

DEVELOPING A CFD MODEL FOR STUDYING WHEY PROTEIN DENATURATION-AGGREGATION

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CONCLUSIONS AND FUTURE WORK

 We demonstrate the feasibility of modeling the thermal denaturation-aggregation of whey proteins under continuous flow through numerical simulations. COMSOL Multiphysics was employed, and no reasons forbid the application of other commercial or in-house modeling software.

The development of a CFD model for representing a liquid food product transformation requires reliable information about the
product properties (like its viscosity) as well as about the transformation model itself. Satisfying results were obtained in the
case of the thermal denaturation-aggregation of whey proteins by assuming a reaction kinetics.

The reconstruction of bulk thermal history experienced by the liquid food product along the experimental setup allowed us to
estimate the parameters of a reaction kinetics of order 1.5. Future work may consider an ensemble of test cases under similar
operating conditions, in order to improve the robustness of our approach. Efforts remain to be accomplished regarding the
influence of the temperature on the apparent viscosity associated with the liquid food product.

· Future work has to consider sensitivity tests regarding the influence of key modeling issues, including the mesh resolution.

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