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Publication date:
2019

Document Version
Publisher's PDF, also known as Version of record

Link back to DTU Orbit

Citation (APA):
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.

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).

\[ F = \frac{V_0}{V_i} \]

\[ Fc = \frac{V_0 - V_i}{V_i} \]

\[ Fs = \frac{V_0}{V_i} \]

\[ V_0 \] 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).

Project is funded by Green Development and Demonstration Program (GUDP), Ministry of Environment and Food of Denmark (J.Nr. 34028-17-1290)

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