order to deeper investigate and better understand these differences, other analytical approaches are planned: dynamic interfacial tension, ellipsometry, film pressure balance as well as small angle X-ray scattering (SAXS).

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